Principles and Public Policy Decisions: The Case of Monetary Policy

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Economics is a discipline that is centrally concerned with the nature and consequences of rational choice. However, the economist's characteristic conception of rational decisionmaking is somewhat different from that of other disciplines that also weigh the rationality of decisions. For a philosopher or a jurist, *rationality* is above all a matter of the way in which a decision is arrived at, or, more precisely, the way in which it can be explained or defended --- it means that *reasons* can be given for the decision. In economics, instead, the rationality of decisions is a relation between their *consequences* and the decisionmaker's goals; a rational decision is one that achieves the decisionmaker's objectives to the greatest extent possible.[2]

The divorce between the economist's conception of rationality and any process of reasoning is illustrated by Milton Friedman's celebrated analogy, in his essay on "The Methodology of Positive Economics" (Friedman, 1953), between the kind of rationality assumed in economic models and the play of a skilled billiards player. There exists a useful theory, based on Newton's laws of motion, that can predict the movements of the billiard balls the cue is struck in a particular way, and that can as a consequence be used to predict how one ought, in principle, to wish to play any given position; but the expert player need not understand this theory, let alone be able to explain his actions in terms of it, in order to be able to play skillfully, and indeed in ways that are successful for reasons that the theory can explain. Similarly, Friedman argued, the hypothesis of individual

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[2] This is what Nozick (1993, p. 64) calls an *instrumental* conception of rationality. Nozick defends an instrumental conception of rationality as a philosophical view of the grounds on which particular procedures for reasoning can be said to be rational: on such a view, a decision is rational because it is arrived at using rational procedures, while those procedures can be justified as rational if they are shown to be effective in achieving the decisionmaker's goals. But he insists that the economist's view ("the standard account of an action's rationality presented by decision theory") is not an acceptable theory of rationality, since "an action might reach goals … without having been arrived at rationally… Decision theory by itself is a theory of best action, not of rational action" (p. 65).

utility maximization can be a useful theory of consumer behavior without consumers themselves understanding the theory, or being able to explain the calculations that an economic theorist would use to derive a description of optimal behavior. The assertion that they choose rationally is simply an assertion that they manage to choose the purchases that do in fact maximize utility subject to the consumer's budget constraint, and not a claim about the mental operations through which this is achieved.

The point of Friedman's argument is that the hypothesis of rational choice can be maintained without having to make any (easily refuted!) strong assertions about the ability of actual consumers to accurately perform the kind of calculations that students encounter in a microeconomic theory class. At times, however, the economics literature even expresses skepticism about the very *desirability* of making decisions on the basis of explicit calculations. Friedrich Hayek (1945) bases a critique of central planning as an alternative to capitalism on the nature of the knowledge upon which private business decisions are based. "So far as scientific knowledge is concerned," he writes, "a body of suitably chosen experts may be in the best position to command all the best knowledge available," but "scientific or technical knowledge" is not the only kind that is relevant. Instead, much value is created by business decisions that "based on special knowledge of circumstances of the fleeting moment not known to others," which, according to Hayek, "is knowledge of the kind which by its nature cannot enter into statistics and therefore cannot be conveyed to any central authority in statistical form" (pp. 521, 522, 524). In this account, the virtue of the capitalist system is that decisions can be made that are rational precisely because they *do not* have to be justified in terms of some formal calculus that could be checked by a bureaucrat.

This attitude of economists differs, for example, from that of many judges or legal scholars, to whom it is natural to be interested in the justifications that can be offered for decisions, and not merely in their consequences. Indeed, many legal scholars would deny that an acceptable *justification* for a decision must be cast in terms of an evaluation of its consequences. For example, Ronald Dworkin's (1977, chap. 4) theory of adjudication distinguishes between arguments of *principle* and arguments of *policy,* and argues that while legislative decisions may properly be based on either type of consideration, "judicial decisions in civil cases, even in hard cases [where no settled rule dictates a

particular decision], characteristically are and should be generated by principle not policy" (p. 84). Dworkin argues that this is true even in a case like the test for negligence propounded by Judge Learned Hand in *U.S. v. Carroll Towing* --- where liability depends on a finding that the defendant could have avoided the accident at a lower cost to himself than the expected loss to the plaintiff --- as such a rule is, in his view, a mechanism for balancing "competing claims of abstract right," and not an invitation to the judge to make his own determination of "costs and benefits to the community at large" (pp. 98-100). This account of the basis for such decisions differs from that of Ronald Coase (1960), and some other proponents of the economic analysis of law, according to whom the common-law doctrine of negligence should be understood as nothing other than an authorization for judges to rule in the manner that (in their judgment) best serves to promote economic efficiency.

I wish to argue in this paper that economists *should* instead be interested in the question of how decisions can be justified, or alternatively, in the question of what it means to make decisions on the basis of principles. In particular, I believe that economists should be interested in structures through which public policy decisions can be justified, and not merely in which decisions on particular occasions will lead to desirable outcomes. My reason for suggesting this is not simply an argument that more things matter in life than are dealt with by economic theory, so that economics cannot aspire to become a universal social science without expanding its scope. Rather, my most important claim is that by overlooking the problem of public justification of policy, economics neglects a potentially important social role for economic reasoning itself --- namely, the use of economic analysis in *explaining policy decisions to the public*. This leads to a conception of the role of economic models and analysis in policy decisions that differs from the conventional one, under which models are intended to allow prediction and control of a system populated by individuals who do not themselves understand the model.

I shall illustrate my theme using as examples problems that arise in the conduct of monetary policy. I first discuss in general terms the advantages of making policy decisions in conformity with principles. I then discuss two particular examples of important issues in the theory of central banking that I believe cannot be adequately

understood if one ignores the role of public explanations of policy decisions. These are the longstanding debate over the advantages of "policy rules" relative to "discretion" in monetary policy, and more recent debates about the appropriate scope and character of "transparency" in central banking.

1. The Functions of Principles

Why should it matter whether decisions can be justified as conforming to some principle? Robert Nozick, in his essay "How to Do Things with Principles" (Nozick, 1993, chap. 1), discusses various possible functions that principled decisionmaking may serve. He distinguishes four categories of possible functions, that he calls intellectual, interpersonal, intrapersonal and personal functions.

By an *intellectual* function, Nozick means that one may follow a principle because one expects more reliably to reach correct conclusions when one is guided by it. Principles of this sort may well be relevant to public policy decisions; there may be useful "rules of thumb" that can help a policymaker to reach good decisions more quickly or reliably. But this kind of case for a principle does not imply that there is anything important about being able to *explain* the decision that is taken in terms of the principle, and so principles of this kind are not really relevant to the present discussion.

By a *personal* function, Nozick means that acting in conformity with a principle can be a way in which a person defines her identity. This is surely relevant to the possibility of public policy decisions being made on the basis of principles; if a central banker is to make policy decisions consistently in conformity with some set of principles, this is likely to be *psychologically* possible only because of the personal meaning to the banker of seeing himself as a person who acts in a principled way. But such an observation tells us nothing about which principles, if any, it is desirable for a central banker to appeal to in monetary policy deliberations. If one knew, on other grounds, that certain principles were desirable, one might wish to select as central bankers people who appear to be committed to these principles for personal reasons --- hence Rogoff's (1985) argument for the appointment of "conservative" central bankers --- but the mere existence

of potential appointees with personal commitments of particular kinds does not tell us which kind would make good central bankers.

The other two classes of functions are instead more relevant to the present discussion. By an *interpersonal* function of a principle, Nozick means that a commitment to act in accordance with a principle can allow others to *rely* upon our behaving in a certain way, which can be of importance to them in making decisions of their own, the rewards to which will depend on our future behavior. By an *intrapersonal* function, he means that a person himself may have an interest in preventing himself from giving in to temptation, though he may expect that he would do so in the absence of commitment to a principle of conduct; this could result from *time inconsistency* of the preferences that are used to judge now that one wishes not to give in later, but that later would lead one to wish to give in.

These last two functions are in fact closely related, since in both cases the crucial consideration is avoiding time-inconsistent choices. In the case of the interpersonal functions of principles, one's interest in allowing others to rely upon one's behavior requires the support of commitment to a principle *only* because that interest would not necessarily determine one's behavior at the later date, if one allowed oneself to simply pursue whatever appeared to be in one's interest at the time. One may be interested at an earlier date in having others expect certain behavior on our part, precisely because this will induce them to undertake actions that benefit us; yet once they have taken the desired actions, we no longer have the same interest in acting in the way that we wished them to expect, if we simply pursue self-interest as it appears at the time. This results in inconsistency between what we would like to arrange to have happen at the earlier date and what we can be expected to choose at the later date, unless we are motivated at the later date to act in accordance with a principle such as the importance of keeping promises.

Considerations of this kind are pervasive when thinking about the proper bases for public policy decisions, insofar as people must make decisions in reliance upon expectations about future policy, and there is a public interest in how those private decisions are made. Monetary policy provides many illustrations. For example, expectations about the future rate of inflation ought to depend crucially upon expectations

about the future conduct of monetary policy. Those expectations are in turn important determinants of private decisions that crucially affect a central bank's ability to achieve its stabilization objectives. If people expect high inflation, or at least are not certain that inflation will not be high, they will demand large wage increases in money terms, so that the purchasing power of their wages will not be too severely eroded by the increased cost of living. But once they do so, the high level of money wages relative to the past general level of prices will result in the central bank's facing a more uncomfortable tradeoff between accepting higher inflation on the one hand or lower employment and output on the other --- for keeping inflation low will mean confronting firms with real wages that are too high for high employment to be profitable, or alternatively, the increased labor costs will give firms an incentive to raise prices rapidly unless aggregate expenditure is restrained to an extent that prevents firms from fully utilizing their productive capacity.

Thus a central bank has an interest in maintaining confidence that inflation will be low in the future, so that wage demands in terms of money will be moderate; yet once the wages have been negotiated, there is no corresponding motive to deliver the rate of inflation that one wished people to expect. At this point, the central bank faces a short-run "Phillips curve" trade-off between higher employment but higher inflation and lower inflation but lower employment as well, and --- given its stabilization goals with regard to current inflation and employment, but neglecting any effect of its policy on the wages that have already been negotiated --- it can easily have an incentive to choose a more inflationary policy than it would have wished for people to anticipate when making their wage demands. This is the celebrated argument of Kydland and Prescott (1977) for the advantages of *commitment* to a less inflationary policy than would be chosen as a result of sequential optimization.[3]

[3] Nozick (1993, p. 184, fn. 12) cites the argument of Kydland and Prescott as an example of the interpersonal functions of commitment. His discussion supposes that the time inconsistency relates to the choices over time of a government, which can bind itself not to manage the currency in a way that serves its short-run interests by delegating monetary policy decisions to an independent agency (the central bank). But a similar problem arises for the conduct of policy by such an agency (as assumed in the text here), if the agency takes its task as being to make decisions in the public interest at each point in time, with no advance commitments regarding future policy. What is important is not *who* makes the decisions about policy, but what *principles* determine the decisions that are to be made under any given circumstance. In practice, central bank independence is important, but the reason it is important is that delegation of responsibility for policy decisions to a highly professional agency facilitates principled decisionmaking.

There is accordingly a clear case for concern not simply with the *consequences* of policy decisions, but also with how policy is *understood* – in particular, with the credibility of the central bank's commitment to maintaining low inflation. Such credibility is valuable not only because it reduces the output cost of actually maintaining low inflation, but because it facilitates successful *stabilization* as well. The issue is sometimes presented as one of having to forego stabilization of the real economy for the sake of maintaining the credibility of one's commitment to inflation control; this notion derives from the observation that it is awareness of a short-run relation between inflation and employment that creates the temptation to deviate from a commitment to low inflation in the Kydland-Prescott analysis. But in fact monetary policy can more effectively be used for short-run stabilization of the real economy when expectations regarding future inflation remain well-anchored.

Suppose that some real disturbance --- such as an increase in energy costs, or an increase in the bargaining power of labor --- temporarily increases the cost of supplying a given level of output, for given inflation expectations. This shifts the short-run Phillips-curve tradeoff in such a way as to require either lower employment, higher inflation, or both. In such a situation, greater stabilization of the real economy can be achieved if inflation is allowed to temporarily increase in response to such a shock. But if when the public sees inflation increase, they expect *higher future inflation* as well, the effect of the increased inflation expectations on wage demands will shift the Phillips-curve tradeoff even further in the same direction, making achievement of the central bank's stabilization goals even more difficult. As a consequence, it will not be possible to use the Phillips-curve tradeoff in any effective way to stabilize real activity and employment in response to such disturbances. If, instead, the public remains confident that in future the inflation rate will remain, on average, what it would have been expected to be prior to the disturbance, this confidence results in the Phillips curve shifting to a lesser extent in response to the cost shock, so that short-run stabilization can be more effectively achieved.[4]

[4] Orphanides and Williams (2005) provide a quantitative analysis of the way in which the trade-off between inflation stability and output stability available to a central bank becomes less favorable when people are assumed to have to estimate the central bank's inflation target by extrapolating from the recent behavior of inflation, rather than knowing the true statistical law describing inflation fluctuations under the bank's

Note that taking advantage of the Phillips-curve tradeoff to mitigate the effect of the disturbance on employment need *not* disconfirm the public's expectation that monetary policy will be used to ensure a low inflation rate on average. As long as the policy is pursued symmetrically --- so that in the same way, the central bank temporarily *reduces* the inflation rate in response to a temporary *reduction* in costs --- then an expectation of this kind of behavior is perfectly consistent with stable medium-run expectations regarding the rate of inflation. What is important is that the Phillips-curve trade-off be exploited in a principled way, rather than opportunistically --- that an increase in inflation relative to the fixed medium-run objective be allowed only when production costs are temporarily higher than average, and not simply any time that a higher level of employment is judged to be desirable --- and that this be understood, and hence relied upon, by the public.

This discussion illustrates two potential benefits of making monetary policy decisions on the basis of principles, and not simply on the basis of policymakers' current judgment about the action that will best serve their immediate stabilization objectives. First, *it matters what the public understands* about the systematic character of policy, and hence what they can predict about future policy. A given choice by the central bank --- for example, allowing inflation to increase moderately in response to the increase in costs --- can have worse consequences if not correctly understood. This in turn means that there are benefits from conducting policy in accordance with principles that can be articulated and that can be verified to explain one's behavior. If conformity to a principle that can be made explicit and the application of which can be verified requires a policymaker to respond to current circumstances in a less finely calibrated way than would be possible in the absence of a need to justify each decision to others, some reduction in flexibility of this kind may well be justified by the increased transparency of one's decisions and the corresponding increase in the degree to which they can be relied upon in advance.

Second, even if we suppose that the public can be relied upon to correctly understand and anticipate the central bank's behavior, no matter how it approaches its

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systematic policy. A conclusion that they draw from this is that *public announcement* of the target is valuable, even to a central bank that is already privately committed to a systematic rule of conduct that guarantees that rate of inflation on average.

task and regardless of anything it says in explanation of its decisions, a central bank can generally benefit from commitment to a principled approach to its policy decisions, by preventing itself from taking decisions that appear to serve its stabilization objectives *ex post* but that it would prefer that people *not* expect it to take. In the case of the temporary increase in costs, the central bank's joint stabilization objectives --- taking account of its desire both to stabilize inflation and to stabilize employment --- would best be served if people were to understand that the excess price increases that are allowed during the time that supply costs are temporarily high will subsequently be *taken back,* by pursuing a less-inflationary policy for a time than even would be required to simply return to the medium-run target inflation rate. If a systematic pattern of this kind came to be understood by the public, a temporary increase in costs would result in *reduced* near-term expectations of inflation, even though inflation was currently increasing, and this would allow even greater stabilization of the economy than is possible if one simply ensures that expectations regarding future inflation never change. But of course, once the cost disturbance has dissipated, the central bank has no continuing incentive --- as far as the pursuit of its current stabilization objectives is concerned --- to bring about such a disinflation, which would require it both to prolong the contraction of employment longer than is required by cost conditions *and* to delay the stabilization of inflation around its medium-run target value as well.[5] A central bank will only do so --- and so can only expect to reap the benefits of being expected to do so --- if it commits itself to determine policy in accordance with principles that do not reduce simply to the pursuit of its current stabilization objectives to the extent possible at each point in time.

2. Principles for the Conduct of Monetary Policy

It should be evident that there can, at least potentially, be benefits from a commitment to make policy decisions on the basis of principles other than simply choosing whatever current action is judged to best serve the bank's stabilization objectives under current circumstances. But *what* principles should those be? At the most

[5] For an analysis of the optimal policy commitment in a situation of this kind, in the context of a conventional "new Keynesian" specification of the short-run Phillips-curve tradeoff, see for example Clarida *et al.* (1999) or Woodford (2003, chap. 7).

general level, I have proposed that a central bank should seek to make decisions that would be chosen "from a timeless perspective" (Woodford, 1999). By this I mean the decisions that the central bank *would have wished to commit itself to make* at a time far enough in the past for all possible consequences of the public's anticipation of the bank's systematic pattern of conduct to be taken into account, even though, at the time that the decisions must actually be made, the public has already anticipated whatever it has anticipated, and these past expectations can no longer be affected by the current decision --- they can only be fulfilled or disappointed.

From this point of view, a central bank should commit itself to pursue a low rate of inflation on average, even if at each point in time it finds (given the Phillips-curve trade-off that it faces at that time) that it could better serve its current stabilization goals by allowing a higher rate of inflation; the reason is that at an earlier date, taking into account the effects of the anticipated rate of inflation at the date in question upon wage demands at earlier dates, it ought to have wished to commit to the lower rate of inflation. At the same time, the use of monetary policy to stabilize the real economy to some extent in the face of random disturbances need not be abjured; for even were one to commit oneself far in advance to a contingent course of conduct, taking into account the effects of anticipation of that conduct upon wage setting at earlier dates, one would wish to plan to allow higher inflation at times of higher than average real cost of production, given that a symmetrical policy of this kind would lead to no anticipation of a higher rate of inflation on average, and hence no higher wage demands. Finally, a truly sophisticated central bank should commit to subsequently reverse temporary increases or decreases in the price level in responses to such variations in costs, since from the perspective of a date far enough in the past it would have wished to be expected to do so.

This is not the place for a thorough discussion of the implications of the criterion of optimality from a timeless perspective.[6] Here I shall restrict myself to the remark that the proposal is somewhat in the spirit of John Rawls' (1971) interpretation of social contract theory, according to which citizens should accept as binding upon them principles of justice to which they have not *actually* voluntarily submitted themselves, on the ground that these principles are ones that they *should have* been willing to choose in a

[6] See, for example, McCallum (2000) and Woodford (2003, chaps. 7, 8) for further discussion.

hypothetical "original position," from which --- not yet knowing anything about the actual situation that they will occupy in society --- they would not make choices that seek to take advantage of the particular circumstances of the individual that they actually become. The doctrine of the timeless perspective similarly argues that a central bank should accept to be bound by principles for making monetary policy decisions that it would have wished to be bound by, if considering the matter before reaching the situation that it is actually in at the time that the action must be taken, though considering the *possibility* of reaching that situation among others.

While the timeless perspective should be used, in my view, to choose the principles that will be used to determine policy decisions, it is not *itself* the principle that should be used in those deliberations. A commitment to make policy decisions that are optimal from a timeless perspective would not serve as well, either to stabilize expectations regarding future policy decisions or to prevent decisionmakers from being tempted to make myopic decisions, as a commitment to a rule with more specific content. Similarly, in Rawls' theory of justice, the "original position" is not itself the principle that determines the justice of particular social arrangements, but only the criterion on the basis of which the "principles of justice" are themselves to be justified.

The derivation of principles of sound monetary policy from the timeless perspective requires more specific assumptions about the setting in which monetary policy is to be conducted than does the argument for the desirability of the timeless perspective itself. I shall not here seek to defend particular assumptions of that sort, nor summarize all of the conclusions that the literature that proceeds in this way has obtained. But one can nonetheless review some general conclusions from that literature that illustrate how it is possible to overcome the problems with purely outcome-focused decisionmaking sketched above.

First, a fairly robust conclusion from analyses of optimal policy from a timeless perspective in the context of a variety of models is that an optimal policy would result in relatively transitory fluctuations in the inflation rate around a constant rate. While both the degree to which inflation should be allowed to vary in response to particular economic disturbances and the rate at which inflation should be expected to return to its constant long-run level under an ideal policy depend on more specific assumptions, one

can state much broadly that it is not desirable for there to be permanent shifts or very persistent fluctuations in the inflation rate.[7] This is true, for example, even in the case of a permanent change in the degree of distortions in the economy of a kind that changes the degree to which the level of economy activity consistent with stable prices falls short of the efficient level (given preferences and technological possibilities).[8] It is also a proposition the validity of which is relatively independent of which particular price index one proposes to use to measure inflation; for while different indices behave differently over periods of a few quarters, and should be expected to for reasons that are well-understood, the rate of inflation as measured by different indices is much more similar at lower frequencies, so that most economic disturbances should not be expected to have different *permanent* effects on different measures of inflation.

Since it is not only true that the best equilibrium involves fairly rapid mean-reversion in the inflation rate, but that achievement of the benefits associated with that equilibrium depends on correct anticipation of that mean-reversion by the public, for reasons sketched above, such analyses provide a strong case for the desirability of a public *commitment* of the central bank to restore inflation to a particular target level fairly promptly following disturbances. This is a concrete example of a principle to which a central bank might reasonably commit itself to adhere in making individual decisions about monetary policy (for example, about its operating target for some very short-run interest rate such as the federal funds rate).[9]

It is important to note that the case for an inflation target is not based on trying to generalize about the nature of the solution to the kind of optimization problem that is faced by a central bank that seeks to choose the action that best serves its stabilization goals at each point in time. If the argument were of this form --- if one were simply proposing a guideline based on a summary of the results of optimization problems of this kind in a variety of hypothetical cases --- then central bankers might reasonably feel that it would nonetheless be better not to *announce* the guideline as an explicit target in their

[7] See, for example, Giannoni and Woodford (2005) for discussion of this issue in the context of a variety of assumptions about adjustment mechanisms for wages, prices and aggregate expenditure that are often made in empirical models of the transmission mechanism for monetary policy.
[8] See, for example, Benigno and Woodford (2005) for analysis of this issue in the context of a "new Keynesian" model of price adjustment.
[9] For further general discussion of the desirability of an explicit inflation target, see, e.g., Bernanke and Mishkin (1997), Goodfriend (2005), and King (2005).

deliberations, preferring to weigh the complexities of each actual case that they face when it arises. Critics of inflation targets often assume that the argument *is* of this kind, and so object that unless one is sure *exactly which* inflation target would be optimal, despite the uncertainty that exists in practice about precise details of the way in which monetary policy affects the economy, it can make no sense for the central bank to tie its hands in advance by committing to a specific target. Exactly *which* rate of inflation should be the target rate, and exactly *which* measure of inflation should be targeted, they ask --- presuming that if there is ambiguity about which answer to these questions is clearly superior to the alternatives it cannot be important, and likely is not even desirable, to have an inflation target at all.

But this way of thinking assumes that the *reasons* given for policy decisions are of no import, apart from their reliability in leading policymakers to the decision that should achieve the best outcome. Given the advantages of stable inflation expectations --- and especially, the dangers associated with drift in expectations of inflation, if the public is left to try to determine the likely future average rate by extrapolating from the past, and is prey to rumors about the central bank's intentions of the kind that easily spread among investors when the central bank itself remains cryptic --- there is good reason for a central bank to be willing to commit to *some* specific target, even when it has no firm grounds for believing that a target of 1.5 percent per year would result in a better outcome than a target of 2.5 percent, or for believing that targeting the personal consumption expenditure deflator would be superior to targeting the consumer price index. For it is likely that pursuit of *any* of these targets will be superior to the outcome that should be expected to result from case-by-case optimization, given the systematic tendency of decisions made on that basis to fail to internalize the effects of anticipation of the average rate of inflation brought about the central bank's pattern of behavior; and it is likely that explicit commitment to a target can increase the accuracy of the public's estimate of that average and the confidence with which they base their behavior upon it.

While this principle --- now widely adopted by central banks around the world, though still controversial in the U.S. --- is itself a very useful one, it does not suffice in practice to allow monetary policy decisions to be made on this basis alone. After all, the question on the table in monetary policy deliberations is always what to do with some

instrument (such as the federal funds rate) over the next month or so, understanding that the committee will meet again in a few weeks to decide on the appropriate policy at that time; and a mere consideration of the desired rate of inflation some years in the future will not suffice to determine whether it is important to raise or lower interest rates immediately rather than waiting a few more months. It is therefore desirable to formulate additional principles that can discriminate among possible transition paths that all converge to the medium-run inflation target.

As an example, I have observed above that in the case of a disturbance to production costs, the best outcome is likely to be achieved if people not only expect the increase in inflation associated with a temporary increase in costs to be *temporary*, but if they furthermore expect the increase in the price level to eventually be *reversed*, so that an appropriately defined price index eventually returns to the same trend growth path as it would have been on if the disturbance had never occurred. Such mean-reversion of the price *level*, and not just its rate of growth, is a feature of optimal policy from a timeless perspective under a variety of assumptions, though the assumptions required for this result are somewhat more restrictive than the ones required for the previous generalization about the asymptotic behavior of the expected rate of inflation.

In particular, in the formulation of this principle, it matters greatly *which* price index should be stabilized around a trend path, since there are frequently real disturbances that can (and should) permanently shift the relative prices of different goods. The answer to this question depends on details of the nature of wage and price adjustment in a given economy --- and the optimal index may involve wages in addition to goods prices, as discussed by Giannoni and Woodford, 2005. Nonetheless, under a range of assumptions there exists *some* index which it is optimal to stabilize in this way. And an explicit commitment to a particular index can have important advantages, both in allowing the public to understand that an unusually rapid increase in *one* measure of inflation may not represent any departure from its commitment to stabilize the path of a different index, which will imply medium-term stability of other measures of inflation as well, and allowing it to anticipate future disinflation on those occasions when a temporary increase in the rate of growth of prices in general may be justified by a broad-based disturbance to costs of production.

This proposed principle is less intuitive than the previous one, and is not explicitly followed by any central banks at present.[10] It would require a more obvious break with the logic of outcome-based policymaking, since no one would argue that the absolute level of *any* price index is of intrinsic significance for the allocation of resources in the economy --- only *relative* prices matter for the incentives that households and firms have to correctly use real resources. But just as the arbitrariness of the definitions of units of measurement such as the yard or the pound do not make it irrelevant that there *be* stable meanings to these measures that people can rely upon (in doing business, among other purposes), the fact that it is of no economic significance whether the U.S. dollar should be worth as much as one euro or as little as one yen does not mean that there could not be significant benefits to stabilizing its value in absolute terms, by committing to a target path (or even a fixed value) for the price of a particular basket of goods in terms of dollars.

It is often objected that such a proposal would actually interfere with the goal that the first principle is intended to serve, namely, the reduction of distortions resulting from variable inflation. If, following a departure of the inflation rate from its medium-run target, one is committed to undoing the excess (or insufficient) increase in the price level, this requires that one *predictably* depart from the medium-run inflation target longer than one would have to, offsetting one (possibly unexpected) departure from the inflation target with another (predictable) one. But the supposition that such a commitment must be undesirable is again based on the logic of outcome-based decisionmaking: it considers the effects of current policy on the distortions directly resulting from inflation that is either too high or too low, but neglects the beneficial consequences of the *anticipation* of the reversal of price changes on earlier decisions.

A more precise determination of the appropriate policy decision at each point in time requires the invocation of yet more specific principles. In particular, it is necessary that there be principles that explain how one should judge whether a particular economic

[10] Price-level targeting was implemented by Sweden in the 1930s, in the first historical example of a targeting regime for monetary policy as an alternative to convertibility of the currency in terms of a precious metal (Jonung, 1979). Moreover, Gorodnichenko and Shapiro (2007) argue that Fed policy under Alan Greenspan was in some ways similar to what a price-level target would require, even if there was no public avowal of such a principle. The desirability of a price-level target is a topic of discussion at some central banks with official inflation targets; see, e.g., Cote (2007).

disturbance justifies a temporary departure of the inflation rate from its long run target level (or of the price level from its target path), and what size of departure is justified. Such principles must explain what kind of temporary departure of one or more *other* variables from their long-run values should be considered to warrant a proportionate temporary departure of the price level from its long-run target path.

For example, in the case discussed above, a principle that would capture the character of optimal policy from a timeless perspective would assert that the departure of the price level from its target path should be opposite in sign and proportional to the departure of real GDP from the "natural rate" of output (or, more or less equivalently, proportional to the difference between the unemployment rate and the natural rate of unemployment).[11] In the event of disturbances that do not shift the Phillips curve tradeoff between inflation and the "output gap" (or unemployment gap), the principle would require that monetary policy be used to prevent *either* inflation or the output gap from being affected by the disturbance, though this might well require a change in the level of interest rates. In the event of a cost disturbance that *does* shift the tradeoff, policy should aim to ensure that the effects on the general level of prices and on the output gap are of opposite sign and in the appropriate proportion to one another, *and* that along the transition path by which both variables eventually return to the paths predicted for them prior to the disturbance, they *remain* in such a relation of proportionality. The latter requirement implies that the price level be anticipated to eventually return to its target path, since even if it did not, one would not expect a permanent gap between actual output and the natural rate of output; and it also uniquely determines both the size of the initial effect of the disturbance on prices and the rate at which the price level should be brought back to its target path.

Such a principle prescribes a particular way of balancing two important goals of monetary stabilization policy, corresponding to the dual objectives of "price stability" and "maximum employment" specified in the Federal Reserve Act. Nonetheless, it is not equivalent to simply instructing a central bank to make each of its decisions in the way that best serves those two goals, or some specified objective function incorporating an

[11] Hall (1984) calls this "an elastic price standard." On the optimality of this principle, not merely in the canonical "New Keynesian" model considered by Clarida *et al.* (1999), but also under a variety of alternative assumptions about the dynamics of price adjustment, see Woodford (2007).

explicit weighting of the two. At least if the objective of "price stability" is interpreted --- as it generally is in the scholarly literature on monetary policy, and as it appears to be in the thinking of Federal Reserve officials --- as meaning control of the rate of inflation but not any concern with the absolute price level, then outcome-based decisionmaking focusing on an objective each period that is some function of the inflation rate and the output gap (or unemployment gap) will not lead to any tendency to restore the price level to the path that would have been expected for it prior to a disturbance, as the principle described in the previous paragraph would do.

I shall not go further here into more technical aspects of suitable principles for the conduct of monetary policy. Instead, I wish to discuss two more general issues in the theory of central banking. These are the appropriateness of rules as opposed to discretion in the conduct of monetary policy, and the appropriate scope of transparency in central banking. In each case, I believe that the practical relevance of much theoretical discussion of the issue has been limited by a failure to recognize the value of explanations of the bases for policy decisions.

3. Rules versus Discretion in Monetary Policy

A crucial debate in monetary economics over the past several decades has been between proponents of "rules" to govern the conduct of monetary policy and proponents of policymaker "discretion." Probably the best-known example of a proposed policy rule was Milton Friedman's (1960) advocacy of a rule according to which the Federal Reserve should be required to ensure a constant rate of growth of measure of the money supply. In Friedman's view, commitment to such a rule would prevent variations in money growth from becoming a source of economic instability, and ensure a consistent low rate of inflation, at least with regard to the average rate of inflation over sufficiently long periods of time. While a more complex way of adjusting monetary policy might allow superior stabilization of the economy (with regard either to prices or real activity) in principle, attempts at such "fine tuning" were unlikely to succeed in practice, and a disciplined refusal even to attempt a more "activist" policy would allow policymakers to avoid being tempted into errors that would actually create greater instability.

Critics of this and other proposed policy rules, including many central bankers, have instead stressed the value of allowing central banks to respond in a flexible way to constantly changing circumstances. While monetary policy decisions must admittedly be made under circumstances of imperfect information, central bankers do have a great deal of information about current economic circumstances, and it is indefensible that they should refuse to act to ameliorate short-run instability when they *are* aware of developing circumstances that monetary policy could at least partially correct. Moreover, while one might in principle imagine writing down a rule for policy that describe the optimal way of adjusting policy in response to whatever circumstances might arise --- an "optimal control" rule of the kind that can be derived for engineering problems --- in practice, no rule that could be written down will be an adequate substitute for the judgment of an experienced policymaker. The types of circumstances that will arise are too various to be anticipated and analyzed in advance; the available sources of information relevant to a sound policy decision will be different on different occasions. Hence it is important to make a careful choice of the people to be entrusted with the task of making policy decisions, and then grant them complete discretion to conduct policy in the way that seems best suited to whatever circumstances may arise. As an example of the possibility of wise use of such discretion, some have argued that the relative stability of the U.S. economy during Alan Greenspan's chairmanship of the Federal Reserve could be attributed to Greenspan's distrust of academic fashionable rules for policy, and a policy that instead "has been characterized by the exercise of pure, period-by-period discretion, with minimal strategic constraints of any kind, maximal tactical flexibility at all times, and not much in the way of explanation" (Blinder and Reis, 2005, p. 14).

These two sharply antithetical positions are often taken to define the only two possible positions on the issue. In fact, however, common statements of *both* positions assume an unduly limited view of the possible bases for a policy decision. Critics of rules typically assume that a rule would specify policy decisions as a precise function of specific (unambiguous) measurements, so that, in Bennett McCallum's phrase, it should be possible to "turn policy decisions over to a clerk armed with a simple formula and a hand calculator" (McCallum, 2000, p. 274). This is not what all proponents of policy

rules have in mind, as McCallum stresses.[12] But it is true that proponents of rules such as Friedman warn darkly of the likelihood of misuse by central bankers of any freedom to exercise discretionary judgment, and argue for the desirability of a rule that provides sufficiently unambiguous instructions as to allow it to be possible for outside observers to verify compliance with it. The assumption often seems to be that any opportunity to make a bad decision that is left open will surely be exploited. Because of the stress given to the importance of eliminating judgment from decisionmaking, proponents of rules are often willing to admit that it is necessary to give up altogether on some superficially desirable goals, such as the use of policy to mitigate the destabilizing effects of disturbances from other sources.

Both sides of this debate tacitly agree that what policymakers *say* about the reasons for their decisions are of little import. For the proponents of unfettered discretion, it is only the *consequences* of policy decisions that matter, and so it would be a mistake to allow any requirement that decisions be justifiable in a particular way to get in the way of choosing the best available outcome under any given circumstances. In essence, central bankers are expected to be like Friedman's expert billiards player, and able to solve optimization problems with considerable accuracy, even if they are not able to expound a theory of what they do. For the advocates of strict rules, as well, the only thing that matters is what central bankers do, and not any account they may give of how they arrived at their decision. One can expect them to successfully pursue misguided objectives if open-ended institutional constraints allow them an opportunity to do so; hence the need for a rule that precisely specifies their actions, allowing external verification of compliance through observation of their *actions* alone.

But if one recognizes that the principles that *determine* policy decisions themselves matter, and not just the actions that are taken, one no longer faces such a stark choice between the two irreconcilable positions. The proponents of discretion do not, of course, argue for the desirability of purely whimsical policy; for example, Blinder and Reis (2005) describe Greenspan as "following a sound set of principles" that they try to

[12] Yet this conception of policy rules is hardly a straw man. As a recent example, Gary Becker (2007) argues that "the Fed should establish a rule easily calculated from publicly available information about how the federal funds rate is determined. With such a rule, investors and businesses would be able to forecast perfectly what the Fed will do next week because market participants would know all the information that determine[s] the Fed's behavior."

elucidate in their paper (p. 16). They do take pains to insist that Greenspan's principles of decision-making cannot be represented within what they call "the optimization paradigm" (pp. 18-24). They associate the latter view of decision-making with a calculation in advance of the best achievable outcome under any of the possible situations that may later be encountered, so that the precise action to be taken at any time can be specified in advance as a function of the observed state of the economy. Yet a commitment to make decisions on the basis of certain *principles*, that can be described in advance at a sufficient level of generality, is meaningful even when one cannot anticipate (and enumerate) in advance all of the possible situations in which one may need to apply the principles, and work out in advance exactly the decision that the principles will require.

Moreover, given the public's need to be able to understand and rely upon particular patterns of behavior, discussed above, there are advantages to making the nature of such principles *public* --- to granting them official status, and not leaving them merely as a topic of speculation on the part of outside commentators. The advantages to a policy committee of being able to commit itself to make decisions that differ systematically from those that would achieve the most desirable outcome *ex post* on each individual occasion, also already discussed, militate in the same direction: an explicit formulation of principles of decision-making, and public discussion of them, can serve the institution's goals.

It is true that such advance discussion of the principles that guide policy decisions has an inevitable cost of some reduction of the institution's flexibility of response to unforeseen situations; but because there are also advantages associated with more predictable policy and with the possibility of commitment, the optimal degree of advance clarification of the principles of policymaking is unlikely to be zero. And once one grants that explanations of decisions matter, one no longer faces a simple choice between a full advance specification of the decision that must be taken as a function of unambiguously observable conditions and no advance commitments whatsoever. As Richard Posner (2007) remarks in response to Gary Becker's (2007) call for precise rules for monetary policy (among other public policies), there are a variety of ways in which the character of administrative decisions may be specified in advance to a greater or lesser extent. Posner

distinguishes among “rules,” “standards”, “guidelines,” and “discretion” as bases for decisions.

Of particular relevance here is Posner’s discussion of standards. “A fixed speed limit is a rule; negligence is a standard,” he writes. “It would be impossible to anticipate every possible cause of an accident (driving above 60 m.p.h. at night, in snow, in heavy traffic, on a divided highway, or in an SUV, etc.) and make a rule that would declare each cause to be either culpable or excusable. The negligence standard enables a court to determine liability as cases arise, on the basis of a weighing of the costs and benefits of measures that would have avoided the particular accident.”

At the same time, this does not mean that a judge is free to make any determination she may wish in such a case; there is a clear standard that must be used as the basis for reasoning about the case, even if the particular considerations that will be taken into account may be somewhat different in each accident. Moreover, the relevant standard is *not* simply the (crudely) utilitarian principle of weighing all of the harms and benefits that can be achieved by *the judge’s decision in the case.* The negligence standard requires the judge to consider what actions should have been taken in the particular instance, given what should have been foreseeable about their consequences, even if it was not; essentially, the costs and benefits to be weighed are the ones that the judge believes should have resulted from a particular judgment regarding liability *having been foreseeable,* rather than the ones that the judge herself predicts as consequences of the assignment of liability that have yet to occur.

The crucial point here is that while the negligence standard is a *principle* rather than a strict *rule* --- there is no directory in which one can look up all of the possible circumstances that may apply in a given accident and read from a table which party should be liable --- this does not mean that a commitment to decide cases in accordance with the standard does not increase the predictability of the assignment of liability in individual cases. Indeed, the attempt to shape parties’ predictions of the circumstances under which they will be held liable, in a way that should adjust behavior so as to lower the costs of both accidents and accident prevention, is the whole point of the standard; it is reasonable only to the extent that its application to particular cases can be predicted to

some extent. But the impossibility of completely eliminating ambiguity from the application of the standard does not make the enunciation of such a standard pointless.

In particular, a statement of the negligence standard is useful, despite the fact that one cannot list in advance all of its applications, because it is possible to verify *on the occasion of a particular decision* that it is used to structure the deliberations about liability in that case. One might say that what citizens have a right to, under the common law of negligence, is not a particular decision that can be looked up in advance, but a procedure under which a particular standard of negligence will be used to assign liability. While the outcome of such a procedure is not fully predictable, it does allow people greater certainty about the consequences of their decisions, and hence a greater ability to plan their affairs, than would exist in the absence of such a standard; and it allows them to anticipate *different* consequences, on average, than they would anticipate in the absence of a law of negligence, of a sort that shapes their behavior in socially desirable ways, even if the anticipation of these consequences cannot be perfectly precise.

The possibility of requiring an explanation of the grounds for a policy decision after it has been made means that it is not true that a central bank's commitment to particular principles of decisionmaking has no content that is verifiable to outside observers unless the decision is made in accordance with a formula that could be stated precisely enough in advance for policy to be implemented by "a clerk with a calculator." This in turn means that it is possible for policy to be principled --- in the sense that it can be relied upon to have a systematic character other than the one implied by case-by-case choice of the outcome that best serves the bank's stabilization objectives --- without it having to be as unresponsive to the complexities of the situation at hand as the proponents of central-bank discretion often suppose.

In fact, avoidance of the kind of policy trap displayed in the analysis of Kydland and Prescott depends not so much on *excluding* particular considerations from a role in the policy decision that a discretionary policymaker might be tempted to take into account --- it is not, for example, necessary that one ignore the effects of monetary policy decisions on the output gap or the rate of unemployment --- as on *including* considerations that an act-utilitarian policymaker would neglect as irrelevant, namely, the predictable consequences of one's approach to the policy decision for variables that

people have had to forecast when making decisions that have already been taken by the time that the policy decision is made. Bringing these additional considerations into play in an effective way requires that the grounds for the policy decision be considered more explicitly than would be necessary if one were simply seeking to choose the most preferable among the outcomes that can be achieved as a consequence of the current decision. But there is no essential requirement that any of the considerations that would be considered important by the discretionary policymaker --- assuming, as in the analysis of Kydland and Prescott, that the discretionary policymaker does seek in good faith to maximize social welfare --- be excluded from consideration when monetary policy decisions are made in a way that is intended to implement the choices that would be made from a timeless perspective.

Another common criticism of proposals to base monetary policy decisions on a rule questions their democratic legitimacy; it is suggested that insistence that policy should conform to a rule allows the objectives and opinions of a technocratic elite priority over the desires and opinions of the general public, as expressed through their political representatives. For example, Stephen Marglin (2008, pp. 169-172) treats proposals for policy rules, such as Milton Friedman's or the more recent proposal of John Taylor (1993), as part of "the project of making central banks … independent of political control and accountability," a project that he finds anomalous "in the country that prides itself on being the world's leading democracy." In Marglin's view, the claim that an explicit rule for policy is possible is based on the pretence that "economic agents [can be] understood in terms of a rigorous, axiomatic system, and therefore that the conclusions of economics are entitled to the deference due science." He argues instead that "monetary policy, like other kinds of policy, is necessarily political in the sense of being a central function of modern governance …. There are winners and losers from any monetary policy, and it remains the art of good policy to balance these gains and losses." Hence "whoever makes these decisions ought to be accountable through the political process."

For Marglin, it seems, a commitment to conduct policy in accordance with an explicit rule represents a refusal to be held accountable for one's decisions. But if a principled policy is understood to mean above all a commitment to *justify* policy decisions within a clearly established intellectual framework, then it should be considered

a commitment to *greater* accountability --- certainly to greater accountability than exists if central bankers arrogate to themselves the right to determine the action that is best for the economy at each point in time, without any need to explain their judgments.

As to the suggestion that greater democratic legitimacy could be achieved by making *individual policy decisions* "accountable through the political process," this would be the same kind of mistake as if property rights or rights under contracts were to be abolished on the ground that the uses of property should instead be determined on each occasion by majority vote or some other "democratic" process. People's needs to be able to rely upon stable expectations regarding their claims to property or to the enforcement of contracts justify settling questions of this kind in individual cases by recourse to settled principles of private law, though the law itself can reasonably be determined through the political process; the fact that "there are winners and losers" in each case does not prevent people from accepting, through the political process, the desirability of having cases settled in this way. Similarly, people's needs to be able to rely upon stable expectations regarding macroeconomic conditions when planning their business affairs justify making individual monetary policy decisions on the basis of stable principles, though it is appropriate for these principles themselves to be subject to political debate.

4. Forecast Targeting as a Decision Framework

I have argued above that a principled approach to monetary policy can have verifiable content, without requiring conformity to a mechanical formula, if there is a commitment to *explanation* of the grounds for policy decisions when they are made. The *forecast targeting* procedures currently used by a number of central banks --- leading examples would include the Bank of England, the Reserve Bank of New Zealand, the Swedish Riksbank, and the Norges Bank [central bank of Norway] --- provide a useful illustration of how this is possible in practice.

These banks are well-known examples of banks with official inflation targets --- a constant numerical target for a particular measure of inflation which the central bank is expected to seek to achieve --- and the method of forecast targeting was developed at

these banks in the early 1990s as a way of giving specific operational content to their commitments to their inflation targets. However, forecast targeting means something much more specific than the mere announcement of an inflation target, and as should become clear, it need not imply an exclusive focus on inflation as the basis for policy decisions.

Forecast targeting is a specific structured approach to deliberations about monetary policy actions, and a corresponding framework for communication about the justification for those actions. A central bank that practices forecast targeting is committed to adjust its instrument or instruments of policy (typically, its operating target for an overnight interest rate more or less equivalent to the federal funds rate in the US) in whatever way proves to be necessary in order to ensure that the bank's quantitative *projections* of the economy's future evolution satisfy a specific *target criterion.*

For example, the Bank of England has often stated that its monetary policy is intended to satisfy the requirement that the projection for a particular measure of inflation (currently, one based on a consumer price index) equal the official target rate (currently 2.0 percent) at a horizon eight quarters in the future.[13] Although this description is plainly an oversimplification of the Bank's actions, each issue of the Bank's quarterly *Inflation Report* begins with an overview of the justification of the current stance of policy that contains two charts like those shown in Figure 1. The "fan chart" on the left indicates a probability distribution of possible future evolutions of GDP over a three-year horizon, while the fan chart on the right shows a probability distribution of possible future evolutions of inflation, with the modal projection indicated by the most deeply shaded region. Primary emphasis is given to panel b in judging that the evolution of policy assumed in constructing the projections is suitable; the vertical dashed line at a horizon eight quarters in the future and the horizontal line at the inflation target of 2.0 percent help the eye to judge whether the path of deepest shading crosses the intersection.

A decision procedure of this kind allows the central bank to use *all* available information about the current outlook for the economy, including non-quantitative

[13] See, for example, Vickers (1998) and Goodhart (2001). As the Bank's procedures have evolved, there appears to be less of an effort to explain the target criterion that determines the policy decision in such a simple fashion; in particular, it is now made more explicit that the projection for GDP growth is also taken into account.

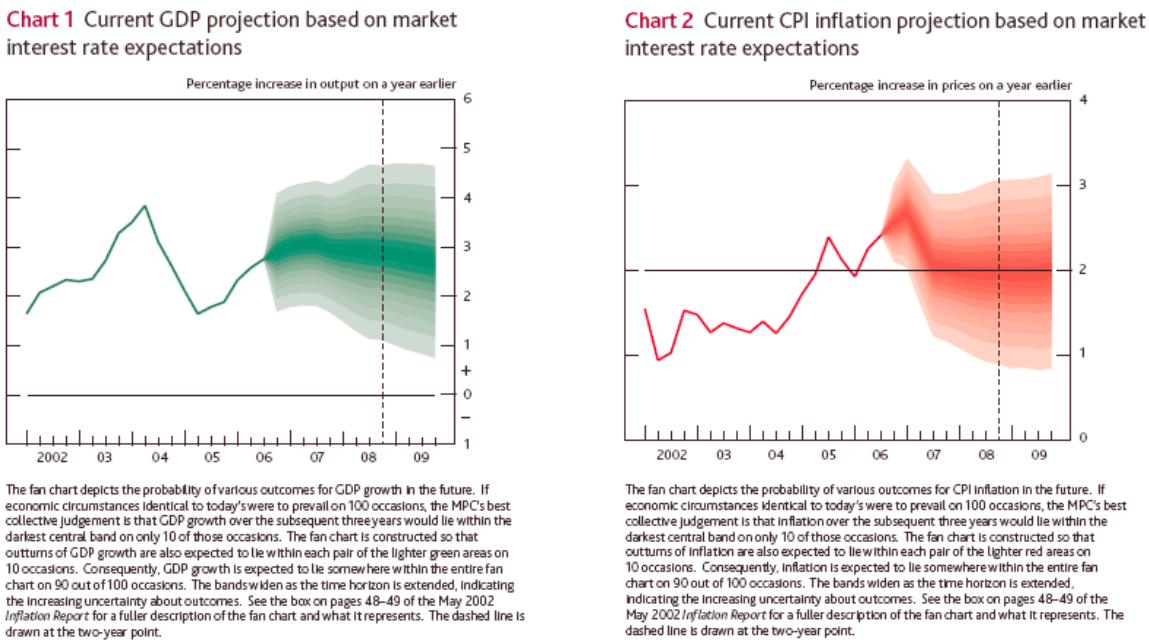

Figure 1. The "fan charts" from the *Inflation Report* of the Bank of England.[14]

information ("judgment"), in determining the appropriate level of interest rates. There is a specific target criterion --- which favors both focus in the decision-making process and predictability of the policy committee's decisions --- but unlike a rule like the Taylor rule, forecast targeting is not a mechanical formula that makes monetary policy a function of some very small set of present economic variables. After all, the relation of current economic variables to the variable that one actually wishes to stabilize may change over time.

Forecast targeting also involves a commitment to regular publication of the projections on the basis of which policy decisions have been made, typically through reports (like the *Inflation Report* of the Bank of England or the *Monetary Policy Report* of the Riksbank) published several times per year. Such publications serve the goal of anchoring inflation expectations in several ways. First, they make the central bank's policy commitment verifiable, by allowing the public to see at frequent intervals that policy is still being conducted in a manner consistent with that commitment. In addition,

[14]The two panels here reproduce Charts 1 and 2 from the introduction of the November 2006 *Inflation Report*. The figures from this particular issue are of interest because they show that the inflation projection can be judged to be acceptable even when inflation is not only currently above target but is forecasted to depart further from the target over the next few quarters; and indeed, CPI inflation went above 3 percent in the summer of 2007, but has since moderated.

they sharpen expectations about the likely future conduct of policy, by allowing people to observe how the central bank processes and responds to developments of various types (the import of which for the bank's projections and decisions are discussed in the report). Finally, publication of the bank's own view of the future outlook for inflation may well directly influence inflation expectations. In particular, a chart showing why current inflation different from the target rate (and perhaps even moving in the wrong direction, as in Figure 1) is nonetheless consistent with an expectation that inflation will be close to the target rate within a few years can help to keep medium-run inflation expectations anchored, despite the high-frequency variations that tend to dominate press coverage. The justification of policy decisions by reference to the projections is a crucial feature of this policy strategy, for these projections are expected to substitute for verification of convertibility (as under a gold standard) or verification of conformity with an "intermediate target" (such as a money-growth target) as a basis for the public's confidence in the future value of money.

Procedures of this kind demonstrate that explicit reference to principles in monetary policy decisions can be a practical possibility. They also show that making policy decisions on the basis of principles that can be explained in advance need not preclude using a wide range of information about current conditions and the near-term outlook for the economy when making decisions. Finally, they illustrate how greater flexibility in the way that the principles are applied to particular cases is possible precisely in the case that the central bank commits itself to publicly explain the basis for its decisions once the particular decisions have been made.

A cynic might suppose that this poses little constraint upon discretionary decisionmaking by the monetary policy committee, since projections can be constructed to support whatever decision has been made. However, once the projections are made public, it becomes necessary to defend their reasonableness, and systematic manipulation of them to support indefensible policy decisions would likely soon become a source of embarrassment to the bank. Moreover, a forecast-targeting central bank can reasonably be expected not merely to present its current projections in each *Inflation Report*, but to comment on the reasons for the differences between what is being projected now and what had been projected for the same time period in the previous *Report.* Of course, there

is no reason why the projections should remain identical from issue to issue, as unanticipated developments constantly occur; but it should be possible *ex post* to explain which unanticipated developments have occurred in the interim, even if it was not possible to predict them (or even identify them as possibilities) *ex ante*, and it should be possible for readers to judge whether these really represent developments that should not have been anticipated previously.[15]

In the case just described, the principle to be appealed to in making the policy decision appears to be one that can be stated very simply, making verification of compliance with the principle correspondingly straightforward. In fact, the proposal is not as simple as it may appear, as it can be made operational only in the case of a particular specification of the assumptions about the *future path of policy* that should be used in constructing the projections. The computation of projected paths for inflation and real activity over a horizon extending several years into the future requires that one make a specific assumption not only about the contemplated current policy decision, but about the expected conduct of policy over the entire projection horizon, or even beyond.[16] But a target criterion that can be summarized by a single number --- the projected value of one variable at one particular horizon --- can at most determine the appropriate policy within some one-parameter family of contemplated alternatives.

In the first decade of forecast targeting at the Bank of England (until August 2004), the Bank's decision procedure emphasized "constant-interest-rate" projections, in which it was assumed that whatever level of the policy rate was contemplated as the current decision would be maintained over the forecast horizon. The idea was that projections could be produced, given the Bank's assessment of current and future conditions outside of its own control, under a variety of different assumed constant levels

[15] As an illustration of this kind of accounting, see the box labeled "Projections in Inflation Report 2/06 and 3/06" on pages 44-47 of the issue of the Norges Bank *Inflation Report* reproduced in the Appendix. The box discusses the differences between the projections presented in the present issue of the *Report* (3/06) and the previous issue (2/06), as well as differences between the projections of the Norges Bank and other forecasters.

[16] Insofar as one's model of the monetary transmission mechanism incorporates forward-looking behavior on the part of households and firms, the predicted evolution of the economy over a given horizon will depend on expectations about the farther future. In the kind of models that are typically used, solution for the dynamic path of the economy under an assumption of "rational" (or model-consistent) expectations on the part of at least a subset of the decisionmakers in the economy requires a specification of policy over an infinite horizon, though the specification for more than a few years into the future will often be of only minor importance for quantitative predictions about near-term outcomes.

for the policy rate; the right current decision regarding the policy rate would be the one corresponding to the (presumably unique) constant-interest-rate projection most closely satisfying the target criterion (i.e., implying that inflation should equal the target rate 8 quarters in the future).[17]

But there are problems with the internal consistency of this procedure. It does not require that the assumed constant-interest-rate path actually represent the monetary policy committee's current best guess about future policy, and indeed, *the projections themselves* that are produced under the constant-interest-rate assumption might imply that it should already be foreseeable that the policy committee should *not* wish to hold interest rates constant over the next 8 quarters, even if the economy were to evolve exactly in accordance with current projections.[18] As a consequence, many forecast-targeting central banks have now abandoned the use of constant-interest-rate projections. A number of them, including the Reserve Bank of New Zealand, the Norges Bank, and Sweden's Riksbank, now use procedures under which the forward path of the policy rate must be projected along with other variables such as inflation and GDP.[19] This requires that the criteria used to determine an appropriate assumed forward path for policy must be sufficiently complex to determine an entire path, not simply a single number.

The Norges Bank, which adopted a procedure of this kind at the beginning of 2005, has been the most explicit about what these criteria are. Both an official description of the criteria, and an illustration of their application, can be found in the excerpts from the Norges Bank *Inflation Report* of November 2006 that are included as an appendix to this paper. Of particular relevance to the present discussion is the box labeled "Criteria

[17] For further discussion of this procedure, again see Vickers (1998) or Goodhart (2001).
[18] See Woodford (2007) for further analysis of this and other problems with the constant-interest-rate procedure.
[19] For example, in the excerpts from a recent *Inflation Report* of the Norges Bank presented in the Appendix, the projected path of the Bank's policy rate (the "sight deposit rate") is shown in Chart 1.9a on page 11. Because this is merely a projection given what is known at the time, rather than an *intention* to which the policy committee is already committed, the projected path of the policy rate is surrounded by confidence intervals, as with the projections of the other variables in Chart 1.9. Note that in the summary of the Executive Board's policy decisions on p. 18, both the current level chosen for the policy and the currently anticipated forward path for the policy rate are discussed, though the Board is careful to qualify the description of the forward path as "conditional on economic developments that are broadly in line with projections."

for an appropriate future interest rate path" on page 10 of the *Report.*[20] This box essentially states the *target criteria* that the policy committee seeks to satisfy in its deliberations; in the case of the Norges Bank, the criteria involve projections of more variables than the inflation projection alone, and projections for more than a single future horizon.

The first, and most basic, of the criteria that are listed is that the inflation projection should indicate convergence of the inflation rate to the Bank's constant long-run target rate (2.5 percent per annum) over the course of the projection. While no precise horizon is specified at which projected inflation should equal the official inflation target, "inflation should be stabilized near the target within a reasonable time horizon, normally 1-3 years." This is similar in spirit to the target criterion of the Bank of England, except that it is less specific about the time that should be allowed for convergence. However, this vagueness is made up (and indeed is *required*) by the specification of *additional* criteria, that describe what kind of transition path toward the medium-run target should be acceptable.

Among these, the most important is the second on the list: "the inflation gap [i.e., the gap between projected inflation and the inflation target] and the output gap [the gap between projected output and potential output]" should be opposite in sign at each horizon, and "should be in reasonable proportion to each other until they close." This specifies a relation that should exist between the projections for two different variables, inflation and the output gap, and one that involves the projections for *each* horizon, both in the near term and farther in the future. At each point in time, the two projected gaps should be of opposite sign, and furthermore proportional to each other in magnitude, so that they are projected to close at the same rate.[21]

In order to facilitate checking whether the second criterion is satisfied under the forward path for policy assumed in the projections, each issue of the Norges Bank's

[20] The box appeared in this form in each of the issues of the Norges Bank *Inflation Report* in 2005 and 2006. A similar box has appeared in more recent issues, though with a less specific version of the second of the criteria in the list. The criteria are discussed in more detail in Qvigstad (2006).

[21] Since 2007, the second criterion has been expressed more vaguely, stating simply that "the interest rate path should provide a reasonable balance between the path for inflation and the path for capacity utilization." A chart showing the projected path of inflation superimposed upon the projected path of the output gap is still used to assess the degree of satisfaction of this criterion; see, for example, Chart 1.14 on p.11 of Norges Bank, *Monetary Policy Report 3/2007*, issued November 2007.

Inflation Report[22] presents a chart in which the inflation projection and the output gap projection are superimposed upon one another in a single figure. (See Chart 1.13 on page 13 of the 2006/3 *Report.*) In this chart (unlike the "fan charts" for these variables shown on page 11), only the evolution of each variable under the projection's "baseline scenario" is shown, so that one can easily observe the degree to which the two lines represent mirror images of one another.

This second, subsidiary criterion does not contradict the first one; instead, it specifies the rate at which the convergence to the target rate of inflation should occur, namely, the rate that would imply maintaining an output gap of a magnitude proportionate to the inflation gap, and converging to zero at the same rate. (Suppose that, as in the projections shown in Charts 1.9c and 1.9d on page 11, inflation is initially below the target rate of 2.5 percent, shown by the horizontal line in Chart 1.9c. Bringing inflation up to the target rate more rapidly would require a looser monetary policy, meaning an even more positive output gap than the one projected in Chart 1.9d, and one not converging to zero as quickly as the inflation gap would; this would violate the principle expressed in criterion 2.) Moreover, since the criterion indicates a relation that should hold at *each* horizon, it specifies a large enough number of relationships to pin down the appropriate projected level of the policy rate for each horizon as well.

As a logical matter, the first two criteria suffice to determine a desirable forward path for policy, in the context of a particular model of the monetary transmission mechanism and given assumed paths for exogenous factors such as productivity growth, the world price of oil, and so on. The remaining criteria listed in the box mainly indicate ways in which the Bank seeks to ensure that its conclusions regarding the desirable path of policy are robust to possible errors in the assumptions made in producing a particular set of projections.

The criteria for choosing a desirable forward path set out in the *Inflation Report* of the Norges Bank illustrate in some detail the kind of principles that might reasonably be appealed to as a basis for monetary policy deliberations. Note that the principles stated here are of essentially the form recommended in section 2 of this paper: the first and most essential principle indicates that inflation several years in the future must always be

[22] The publication is now called *Monetary Policy Report*, since the first issue of 2007.

projected to be close to an unchanging target level, while a subsidiary principle indicates the relation that must exist between projected nearer-term departures of the inflation rate from the target level and the projected near-term evolution of real activity.

5. Transparency in Central Banking

One of the more notable changes in the conduct of central banks around the world over the past two decades has been a steady increase in the degree to which central banks talk openly both about the policy decisions that they have been made and about their view of the outlook for the future. The title of William Greider's 1987 bestseller about the Fed --- *Secrets of the Temple* --- gives an idea of the mystique with which that institution was shrouded only twenty years ago. Before 1994, for example, the Federal Open Market Committee made no public announcement regarding its target for the federal funds rate following the meetings at which the target was determined; markets had to try to infer the target rate from the type and size of open-market operations that were subsequently conducted by the Trading Desk in New York to implement the policy. According to Poole (2005), "before Greenspan many within the Fed believed that policy effectiveness depended on taking markets by surprise."

But since February 1994, the FOMC has issued a public statement following each meeting at which the target has been changed, indicating the new target rate. The FOMC has also been increasingly willing, since the late 1990s, to give advance signals of the likely future stance of policy, by including in the post-meeting statement an assessment of the current "bias" with respect to possible changes in the stance of policy or an assessment of the current "balance of risks"; for a period, even more explicit signals about the future path of the funds rate target were given, as in the period in the second half of 2003 when for several meetings in a row the FOMC indicated the expectation that "policy accommodation" (understood to mean a funds rate target at its then level of one percent) would be "maintained for a considerable period." Transparency about the content of FOMC deliberations has also increased. Since 2005, the FOMC has expedited the release of the minutes of its deliberations, so that these are now available before the next Committee meeting; and beginning in November 2007, the FOMC began releasing

along with the minutes of certain meetings (four times per year) a summary of the economic forecasts of the FOMC members, in the light of which the policy decision has presumably been made. Other central banks have made similar changes in their communications policies over the same period, some of them --- most notably, the forecast-targeting banks discussed above --- increasing transparency to an even greater extent than at the Fed.

These notable changes have led to considerable discussion, with frequent questions about how much farther transparency should be taken and how quickly. Theoretical analyses of the question, however, have contributed little to the clarification of the practical debate, and the reason, in my view, has to do with the lack of any place in conventional economic analysis for the explanation of decisions.

Perhaps the most influential recent analysis of the desirability of increased transparency is the paper of Morris and Shin (2002). This analysis assumes an abstract strategic situation in which each agent *i* must choose an action a_i, the (private) payoff from which depends on both the conformity of the action with an unknown (random) state θ and the conformity of the individual's action with the actions of the other agents. Each agent has a private source of information, a noisy observation of the state θ (with the error in the private observations independently distributed across agents), and in addition a public agency (the central bank) has a noisy observation of the state θ as well (with noise independent of the noise in the private signals). The question posed is whether it is beneficial for the central bank to publicly announce its information before the agents must choose their actions. Morris and Shin assume that the goal of policy should be to minimize the average expected squared difference between agents' actions and the state θ.

The key result of the paper is that for some values of the model's parameters, transparency does not increase welfare. This is because the public announcement by the central bank is *common knowledge* --- not only does each agent know it, but he knows that every other agent knows it, and knows that every other agents knows it, and so on --- unlike each agent's observation of his private signal. The public announcement is therefore given a weight in determining each agent's action that is disproportionate to the degree of information that it actually reveals about the value of the state θ; for it provides

information not only about what θ is likely to be, but also about *what others are likely to think that θ is,* given that they are known to have observed the central bank's announcement as well. Hence the occurrence of the public announcement reduces the degree to which agents' actions reflect the information contained in their private signals, and if the central bank's information is sufficiently imprecise relative to that of the private signals, this can reduce the extent to which agents' actions successfully track the true value of the state θ. In such a circumstance, it is argued that it would be better for the central bank not to reveal its information, despite the fact that the announcement would provide people with additional information about something that is relevant to their decision problems.

The degree to which this theoretical possibility provides a convincing reason for skepticism about the desirability of transparency in central banking has been disputed on a variety of grounds.[23] The point I would like to emphasize here is how narrow a conception the analysis reflects of the possible matters about which a central bank might wish to communicate. It is assumed that if central-bank announcements matter, it must be because the central bank has information about an objective external state, not otherwise available to the public, which the bank can publicly display if it chooses. The matter in question is then one about which one may reasonably suppose that individual members of the public have their own sources of information. In fact, in order for the case in which transparency is shown to be harmful to be possible in the model of Morris and Shin, it is necessary for individuals' private sources of information about the value of θ to be *more accurate* than the central bank's information, so that inducing people to put more weight on their personal information makes their actions closer on average to the true value of θ.

But this is hardly what the practical debate about central-bank transparency is about. There is little controversy about the desirability of publication by central banks of information about the economy that they might have as a result, say, of a survey conducted by the bank. What is debated is instead the extent to which banks should reveal information about their *internal deliberations* about policy and about *intentions* that the policy committee may already have about future policy decisions --- matters about which the central bank is surely better informed than anyone outside the institution.

[23] See, for example, Hellwig (2004), Woodford (2005), Svensson (2006) and Morris *et al.* (2006).

Yet it is hard, within the conceptual framework of economic analysis, to discuss why it should matter to speak about such things. Because decisions are commonly assumed to follow automatically from preferences and the mapping from available choices to predictable outcomes, there is nothing that should need to be said about the nature of deliberations as such; to the extent that there is anything about a decision that could not be perfectly predicted by an external observer, it must relate either to the preferences of the decisionmaker or to the decisionmaker's information about the state of the world. Some theoretical analyses of central-bank transparency do assume that the communication should be about the current policy preferences of the central bank, though there should be nothing to reveal about those, either, unless the preferences are assumed to randomly vary over time. The normative basis for evaluation of possible equilibria in this latter case is unclear; is it desirable to facilitate the achievement of a central bank's randomly varying preferences, or is such random variation necessarily a sign that the central bank is not pursuing true social welfare? In the latter case, one can argue that a desirable regime would seek to curb the influence on policy of the random preferences, in which case there would be no need for the central bank to inform the public about them. One is then left to discuss the desirability of communication about the central bank's observations of the state of the world.

Practical discussions of central-bank transparency do focus on the question of what central banks should reveal about policy deliberations, but in these discussions as well, the emphasis is often misplaced in my view. It is commonly supposed that the point of greater transparency should be satisfy the curiosity of market participants about what central bankers are up to; if traders in financial markets would pay to know what is going on in the committee room, then this information must be of private value to them, and if so there should be a social benefit in making more of such information freely available. One therefore frequently hears calls for the release of more detailed transcripts of meetings more promptly, more information about which committee members have voted in a particular way, and so on.

While discussions of this kind do not assume that what happens inside the committee room is irrelevant --- this is disconfirmed by the attention devoted to such questions in the financial press --- they do equally assume that *the justifications given* for

behavior should be of no interest, only what decisionmakers *actually do;* though in this case, "actions" are extended to include statements made in the committee room, votes taken, and so on. It is frequently assumed that greater transparency should mean dispensing with the veil that separates a central bank's public presentation of its decisions from what has actually been said in the course of policy deliberations. Thus, for example, when Geraats *et al.* (2008) call for greater transparency from the European Central Bank, one of their key demands is for the Bank to publish the voting records of the Governing Council, rather than presenting policy decisions as consensual. "The way the Governing Council makes its interest rate decisions remains clouded," these authors write. "By allowing the public to weigh its members' evolving views, the balance of votes leads to a better understanding of how the Governing Council responds to economic information."

I would suggest instead that the *explanation* of policy decisions should matter, but this is not the same thing as saying that the public should have a right to be present as the decisions are made. Instead, precisely because it matters that the policy decision be one that can be justified within a coherent framework that maintains some degree of stability over time, it is important to distinguish between the *process* by which the decisionmakers actually arrive at a decision and the *public explanation* that is offered for the decision. If all that mattered were that the public be able to see the decisionmaking as it occurs, as a factual event at a certain place and time, then it would *not* be necessary for reasons to be given for decisions; the members of the policy committee could cast their votes (perhaps on television), and simply declare: it is a brute fact that I vote thus, what else is there to say?

Again I think that adjudication provides a useful analogy for the kind of decisions that must be made by a monetary policy committee. A judge is required to give an explanation for most decisions regarding the application of the law to particular cases, in the form of a written opinion; this commitment to a public explanation of the grounds for the decision ensures that the decision will not be an arbitrary one, and is what allows members of the public to rely upon particular expectations about the way in which the law should be applied to future cases that may involve them. But the public's right to an explanation of the decisions that are handed down by the court is not generally supposed to mean that discussions among members of the court and draft opinions that may

circulate among members of the court and their clerks, as part of the process by which a decision is eventually reached, should not appropriately remain private.

Such respect for the difference between the process of deliberation and the official product of the process allows more considered judgments to be made, and thus ultimately serves the ideal of allowing a "rule of law rather than of men." Similar considerations are relevant to monetary policy deliberations; excessive transparency, understood as complete openness of the process of deliberation itself to public scrutiny, could easily reduce the sophistication of the deliberation. For example, it is often reported that since the Federal Reserve has been required to publish transcripts of FOMC meetings (after a five-year delay), the discussion at the meetings has more often amounted to a reading of prepared statements by Committee members to one another; but a requirement that one's remarks be prepared in advance of the meeting obviously limits the degree to which Committee members can succeed in actually exchanging views at the meeting.

So while I believe that greater transparency would be desirable on the part of the Fed, the ECB, and other central banks, what is needed is not primarily a greater willingness to reveal information about the deliberations that are already conducted at these institutions. The thing that would be of greater value would be increased effort at principled decisionmaking, of the kind that would be required by a commitment to publicly *explain* decisions to a greater extent; this sort of commitment would improve both the decisions themselves *and* the public's understanding of them. The kind of transparency that really matters is the kind represented by the publication of periodic *Inflation Reports* (or *Monetary Policy Reports*) by the forecast-targeting central banks discussed in the previous section.

My broader conclusion is that the contributions of economics to public policy analysis would be enhanced by greater attention by economists to the importance of the explanations that are given for policy decisions. This requires attention to matters beyond the scope of what is traditionally understood by economic analysis --- to the structure of arguments and to the way in which conclusions can be reached when practical action is necessary, something that involves more than merely the correct application of rules of logical inference. In a word, it requires attention to the *rhetorical* uses of economic analysis, as Deirdre McCloskey (1998) has urged. But as McCloskey has tirelessly

insisted, accepting the rhetorical character of economic analysis should in no way reduce the role of economic analysis in public life. Instead, recognition that arguments themselves matter --- and not simply the intuitive judgments of experienced decisionmakers --- should allow economic analysis an even greater role in the shaping of public policy. For where public policy is concerned, economic analysis is not simply a tool that can (perhaps) help a decisionmaker to predict the behavior of an autonomous reality; it is part of the functioning of the economic system itself.

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APPENDIX

Selected pages from Norges Bank, *Inflation Report 3/06,* issued in November 2006. The complete report is available online at http://www.norges-bank.no/upload/import/front/rapport/en/ir/2006-03/ir-2006-03-en.pdf.

Norges Bank's *Inflation Report* with monetary policy assessments

Norges Bank's *Inflation Report* is published three times a year, in March, June and November. The *Report* presents an assessment of the monetary policy outlook. The report contains projections for developments in the Norwegian economy, boxes in which particular themes are dealt with more fully, and a summary of Norges Bank's regional network reports.

At its meetings on 17 October and 1 November, Norges Bank's Executive Board discussed the main content of the *Inflation Report* and endorsed the analyses and projections for future interest rate developments in the *Report*. At its meeting on 1 November, the Executive Board approved a monetary policy strategy based on these discussions for the period to the next *Inflation Report*, which will be published on 15 March 2007. The strategy is presented in Section 1. In the period to the next *Inflation Report*, the Executive Board will hold monetary policy meetings on 13 December, 24 January and 15 March.

The *Inflation Report* is published three times a year, and together with *Financial Stability,* is part of Norges Bank's series of reports. The report is also available on Norges Bank's website:
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Monetary policy in Norway

Objective

The operational target of monetary policy is low and stable inflation, with annual consumer price inflation of approximately 2.5% over time.

In general, direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary temporary disturbances are not taken into account.

Implementation

Norges Bank operates a flexible inflation targeting regime, so that weight is given to both variability in inflation and variability in output and employment.

Monetary policy influences the economy with long and variable lags. Norges Bank sets the interest rate with a view to stabilising inflation at the target within a reasonable time horizon, normally 1–3 years. The relevant horizon will depend on disturbances to which the economy is exposed and how they will affect the path for inflation and the real economy in the period ahead.

The decision-making process

The main features of the analysis in the *Inflation Report* are presented to the Executive Board for discussion at a meeting about two weeks before the *Report* is published. On the basis of the analysis and discussion, the Executive Board assesses the consequences for future interest rate developments and adopts a monetary policy strategy for the period to the next *Inflation Report*. The strategy is presented in Section 1 of the *Inflation Report*.

The key interest rate is set by Norges Bank's Executive Board. Decisions concerning interest rates and other important changes in the use of instruments will normally be taken at the Executive Board's monetary policy meeting every sixth week. The analyses and the monetary policy strategy presented in Norges Bank's *Inflation Report*, together with assessments of price and cost developments and conditions in the money and foreign exchange markets, form a basis for monetary policy decisions.

Communication of the interest-rate decision

The monetary policy decision is announced at 2pm on the day of the meeting, and the Bank holds a press conference at 2:45 pm on the same day. The press release provides an account of the main features of economic developments that have been of importance for the interest rate decision and the Executive Board's assessments. The press release and the press conference are available on http://www.norges-bank.no.

Reporting

Norges Bank reports on the conduct of monetary policy in the *Inflation Report* and the *Annual Report*. The Bank's reporting obligation is set out in Section 75c of the Constitution, which stipulates that the Storting shall supervise Norway's monetary system, and in Section 3 of the Norges Bank Act. The *Annual Report* is submitted to the Ministry of Finance and communicated to the King in Council and to the Storting in the Government's Kredittmeldingen (Credit Report). The Governor of Norges Bank provides an assessment of monetary policy in an open hearing before the Standing Committee on Finance and Economic Affairs in connection with the Storting deliberation on the Credit Report.

Editorial

Changing trajectories

The different phases of the current cyclical upturn have spanned longer periods than we had expected. As a result of strong growth in productivity and a temporary fall in sickness absence, private and public enterprises were able to increase production without increasing the number employed for a longer period. It was only towards the end of last year that employment began to rise markedly, and this year growth in employment has been substantial. Moreover, it took time for various measures of unemployment to show a clear decline. Since spring 2006, unemployment has shown an appreciable fall.

Even after several years of robust growth in the domestic and global economy, underlying inflation remains low. Increased imports from low-cost countries have resulted in a decline in prices for imported goods. A strong krone has contributed to the fall in import prices measured in terms of NOK. Intensified labour market competition, particularly owing to labour inflows from new EU member states, has most likely contributed to a moderate rise in labour costs. In addition, the possibility for enterprises to relocate production abroad may have had a dampening impact on wage growth.

In relation to capacity utilisation and labour market tightness, inflation is very low. It is likely that this will not continue. Many enterprises in our regional network report that labour shortages are a considerable constraint on production. The position of employees is strengthening and, after a period, it is also likely that employers will be willing to bid up wages to attract labour. In the next round, enterprises will have to pass on higher costs to prices. The krone exchange rate fluctuates from month to month, but depreciated somewhat this autumn from strong levels last summer. Against the background of high growth in demand and a tighter labour market, there are prospects for higher consumer price inflation ahead.

Interest rates have also been low for an unusually long period as a result of very moderate inflation. On balance, developments since the previous *Inflation Report* suggest that it will now be appropriate to raise the interest rate gradually towards a more normal level at a somewhat faster pace than envisaged earlier, although it is unlikely that rates will be raised at every monetary policy meeting. Nevertheless, if developments ahead are broadly in line with projections, it will most likely be noted when we later look back that the interest rate has been raised in small, not too frequent steps during this cyclical upturn.

1 November 2006
Jarle Bergo

1 Monetary policy assessments and strategy

The economic situation

Underlying inflation is low. Consumer price inflation adjusted for tax changes and excluding energy products (CPI-ATE) has edged down since summer (see Chart 1.1). Other indicators of underlying inflation are higher (see Chart 1.2). Both prices for domestically produced goods and services and prices for imported consumer goods have risen less than expected (see Chart 1.3). The rise in overall consumer prices (CPI) has held up, however, and is now around the inflation target. An unexpected strong rise in energy prices has pushed up CPI inflation.

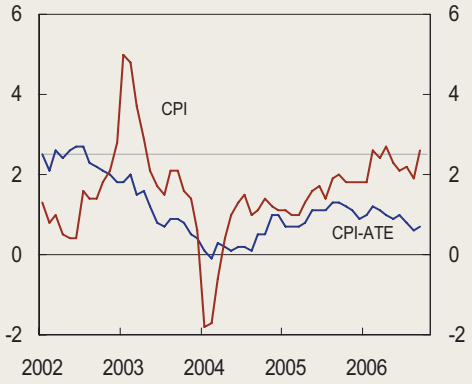
Over the past year, underlying inflation by different measures has largely been stable, but considerably lower than the inflation target of 2.5%. It is our assessment that underlying inflation is now in the interval ¾ - 1½%.

There is little spare capacity in the Norwegian economy. Growth is strong in most industries, and profitability in the business sector is solid. At the same time, the krone exchange rate has depreciated from strong values. Capacity utilisation in the economy is rising. Demand in the household, enterprise and public sectors is growing. Employment is rapidly rising, and unemployment is now in line with the unemployment level during the previous boom at the end of the 1990s. The upturn in the Norwegian economy is stronger than we previously anticipated.

The low rate of underlying inflation is not a result of weak growth in the economy, but rather a reflection of favourable developments on the production side. Strong competition and high productivity growth, combined with fairly low wage growth, have contributed to keeping down the rise in prices for domestic goods and services. Inflation variability has been lower than observed in the 1980s and the beginning of the 1990s (see Chart 1.4). Inward labour migration may have induced participants in local and centralised wage negotiations to place greater emphasis on the already very high level of wages in Norway compared with our trading partners. At the same time, foreign labour inflows have reduced bottlenecks in some industries and increased the growth capacity of the Norwegian economy. In addition, the possibility for many enterprises to relocate production or establish new enterprises abroad has probably contributed to restraining wage growth.

Monetary policy is oriented towards bringing inflation towards target and anchoring inflation expectations close to 2.5%. Since summer 2005, Norges Bank has gradually

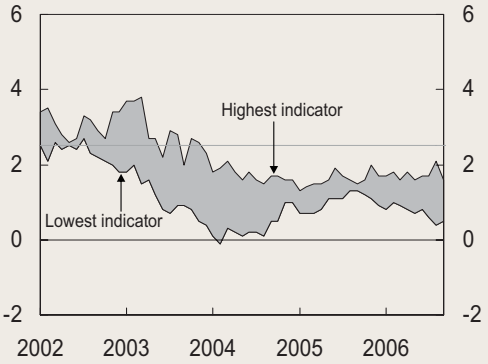
Chart 1.1 CPI and CPI-ATE[1]. 12-month change. Per cent. Jan 02 – Sep 06



[1] CPI-ATE: CPI adjusted for tax changes and excluding energy products. A further adjustment is made for the estimated effect of reduced maximum day-care rates from January 2006.

Sources: Statistics Norway and Norges Bank

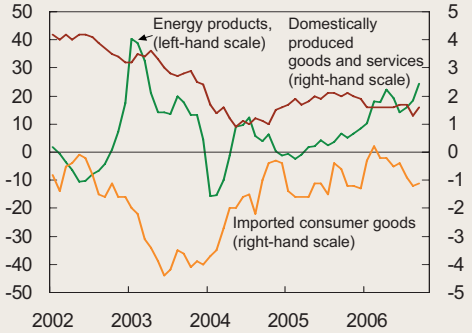
Chart 1.2 Interval of uncertainty for underlying inflation. Highest and lowest indicator[1]. 12-month change. Per cent. Jan 02 – Sep 06



[1] Highest and lowest indicator of CPI-ATE, weighted median and trimmed mean. See separate box on recent price developments.

Sources: Statistics Norway and Norges Bank

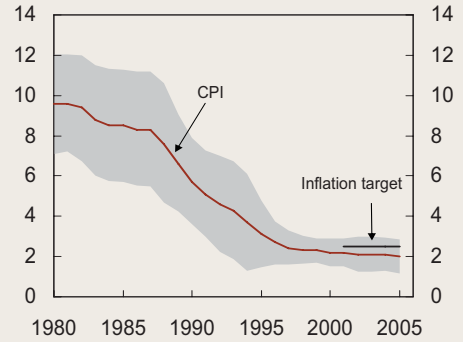
Chart 1.3 Consumer prices. Prices for energy products and the CPI-ATE[1] by supplier sector[2]. 12-month change. Per cent. Jan 02 – Sep 06



[1] Adjusted for tax changes and excluding energy products. A further adjustment is made for the estimated effect of reduced maximum day-care rates from January 2006.
[2] Norges Bank's estimates.

Sources: Statistics Norway and Norges Bank

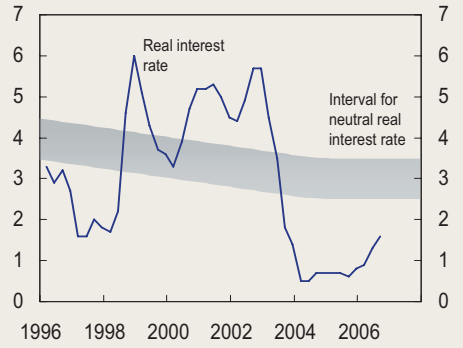
Chart 1.4 CPI. Moving 10-year average[1] and variation[2]. Per cent. Annual figures. 1980 – 2005[3]



[1] The moving average is calculated 7 years back and 2 years ahead.
[2] The band around the CPI is the variation in the average period, measured by +/- one standard deviation.
[3] Projections for 2006 –2007 in this Report form the basis for this estimate.

Sources: Statistics Norway and Norges Bank

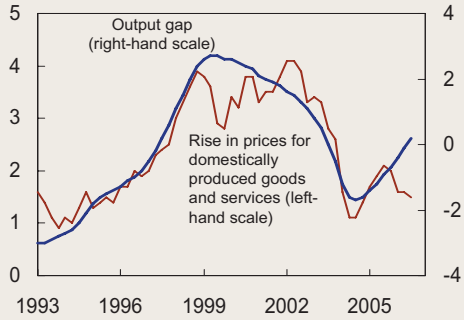
Chart 1.5 3-month real interest rate[1] and the neutral real interest rate in Norway. Per cent. Quarterly figures. 96 Q1 – 06 Q3



[1] 3-month money market rate deflated by the 12-quarter moving average (centred) of inflation measured by the CPI. Projections for the CPI from this Report form the basis for this estimate.

Source: Norges Bank

Chart 1.6 Rise in prices for domestically produced goods and services in the CPI-ATE[1] and output gap level (lagged by 4 quarters). 93 Q1 – 06 Q3



[1] Adjusted for the estimated effect of reduced maximum day-care rates from January 2006.

Sources: Statistics Norway and Norges Bank

raised its policy rate. Real interest rates are nevertheless lower than what we consider to be a neutral interest rate (see Chart 1.5).[1]

Inflation has also been low among our trading partners. High and rising energy prices exerted upward pressure on CPI inflation up to autumn. Reduced uncertainty as to oil and gas supply and high oil stock levels have pushed down oil prices in recent months, although they are still high. The fall in oil prices may push down CPI inflation in the period ahead. Excluding energy prices, inflation is moderate in most countries, with the important exception of the US.

The world economy is experiencing its strongest continuous upturn since the early 1970s. Economic growth is higher than trend in Sweden, Denmark, the UK and the euro area, where short-term interest rates are expected to rise. Developments in China and India are buoyant. At the same time, growth in the US is now tending downwards. Developments in the US housing market indicate that growth in household demand is slackening. Weaker growth prospects in the US have contributed to the fall in long-term interest rates in many countries, and in the US and Canada short-term interest rates are now also expected to move down in the course of next year.

Baseline scenario

After expanding at a strong pace over several years, the US economy is now showing signs of a slowdown. This may have ripple effects in other countries. It still seems that growth in the world economy will be sustained. The weight of China, India and other Asian economies in the world economy is rising. In the euro area, and to some extent in Japan, the upturn has broadened, and dependence on the US economy has been reduced somewhat.

Compared with the upturns in the Norwegian economy in the mid-1980s and the latter half of the 1990s, the current cyclical upswing has a somewhat different profile. An important difference seems to be that the various phases of the expansion have been longer during this upturn. Inflation is still low more than three years after the recovery started (see Chart 1.6).

It has taken longer than normal for employment to rebound. A marked fall in sickness absence in 2004 increased labour availability for the private and public sectors without an increase in the number employed. It was only towards the

[1] Estimations may indicate on an uncertain basis that the neutral real interest rate for Norway is now in the lower end of the range 2½-3½%.

end of 2005 that employment picked up, and this year the number employed has risen sharply. Sickness absence has now increased again, and in the past year unemployment has rapidly declined (see Chart 1.7).

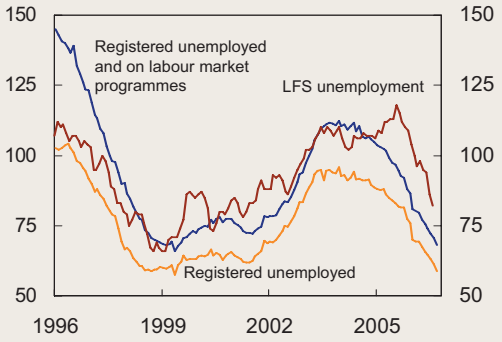
Wage growth has advanced from moderate levels over the past year, but is still lower than during the previous expansion. However, there are now signs that wage growth may accelerate at a faster pace. Many industries report labour shortages. Against this background, there is reason to assume that cost inflation will pick up in the period ahead.

Continued moderate growth in labour costs this year, strong competition in product markets, high productivity growth and an increase in the share of imports from low-cost countries will probably contribute to keeping consumer price inflation at a low level in the period to the end of the year and into next year. At the same time, several factors point to higher inflation ahead.

Mainland GDP growth in Norway will probably be higher than trend growth again in 2007. Capacity utilisation will continue to rise and the labour market will become tighter. Labour shortages are expected to translate into higher wage growth in the coming years, and the projections for wage growth have been revised upwards since the June *Report*. Low prices for imported consumer goods will probably continue to restrain inflation, while certain domestic conditions may gradually have the opposite effect. Productivity growth and corporate profitability have been very high in recent years. Normally, productivity growth picks up early in a cyclical upswing and then slows after a period. In conjunction with higher wage growth, somewhat lower productivity growth may thus lead to an increase in costs among enterprises in the period ahead. How rapidly higher costs will feed through to prices will depend on the market situation and competition in the different markets.

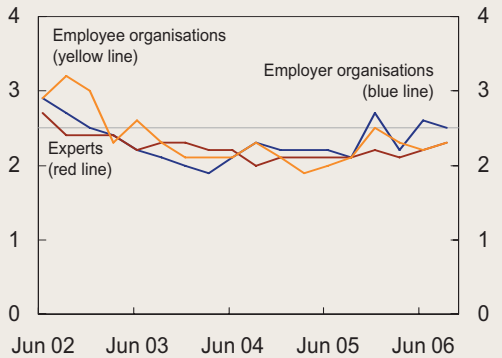
The sustained rise in oil prices points to continued buoyancy in petroleum investment. A substantial increase in the value of the government's foreign investments will lead to a considerable increase in disposable funds under the fiscal rule in the years ahead. The projections are based on the assumption that fiscal policy will provide some stimulus to aggregate demand and production in 2008 and 2009. At the same time, labour force participation has reached a high level. Labour shortages and capacity constraints will gradually impose limits on further growth in production. High capacity utilisation, rising wage growth and somewhat slower productivity growth are expected to lead to higher inflation, particularly from the second half of 2007 and into 2008. Compared with the previous *Inflation Report*, inflation is now expected to increase at a somewhat later point in time.

Chart 1.7 Unemployed. LFS unemployment, registered unemployed and persons on ordinary labour market programmes. In thousands. Seasonally adjusted. Monthly figures. Jan 96 – Sep 06



Sources: Statistics Norway and Norwegian Labour and Welfare Organisation (NAV)

Chart 1.8 Expected consumer price inflation 2 years ahead. Employer/employee organisations and experts[1]. Per cent. Quarterly figures. 02 Q2 – 06 Q3



[1] Employees in financial industry, macroanalysts and academics.

Source: TNS Gallup

Monetary policy cannot fine-tune developments in the economy, but must prevent the largest effects when the economy is exposed to disturbances. In some situations, it may be appropriate to guard against particularly adverse developments.

The policy rate was reduced to a very low level in 2003 and 2004 primarily with a view to preventing inflation expectations from becoming entrenched well below target. In spite of a longer period of low inflation, inflation expectations are close to the inflation target (see Chart 1.8). According to TNS Gallup's expectations survey, a growing share of enterprises expects purchase prices to rise. At the same time, the contact enterprises in Norges Bank's regional network expect retail prices to increase in the period ahead. On balance, the likelihood that low inflation will be followed by deflation now appears to be small. Nevertheless, it is appropriate to guard against the risk of a slower rate of inflation when inflation is already at a low level.

Capacity utilisation is rising at a faster pace than expected. We have previously seen that cost inflation can accelerate quickly in a tight labour market. It may then be necessary to increase interest rates substantially in order to stabilise inflation. Such a development would be particularly unfavourable in a situation with high household debt. With a high debt burden, an interest rate increase would result in a considerable fall in disposable income. The risk of a pronounced downturn in the economy as a result of a high level of capacity utilisation and rising price and cost inflation seems to have increased somewhat. In order to guard against such a development, a pre-emptive increase in interest rates would be appropriate.

Monetary policy affects the economy with a lag and primarily influences inflation one to three years ahead. Against the background of high growth in output and employment, rising wage growth and a weaker krone, there are prospects of higher consumer price inflation ahead. On balance, developments since the previous *Report* suggest that it would be appropriate to raise the policy rate gradually towards a more normal level at a somewhat faster pace than envisaged earlier, although it is unlikely that rates will be raised at every monetary policy meeting (see Charts 1.9 and 1.10). Based on our current assessment, the interest rate will thus continue to be raised in small, not too frequent steps if economic developments are broadly in line with projections.

A gradual normalisation of the interest rate level will contribute to curbing growth in the Norwegian economy. Growth in household demand will be restrained by somewhat weaker growth in real disposable income. Investment growth in the mainland economy is expected to ease. Weaker growth in the world economy, in conjunction with

Criteria for an appropriate future interest rate path

The following criteria may be useful in assessing whether a future interest rate path appears reasonable compared with the monetary policy objective.

1. If monetary policy is to anchor inflation expectations around the target, the interest rate must be set so that inflation moves towards the target. Inflation should be stabilised near the target within a reasonable time horizon, normally 1-3 years. For the same reason, inflation should also be moving towards the target well before the end of the three-year period.

2. Assuming that inflation expectations are anchored around the target, the inflation gap and the output gap should be in reasonable proportion to each other until they close.[1] The inflation gap and the output gap should normally not be positive or negative at the same time further ahead.

3. Interest rate developments, particularly in the next few months, should result in acceptable developments in inflation and output also under alternative, albeit not unrealistic assumptions concerning the economic situation and the functioning of the economy.

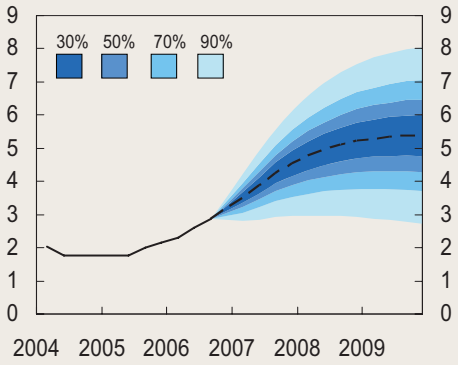
4. The interest rate should normally be changed gradually so that we can assess the effects of interest rate changes and other new information about economic developments.

5. Interest rate setting must also be assessed in the light of developments in property prices and credit. Wide fluctuations in these variables may in turn constitute a source of instability in demand and output in the somewhat longer run.

6. It may also be useful to cross-check by assessing interest rate setting in the light of some simple monetary policy rules. If the interest rate deviates systematically and substantially from simple rules, it should be possible to explain the reasons for this.

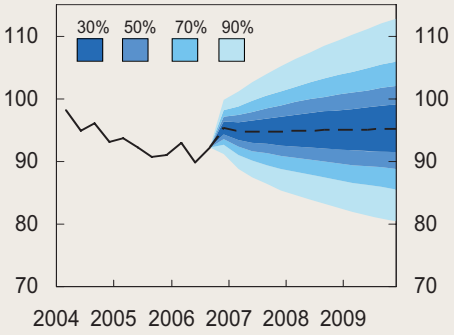
[1] The inflation gap is the difference between actual inflation and the inflation target of 2.5%. The output gap measures the percentage difference between actual and projected potential mainland GDP.

Chart 1.9a The sight deposit rate in the baseline scenario with fan chart. Per cent. Quarterly figures. 04 Q1 - 09 Q4



Source: Norges Bank

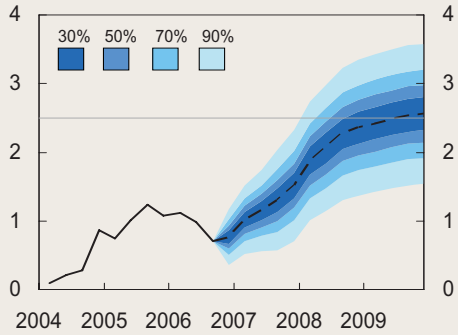
Chart 1.9b Import-weighted exchange rate (I-44)[1] in the baseline scenario with fan chart. Quarterly figures. 04 Q1 – 09 Q4



[1] A rising curve denotes a weaker krone exchange rate. It is assumed that strengthening by a certain percentage is just as likely as weakening by the same percentage.

Source: Norges Bank

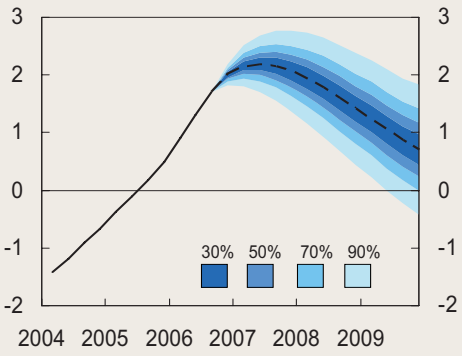
Chart 1.9c Projected CPI-ATE in the baseline scenario[1] with fan chart. 4-quarter change. Per cent. 04 Q1 – 09 Q4



[1] CPI-ATE: CPI adjusted for tax changes and excluding energy products. A further adjustment is made for the estimated effect of reduced maximum day-care rates from January 2006. Other measures of underlying inflation are shown in Chart 3.10.

Sources: Statistics Norway and Norges Bank

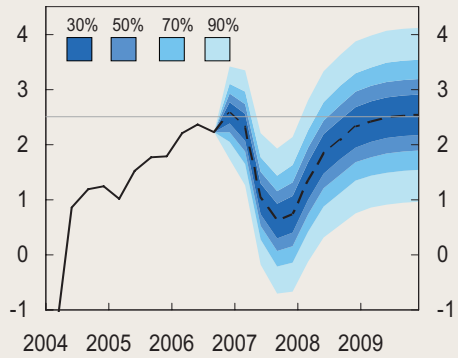
Chart 1.9d Estimated output gap in the baseline scenario with fan chart[1]. Per cent. Quarterly figures. 04 Q1 – 09 Q4



[1] Uncertainty concerning the current situation is not taken into account in the calculation (see separate box p. 48).

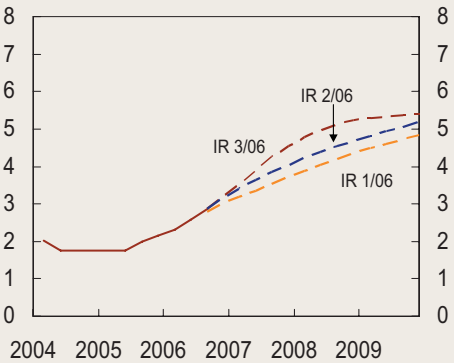
Source: Norges Bank

Chart 1.9e Projected CPI in the baseline scenario with fan chart. 4-quarter change. Per cent. 04 Q1 – 09 Q4



Sources: Statistics Norway and Norges Bank

Chart 1.10 The sight deposit rate in the baseline scenario in IR 1/06, IR 2/06 and IR 3/06. Per cent. Quarterly figures. 04 Q1 – 09 Q4

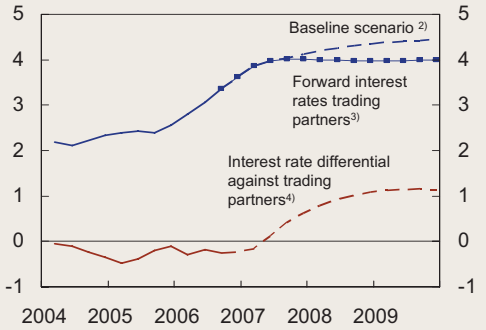


Source: Norges Bank

higher wage growth in Norway, may also contribute to slower growth in mainland exports. All in all, mainland GDP is projected to grow slightly below trend in 2008 and 2009, with a gradual decline in capacity utilisation.

Movements in the exchange rate are difficult to predict. The krone exchange rate is now weaker than assumed in the previous *Report*. Neither the appreciation last spring nor the depreciation in autumn appears to be directly related to interest rate differentials between Norway and its trading partners. The movements in the exchange rate partly reflect changes in the outlook for oil prices and changing themes in foreign exchange markets. Robust global economic growth and favourable prospects have contributed to a gradual tightening of monetary policy among our trading partners over the past year. In the US and Canada, there are expectations of interest rate cuts, but further interest rate increases in the period to next summer are expected for a number of our trading partners. Such a development may dampen the effect of further interest rate increases in Norway on the krone exchange rate. Norges Bank has applied the assumption that money market rates among our trading partners will gradually rise to a normal level of around 4½% over the next few years (see Chart 1.11). As in previous *Inflation Reports*, the projections are based on the assumption that external and domestic interest rates will rise to a somewhat higher level in the longer term than implied by forward interest rates. The krone exchange rate is assumed to appreciate somewhat from its October level, but to remain at a weaker level than assumed in the previous *Report*.

Chart 1.11 Interest rate forecasts for trading partners and interest rate differential. Money market rates[1]. Quarterly figures. 04 Q1 – 09 Q4



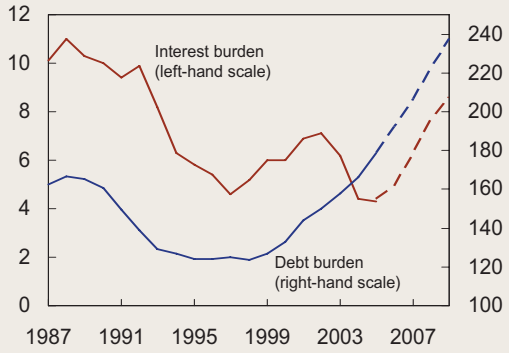
1) The money market rate is approximately 0.2 percentage point higher than the sight deposit rate.
2) As in previous reports, the forward rate is adjusted somewhat in the longer term.
3) Weighted average of trading partners' forward rates at 26 Oct.
4) Interest rate differential in the baseline scenario from 06 Q4 (broken line).

Source: Norges Bank

Charts 1.9a-e show Norges Bank's projected path for the Norwegian economy with a forecast for the interest rate. A further description of the assumptions and projections are provided in Sections 2 and 3. The output gap is now estimated to reach 2¼% in 2007 and to drift lower thereafter. The output gap estimate has been revised up by ¾ percentage point in 2007 since the previous *Report*. The CPI-ATE, adjusted for changes in day-care rates, is projected to rise from the current level of 0.7% to about 2% in the course of the first half of 2008. High electricity prices may contribute to keeping CPI inflation above 2% in the period to next summer, before lower energy prices are expected to contribute to a marked fall in CPI inflation. There are prospects that inflation will be close to the target of 2.5% three years ahead.

The sharp rise in house prices may contribute to sustaining household debt accumulation at a high level in the next few years. Moreover, competition in the banking industry for market shares seems to be influencing credit growth. House price inflation and growth in credit to households

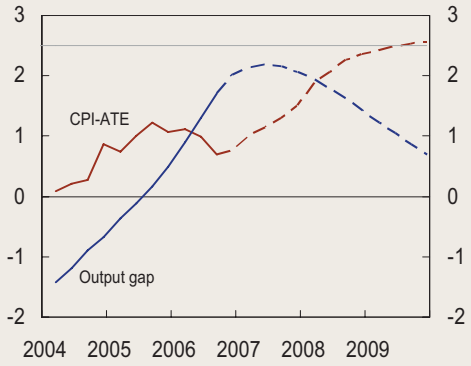
Chart 1.12 Projections of household interest burden[1] and debt burden[2]. Per cent. Annual figures. 1987 – 2009



[1] Interest expenses after tax as a percentage of disposable income less estimated reinvested dividends, less return on insurance claims and plus interest expenses.
[2] Loan debt as a percentage of disposable income less estimated reinvested dividends, less return on insurance claims.

Sources: Statistics Norway and Norges Bank

Chart 1.13 Projected CPI-ATE[1] and output gap in the baseline scenario. Quarterly figures. Per cent. 04 Q1 – 09 Q4



[1] CPI-ATE: CPI adjusted for tax changes and excluding energy products. A further adjustment is made for the estimated effect of reduced maximum day-care rates from January 2006.

Sources: Statistics Norway and Norges Bank

seem to be somewhat higher than projected in the previous *Report*. As a result of low interest rates, the interest burden is now low, but will increase gradually as the interest rate approaches a more normal level (see Chart 1.12). The level of both short-term and long-term interest rates tends to influence household behaviour. An increase in short-term interest rates might have a smaller effect on house prices and credit growth if long-term interest rates remain at a low level. Increased competition has also reduced banks' interest margins. As a result, the interest rate increases over the past year have not fully fed through to interest rates charged on loans to households and enterprises. Interest margins may be reduced further in the years ahead.

The developments in inflation and capacity utilisation in Chart 1.13 provide a balance between the various objectives of monetary policy. The interest rate is sufficiently low for allowing inflation to pick up and approach the target of 2.5%, while the increase in the interest rate will gradually contribute to reducing capacity utilisation.

Uncertainty surrounding the projections

The projections for inflation, output, the interest rate and other variables are based on an assessment of the current situation in the Norwegian economy and our perception of the functioning of the economy. The uncertainty surrounding the projections for the interest rate, the krone exchange rate, inflation and the output gap is illustrated in the fan charts (see Charts 1.9a-e).[2] The wider the fan charts are, the more uncertain the projections. The width of the fan charts is based on historical disturbances.[3] The uncertainty surrounding the interest rate reflects the fact that monetary policy reacts to disturbances to other variables. This increases the uncertainty surrounding future interest rates, but also contributes to reducing the uncertainty surrounding the other variables.

Over several years, interest rates in Norway have been considerably lower than what we consider to be a neutral level. In the baseline scenario the interest rate is gradually raised to a more normal level. The interest rate path may differ from that now envisaged if economic prospects change or if interest rate changes have a different impact on output, employment and prices than assumed. The effects are particularly uncertain in the prevailing situation where the interest rate has been substantially lower than normal for a long period.

[2] There is also uncertainty attached to the current situation (see box on p. 48 and *Inflation Report* 3/05).
[3] A further discussion of the fan charts is presented in Bergo, J. (2006): "Projections, uncertainty and the choice of interest rate assumptions in monetary policy", Economic Bulletin 1/2006 p. 16, Norges Bank.

Conclusions – monetary policy strategy

The Executive Board's assessment is:

- Underlying inflation has been lower than projected in recent months. Nevertheless, several factors point to higher inflation ahead. Capacity utilisation is high and there is little spare capacity in the Norwegian economy. Employment is rapidly rising and unemployment has exhibited a marked decline. There are signs of higher wage growth and expectations of rising inflation. At the same time, the krone exchange rate has depreciated from strong values.

- The interest rate path presented in this *Report* will provide a reasonable balance between the objective of bringing up inflation towards target and the objective of stabilising developments in output and employment, conditional on the information currently available to Norges Bank.

- Monetary policy influences the economy with a lag. Over several years, interest rates have been considerably lower than what we consider to be a neutral level. The interest rate may gradually be raised to a more normal level at a somewhat faster pace than envisaged earlier, although it is unlikely that rates will be raised at every monetary policy meeting. Based on our current assessment, the interest rate will thus continue to be raised in small, not too frequent steps if economic developments are broadly in line with projections.

- The sight deposit rate should be in the interval 3¼ - 4¼% in the period to the publication of the next *Inflation Report* on 15 March 2007, conditional on economic developments that are broadly in line with projections. New information may reveal aspects of economic developments that indicate that the Norwegian economy is moving on a different path than projected. On the one hand, major shifts in trade patterns, strong competition, weaker global growth or a stronger krone exchange rate may result in low inflation. On the other hand, low real interest rates or a further depreciation of the krone may lead to a higher-than-projected rise in output and inflation.

Projections in Inflation Report 2/06 and 3/06

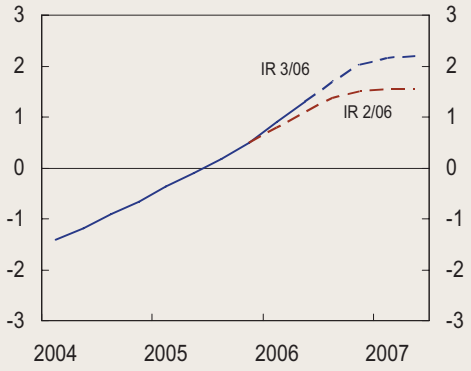
This box presents an analysis of the changes made to the projections in the previous *Inflation Report*. The changes have been made partly because developments since June have differed somewhat from our projections. New information has also emerged concerning conditions that will have an impact on the economy in the period ahead. Moreover, we compare Norges Bank's projections for 2007 with projections from other institutions.

New information since the previous Inflation Report

The following points summarise developments in the economy since the previous *Inflation Report* that have influenced our forecasts for the current year and the period ahead.

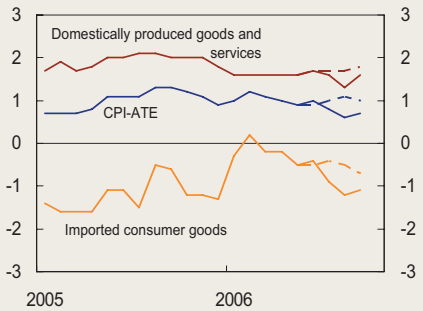
- Our estimate of the output gap now and in the immediate future has been revised upwards (see Chart 1). Employment has increased more rapidly than expected, and unemployment has now fallen to a low level. Various surveys indicate that production in a growing number of enterprises is approaching capacity limits, and that there is a shortage of labour. The rate of growth in the mainland economy is now somewhat higher than projected earlier.
- Inflation measured by the CPI-ATE has been somewhat lower than projected. Prices for both domestically produced goods and services and imported consumer goods have shown weaker-than-expected price developments (see Chart 2).
- The krone exchange rate has depreciated from strong values and is now weaker than assumed when *Inflation Report* 2/06 was published.
- The growth outlook for the US in 2007 appears to be weaker than previously projected. This is also expected to contribute to lower growth among other trading partners
- In the National Budget for 2007 it is assumed that growth in general government consumption will be somewhat stronger than in the previous *Inflation Report.*

Chart 1 Output gap estimates in the baseline scenario in IR 2/06 and IR 3/06. Per cent. Quarterly figures. 04 Q1 – 07 Q2



Source: Norges Bank

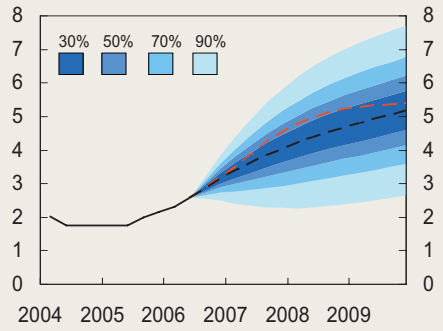
Chart 2 CPI-ATE.[1] Total and by supplier sector[2]. Projections from IR 2/06 (broken line) and actual developments. 12-month change. Per cent. Jan 05 – Sep 06



[1] CPI-ATE: CPI adjusted for tax changes and excluding energy products. A further adjustment is made for the estimated effect of reduced maximum day-care rates from January 2006.
[2] Norges Bank's estimates.

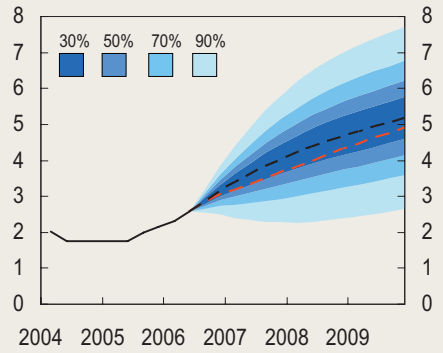
Sources: Statistics Norway and Norges Bank

Chart 3 Sight deposit rate in the baseline scenario in IR 2/06 with fan chart and sight deposit rate in the baseline scenario in IR 3/06 (red line). Per cent. Quarterly figures. 04 Q1 – 09 Q4



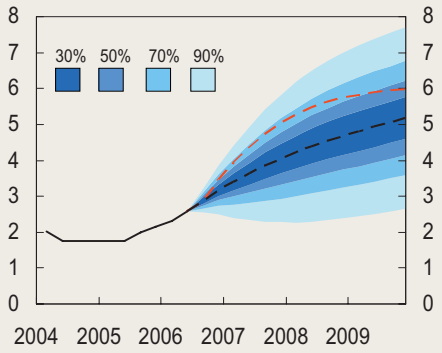
Source: Norges Bank

Chart 4 Sight deposit rate in the baseline scenario from IR 2/06 with fan chart and the isolated effect of lower inflation (red line). Per cent. Quarterly figures. 04 Q1 – 09 Q4



Source: Norges Bank

Chart 5 Sight deposit rate in the baseline scenario from IR 2/06 with fan chart and the isolated effect of a higher output gap and a weaker krone exchange rate (red line). Per cent. Quarterly figures. 04 Q1 – 09 Q4



Source: Norges Bank

Effects on the interest rate path

The interest rate forecast in this *Report* is somewhat higher than that presented in the previous *Report*, i.e. about ½ percentage point on average for 2007 and 2008 (see Chart 3).

The underlying rise in prices has been lower than expected. In isolation, this points to a lower interest rate path (see technical illustration in Chart 4). The relatively moderate rise in labour costs in 2006, strong competition in product markets, high productivity growth and an increase in the share of imports from low-cost countries will probably contribute to keeping inflation low through the remainder of 2006 and into 2007.

On the other hand, the upturn in the Norwegian economy is stronger than previously envisaged. Capacity utilisation in the economy is increasing. Demand from households, enterprises and the public sector is growing. Employment is increasing rapidly, and unemployment is now in line with the level during the previous boom at the end of the 1990s. These developments suggest that cost inflation will accelerate in the period ahead. At the same time, the krone has depreciated. These factors point to a higher interest rate path (see technical illustration in Chart 5).

Changes in the projections

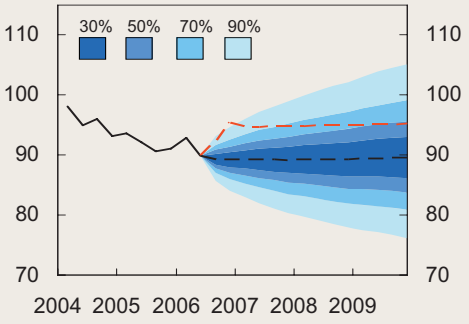
The projections in this *Report* are based on the assumption that the interest rate will follow a path which, in the Executive Board's view, will provide a reasonable balance between the objectives of monetary policy. Section 1 provides a more detailed account of assessments and interest rate developments ahead.

Through summer and autumn, unemployment has fallen more rapidly than assumed in *Inflation Report* 2/06, and the output gap in 2006 is now estimated to be higher than assumed in the June *Report*. Projected mainland GDP growth in 2006

has been revised upwards by ¼ percentage point. Mainland GDP in 2007 is now projected at 3¼ per cent, ½ percentage point higher than projected in the previous *Report*. As a result of higher wage and employment growth, growth in household real disposable income will be higher than projected in the previous *Report*, despite a somewhat faster rise in interest rates. This contributes to raising the projection for private consumption, while at the same time increased leeway under the fiscal rule contributes to higher growth in public demand than previously assumed.

Over the past few months, inflation measured by the CPI-ATE has been somewhat lower than projected in the previous *Report*. The low level of inflation is expected to persist into 2007. Higher wage growth, mounting pressures on economic resources and gradually slower productivity growth are likely to contribute to a rise in inflation, particularly from the second half of 2007 and into 2008 (see Table 1). At the same time, the krone is weaker than assumed in the previous *Report* (see Chart 6). Projected inflation measured by the CPI-ATE is ¼ percentage point lower in 2007 and ¼ percentage point higher in 2008 in this *Report* than the projection in *Inflation Report* 2/06, while the projections for 2009 are unchanged (see Chart 7).

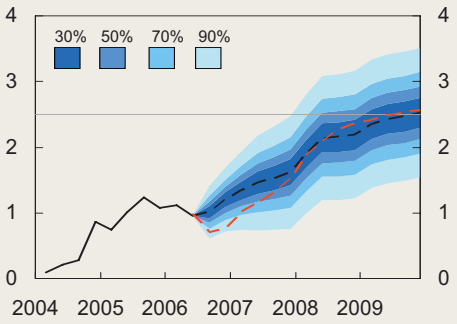
Chart 6 Import-weighted exchange rate (I-44)[1] in the baseline scenario in IR 2/06 with fan chart and I-44 in the baseline scenario in IR 3/06 (red line). Quarterly figures. 04 Q1 – 09 Q4



[1] A rising curve denotes a weaker krone exchange rate. It is assumed that strengthening by a certain percentage is just as likely as weakening by the same percentage.

Source: Norges Bank

Chart 7 Projected CPI-ATE[1] in the baseline scenario in IR 2/06 with fan chart and CPI-ATE in the baseline scenario in IR 3/06 (red line). 4-quarter rise. Per cent. 04 Q1 – 09 Q4



[1] CPI-ATE: CPI adjusted for tax changes and excluding energy products. A further adjustment is made for the estimated effect of reduced maximum day-care rates from January 2006. Other measures of underlying inflation are shown in Chart 3.10.

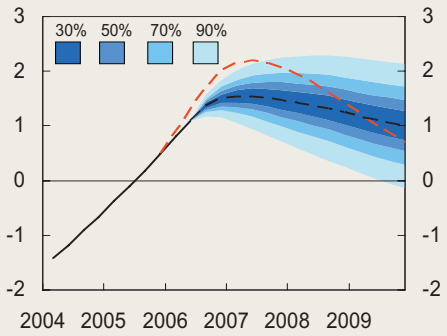
Sources: Statistics Norway and Norges Bank

Table 1 Projections for main macroeconomic aggregates in *Inflation Report* 3/06. Change from projections in *Inflation Report* 2/06 in brackets.

	2006		2007		2008		2009	
Mainland demand	4¼	(0)	3¾	(¾)	2½	(0)	2	(-½)
GDP, mainland Norway	4	(¼)	3¼	(½)	2	(-¼)	1¾	(-½)
Employment	2¾	(½)	1½	(½)	¼	(-¼)	0	(-¼)
LFS unemployment (per cent of labour force)	3½	(-¼)	3	(-½)	3¼	(-¼)	3¾	(0)
CPI-ATE[1]	1	(0)	1¼	(-¼)	2¼	(¼)	2½	(0)
CPI	2¼	(0)	1¼	(-½)	2	(0)	2½	(0)
Annual wage growth	4¼	(¼)	5	(¼)	5¼	(½)	4¾	(0)

[1] Adjusted to take into account that the reduction in maximum day-care rates pushes down the rise in the CPI-ATE by an estimated 0.2 percentage point in 2006.
Source: Norges Bank

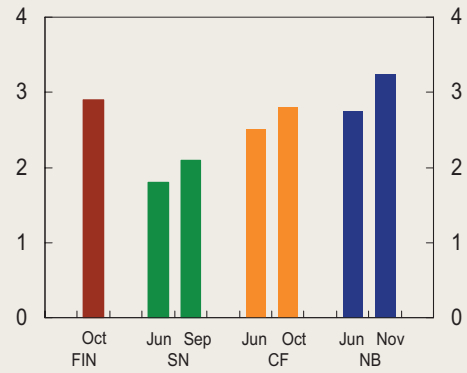
Chart 8 Estimated output gap in the baseline scenario in IR 2/06 with fan chart[1] and output gap in the baseline scenario in IR 3/06 (red line). Per cent. Quarterly figures. 04 Q1 – 09 Q4



[1] Uncertainty concerning the current situation is not taken into account in the calculation (see separate box).

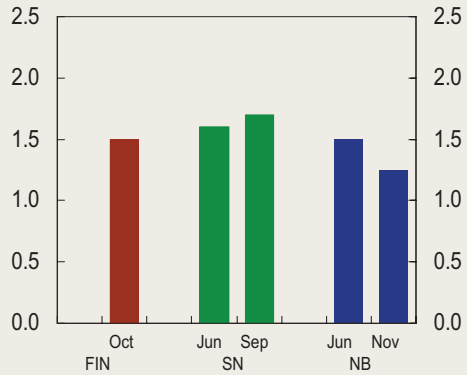
Source: Norges Bank

Chart 9 Mainland GDP. The last two projections published for 2007. Percentage rise



Sources: National Budget 2007, *Economic Survey* 3/2006 and 4/2006, *Inflation Report* 2/06 and 3/06, *Concensus Forecasts* June 2006 and October 2006

Chart 10 CPI-ATE.[1] The last two projections published for 2007. Percentage rise



[1] CPI-ATE: CPI adjusted for tax changes and excluding energy products.

Sources: National Budget 2007, *Economic Survey* 2/2006 and 3/2006, *Inflation Report* 2/06 and 3/06

A higher interest rate and slower growth among our trading partners will lead to slower activity growth ahead. Growth in mainland GDP will probably slacken at a somewhat faster pace than projected in the previous *Report*. At the end of the period, the output gap will therefore be slightly below 1 per cent, somewhat lower than the estimates in *Inflation Report* 2/06 (see Chart 8).

Forecasts from other institutions

Norges Bank's projections for economic growth in 2007 are somewhat higher than those of the Ministry of Finance and Statistics Norway and the average forecast from Consensus Forecasts (see Chart 9). Norges Bank projects mainland GDP growth at 3¼% next year. When Statistics Norway published its forecasts in mid-September, mainland GDP growth in 2007 was projected at 2.1%, which is higher than the June projection of 1.8%. Statistics Norway's forecasts are based on the assumption of a more pronounced global slowdown than expected by Norges Bank. In the National Budget for 2007, the Ministry of Finance puts GDP growth at 2.9% in 2007. The average forecast from Consensus Forecasts has been revised upwards since *Inflation Report* 2/06. In June, the average forecast for growth in mainland Norway was 2.5%, while in October it was 2.8%.

In this *Inflation Report*, Norges Bank projects CPI-ATE inflation at 1¼% in 2007 (see Chart 10), while the Ministry of Finance's projection is 1½%. Since June, Statistics Norway has raised its projection for CPI-ATE inflation in 2007 by 0.1 percentage point to 1.7%. Consensus Forecasts does not compile forecasts for the CPI-ATE.

The Ministry of Finance's forecasts were published on 6 October 2006. These are their first projections for 2007. Statistics Norway published its projections on 15 June and 14 September this year, while Consensus Forecasts collected its forecasts on 12 June and 9 October. As the institutions publish projections at different times, the information on which the projections are based will differ.