1997 conference

Price Stability, Inflation Targets and Monetary Policy

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Introduction

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February 1998

In February 1991, the Bank of Canada and the Government of Canada jointly announced a series of inflation-reduction targets. The targets specified a decelerating path for the year-over-year rate of inflation in the consumer price index (CPI), with a target of 3 per cent inflation to be achieved by the end of 1992, declining to a target of 2 per cent inflation by the end of 1995. These point targets were specified as the midpoints of a range of plus or minus 1 percentage point around the target.

At the time of the announcement, only one other country—New Zealand—had adopted an explicit inflation target. In addition, while there was a large body of academic literature on the benefits and costs of achieving and maintaining low inflation, the use of an explicit inflation target had received relatively little attention among academic economists, both in Canada and abroad.

It was against this background that the Bank of Canada's 1993 research conference put the focus on the implications of targeting a low rate of inflation for economic behaviour and economic policymaking. That conference, entitled *Economic Behaviour and Policy Choice Under Price Stability*, addressed several important questions including:

- What is the optimal rate of inflation?
- What are the benefits of lower inflation and less-variable inflation?
- What is the evidence of downward rigidity in nominal wages and prices?
- Which is better: a target for the rate of change of prices (that is, the inflation rate) or a target for the price level?
- How credible are targets for low inflation, and what are the implications for monetary policy of changes in the way expectations are formed?
- Are there important non-linearities in the inflation process?

Since the 1993 conference, several things have happened. In December 1993 the Bank and the Government jointly announced an extension of the 1 to 3 per cent target range for inflation beyond 1995 to the end of 1998, to provide further experience with low inflation before deciding on the appropriate longer-term objective for monetary policy. On the international front, a number of other countries adopted and gained some experience with inflation targets, including the United Kingdom, Sweden, Finland, Australia, Spain, and Israel. The 1990s have also brought a remarkable convergence in the inflation rates of most industrialized countries (in both those with and those without explicit targets) to relatively low rates of inflation. In these circumstances, research and analysis of monetary policy in a low-inflation environment and the role of explicit inflation targets has expanded both in academia and at central banks.

It was against this background that the 1997 research conference returned to analytic issues related to price stability. This time, with the extension of inflation-control targets beyond 1998 under consideration, particular emphasis was placed on the role and design of inflation targets. In this light, the 1997 conference revisited the questions posed at the 1993 conference, while considering several additional issues including:

- What can we say about the relationship between inflation and economic growth?
- How large is the bias in the CPI measure of inflation?
- How should underlying or "core" inflation be measured?
- How wide should the band be around the inflation target?

- What can we learn from the experiences of other countries with inflation targets?

As is the tradition at Bank of Canada research conferences, both academics and Bank staff were invited to prepare papers to address the questions at hand. For the 1997 conference, three papers were written by academics, another was prepared jointly by an academic and a Bank economist, and four were written by Bank staff. Most of the papers had two formal discussants: a Bank economist and another academic commented on the academic papers, and one or two academics commented on the Bank papers. These commentaries were followed by general discussion among all the participants.

The 1997 conference also featured a special round-table discussion among three practitioners of monetary policy in inflation-targeting countries: Murray Sherwin, Deputy Governor of the Reserve Bank of New Zealand; William A. Allen, Deputy Director, Monetary Analysis, at the Bank of England; and Lars Heikensten, Deputy Governor of the Bank of Sweden. Their remarks, which focussed on the experience with inflation targets in their countries, bring out very clearly the common challenges facing monetary policymakers in open economies.

All the Bank conferences have concluded with a round-table wrap-up, and the 1997 conference was no exception. Paul Jenkins, Deputy Governor of the Bank of Canada, was joined by two distinguished academic panelists, Professor Norman Cameron from the University of Manitoba and Professor Bill Scarth from McMaster University. Their comments, which conclude this volume, provide a thoughtful summary of the conference, weaving together the various themes that emerged over the two days, reflecting on what we learned, and suggesting which issues are the most pressing on the agenda for future research.

The Bank's research conferences are motivated by a desire both to encourage original research from the academic community on monetary policy issues and to have academics actively critique the research conducted by Bank staff. These contribute to ensuring that the monetary policy framework is built on a solid foundation. In an introduction, however, it is impossible to do justice to the many insightful comments and suggestions of the discussants and conference participants. Thus, the focus here is on the research papers and the round-table discussions. The comments of the assigned discussants together with summaries of the ensuing general discussions are included in this volume.

The Intertemporal Nature of Information Conveyed by the Price System

Acrobat PDF (119 kb)

Serge Coulombe (Université d'Ottawa)

With an inflation target, the response of the central bank to a shock that pushes inflation above its target would be to take action to return the inflation rate to its target. In this scenario, the price level would rise as a result of the initial shock, and then the rate of increase in the price level would be reduced until it again equalled the target rate of inflation. Thus, the initial increase in the price level would not be reversed, so there would be a permanent rise in the price level. In contrast, with a price-level target, the central bank would take action to return the price level to its target path (which need not be constant but could be growing at, say, 2 per cent per year, consistent with a long-run average rate of inflation of 2 per cent). In terms of inflation, a shock that pushed the price level above its target path would initially cause inflation to rise above its long-run average, but as the central bank took action to return the price level to its target path, the inflation rate would have to decline below its long-run average for some time to unwind the effect of the initial positive shock on the price level.

Coulombe's paper starts from this observation and considers the determination of the real interest rate—the nominal interest rate less the expected rate of inflation (over the horizon of the instrument)—under both an inflation target and a price-level target. His theoretical analysis shows that with an inflation target, the price level itself plays no role in the determination of the real interest rate. This arises because in this monetary regime all shocks to the price level are permanent, so past shocks provide no information about the future path of the price level and thus none about inflation. With a price-level target, however, the real interest rate depends on the gap between the current price level and the target price level. In this monetary regime, the price level itself conveys useful information about future inflation, because past shocks to prices must be

reversed in the future. This information, Coulombe argues, would be useful for the efficient allocation of resources across time.

Coulombe also suggests that a price-level target would get around the problem, raised by Summers (1991), that with a target rate of inflation of zero, the real interest rate cannot become negative (since the nominal interest rate cannot go below zero), which could constrain the ability of the central bank to provide sufficiently stimulative monetary conditions in times of economic weakness. With a price-level target, the real interest rate can become negative even with a long-run average rate of inflation of zero, since reversing the price-level effects of a negative shock would require a period with inflation above zero.

Since a price-level target has not been pursued in recent times, Coulombe looks to the classical gold-standard period in Great Britain (1717 to 1914) to test his theoretical predictions, arguing that monetary policy was then implicitly geared towards a price-level target. Coulombe uses his theoretical analysis to compute the real interest rate over this period. Examining the resulting series, he argues that when real interest rates are defined in this way, their behaviour is easier to understand and can explain the previously puzzling positive correlation between the nominal interest rate and the price level over this period.

Coulombe concludes by suggesting that the case for defining the explicit target in terms of the price level instead of the rate of inflation deserves more attention before any further reductions in the target rate of inflation are considered.

Is the CPI a Suitable Measure for Defining Price Stability?

Acrobat PDF (153 kb)

Allan Crawford, Jean-François Fillion, and Thérèse Laflèche (Bank of Canada)

In this paper, the authors examine three related questions about the measurement of inflation for monetary policy: Does it matter which measure of inflation (or of the price level) the central bank uses to define its target? How should underlying or "core" inflation be measured? And how large is the bias in CPI inflation?

To address the first question, the authors consider three measures of aggregate prices: the CPI, the implicit gross domestic product (GDP) deflator, and unit labour costs. They find that in terms of their rates of inflation these three measures exhibit relatively similar behaviour in the sense that any differences among them are relatively short-lived. Thus, it is not particularly critical which of these measures of inflation is the medium-term guide for a monetary authority targeting the rate of inflation. If, however, monetary policy were geared towards a price-level target, the choice of index could be more important. The authors find some evidence that the levels of these price indexes share a common long-run trend, but deviations among the different measures are persistent enough to have implications for the medium-term target.

In the short run, measured inflation is affected by relative price shocks. Given the lags in the effect of interest rates on prices, however, monetary policy cannot offset the short-run effects of these relative price shocks on the CPI—it can only control trend inflation over time. Policymakers must therefore try to see through the short-run effects of relative price shocks, and measures of trend or core inflation provide a way of doing this. In practice, the Bank of Canada uses the CPI excluding food, energy, and the effects of indirect taxes (CPIXFET) to measure core inflation, and this serves as the Bank's operational target in the short run. Crawford, Fillion, and Laflèche consider several potential measures of core inflation that are based on the statistical properties of the components of the CPI. Their new measures either remove or reduce the weight on the components of the CPI that have the most volatile prices. They find that the behaviour of these new measures of core inflation is quite similar to that of the CPIXFET, suggesting that the Bank's measure is adequate. At the same time, they also conclude that a couple of their statistical measures have some advantages relative to the CPIXFET, and deserve more attention in the ongoing monitoring of inflation developments.

The issue of CPI bias was examined previously by Allan Crawford (Crawford 1993), but since then this issue has garnered considerable attention, particularly in the United States. With this in mind, the authors update Crawford's previous work for Canada. They conclude that the mean bias in the CPI is about 0.5 per cent per

year, and a reasonable upper bound estimate of the bias is 0.7 per cent. This is slightly higher than the previous estimate of the bias in Crawford (1993), largely because the new study makes allowance for a possible bias associated with the introduction of new brands of existing goods and services. The new estimate for Canada is, nonetheless, about half as large as recent estimates of the bias in the United States. As the authors explain, the lower estimates in Canada reflect several factors, including the more frequent updates of the CPI basket in Canada relative to the United States; the larger bias in the United States that arises when the individual price observations are aggregated; and the fact that the public provision of health care in Canada means that prices for many health care services, which are subject to important quality biases, are not included in the Canadian CPI.

Testing the Link Between Inflation and Growth

Acrobat PDF (109 kb)

Steve Ambler (Université du Québec à Montréal) and Emanuela Cardia (Université de Montréal)

There is a large and growing body of empirical literature on the relationship between inflation and long-run economic growth. Despite this effort, robust estimates of the effects of inflation on growth have proven elusive. While most studies do find a negative relationship, the range of estimates is large, and many studies find that the relationship is not statistically significant.

From this starting point, Ambler and Cardia consider two questions. Why is the relationship between inflation and growth so hard to pin down? And to what extent does the estimated negative relationship between inflation and growth reflect a structural relationship that can be exploited by a low-inflation policy?

The authors step back from the empirical literature and consider these questions in the controlled environment of a general-equilibrium model. In their model, there is a structural relationship between inflation and growth—higher inflation reduces growth. But, as the authors highlight, estimating this structural relationship from data that are generated by their model is complicated by the fact that inflation and growth are jointly affected by a number of other factors. Any failure to adequately control for the effects of these factors will contaminate estimates of the relationship between inflation and growth. This conclusion provides a possible explanation for the wide range of estimates of the inflation-growth relationship in the empirical literature. Different studies control for different factors that affect both inflation and growth, and this may have a significant effect on the empirical estimates.

Ambler and Cardia also suggest that when monetary policy is directed towards achieving a fixed growth path for a monetary aggregate, empirical studies will tend to overestimate the strength of the negative structural relationship between inflation and growth. In other words, they argue that, to the extent that monetary policy has involved targeting a monetary aggregate, the increase in growth that would result from a reduction in inflation is smaller than is suggested by the partial correlations between inflation and growth that are typically estimated in the literature. To solve these problems, Ambler and Cardia suggest that future empirical studies should take more care to control for factors that influence both inflation and growth; this will require empirical specifications to be based more firmly on economic theory.

Non-Linearities in the Output-Inflation Relationship

Acrobat PDF (353 kb)

Appendix Acrobat PDF (26k)

Chantal Dupasquier and Nicholas Ricketts (Bank of Canada)

Whereas Ambler and Cardia focus on the long-run relationship between inflation and economic activity, Dupasquier and Ricketts examine the short-run relationship. This short-run relationship runs from output to inflation, with higher levels of economic activity tending to push inflation up when aggregate spending in the economy runs ahead of the level of output that the economy can supply on a sustainable basis. This positive short-run relationship, known as the Phillips curve, is central to the implementation of monetary policy,

since monetary policy influences inflation through the effects of interest rates and the exchange rate on aggregate demand.

Dupasquier and Ricketts' study considers the shape of the short-run output-inflation relationship. For various reasons, empirical Phillips curves are often assumed to be linear, but the theoretical literature suggests a number of possible sources of non-linearity. One possibility, known as the capacity constraint view, is that inflation may become more sensitive to increases in aggregate demand when the level of demand is already high. Another potential source of non-linearity is that inflation might become less sensitive to the level of aggregate demand relative to supply at lower and/or more stable rates of inflation.

In an attempt to distinguish among the alternatives, the authors estimate Phillips curves for both Canada and the United States that encompass these and other types of non-linearities. They find that it is difficult to draw firm inferences about the shape of the short-run Phillips curve. Nonetheless, they do find some support for the capacity constraint view, while also suggesting that inflation might become less sensitive to aggregate demand at lower and/or more stable rates of inflation. At the very least, this suggests that monetary policymakers must take account of the uncertainty surrounding the Phillips curve and watch for any changes in this relationship as our experience with low rates of inflation continues.

Testing for Downward Rigidity in Nominal Wage Rates

Acrobat PDF (211 kb)

Allan Crawford (Bank of Canada) and Alan Harrison (McMaster University)

In this paper, the authors attempt to test the proposition that a little bit of inflation is a good thing because it facilitates the adjustment of real wages to shocks and thus improves the efficient allocation of labour. If workers' assessments of their wages are based on the real purchasing power of the money they receive, they will view a nominal wage cut of 5 per cent when inflation is zero to be equivalent to a nominal wage freeze when inflation is 5 per cent. But if, for some reason, workers find the former to be less acceptable than the latter, then low inflation may increase the downward rigidity in real wages. This has the potential to increase the equilibrium level of unemployment at low rates of inflation since, if firms facing the need to reduce labour costs cannot reduce real wages, an alternative is to reduce employment.

Crawford and Harrison look for evidence of excess downward rigidity in nominal wages at low rates of inflation. Looking first at data from union wage settlements, they find that at low rates of inflation there are more wage freezes than at higher rates of inflation, with the extent of this effect being much smaller in the private sector than in the public sector. The real question, however, is not how many wage freezes there were at low rates of inflation, but how many more there were than if there had been no downward nominal wage rigidity. Crawford and Harrison address this more difficult question for private sector union wage settlements and conclude that an upper bound estimate of the excess number of wage freezes at low inflation is between 10 to 15 per cent of the contracts in this sector.

The authors then go on to consider alternative data sources in an effort to gauge th xibility of nominal wages in the non-union sector, as well as the potential to adjust total compensation without changing the base wage rate. Each of the data sources they consider provides only partial information, but together they suggest that union wage settlements understate the overall flexibility in wage costs in the private sector. In particular, they find that wage freezes are less frequent in the non-unionized sector and wage rollbacks more frequent, and that variable compensation (such as bonuses) makes a significant contribution to wage flexibility in the overall wage structure of firms of all sizes. Thus, while there is some evidence of downward nominal rigidity in base wages, particularly in the unionized sector, it is much less clear whether the downward nominal rigidity in total compensation across the labour market as a whole is large enough to have significant macroeconomic consequences.

Round-Table Discussion: International Experiences with Inflation Targeting

Murray Sherwin (Reserve Bank of New Zealand) *Acrobat PDF (59 kb)*
William A. Allen (Bank of England) *Acrobat PDF (15 kb)*
Lars Heikensten (Bank of Sweden) *Acrobat PDF (154 kb)*

As described in a background paper by Robert Lafrance (included in this volume Acrobat PDF (59 kb)), New Zealand adopted an inflation target effective February 1990, the United Kingdom announced an inflation target in October 1992, and the Bank of Sweden began conducting monetary policy with reference to an inflation target in January 1993. In the round-table discussion, central bankers from these countries shared their experiences with inflation targets, focussing on both the benefits and the challenges.

Sherwin began by stressing that an explicit inflation target is only one element of the New Zealand monetary framework. The target is part of a package that also includes provisions for the Reserve Bank to have operational autonomy for monetary policy, a mechanism whereby the Reserve Bank is held accountable for maintaining inflation within the target range, and a strategy for the transparent communication of monetary policy objectives and actions to both financial markets and the general public. This package, Sherwin suggested, has proven effective on several fronts. By raising the profile of inflation, it has focussed the attention of monetary policymakers on the difficult decisions to be made. For the political establishment, the explicit character and transparency of the monetary policy arrangements have been helpful in focussing the debate on the longer-term objectives of monetary policy, while leaving the Reserve Bank to implement policy on a day-to-day basis. For financial markets and the public at large, the new framework has been a key element in establishing expectations of low inflation. A clear target, together with the transparency and frequency of the Reserve Bank's public reports on monetary policy, has also allowed financial markets to better anticipate the emerging stance of monetary policy, which has reduced surprises.

William Allen began by noting that while there is some evidence that exchange rates are more stable when inflation is low than when it is high, exchange rates have nonetheless moved considerably in the 1990s. His remarks focussed on the challenge this has posed for inflation targeting and monetary policy in the United Kingdom. In an open economy, the real effects of monetary policy are transmitted through both interest rates and the exchange rate. At the same time, interest rates and the exchange rate are affected by factors other than monetary policy, and often these factors are international in origin. Exchange rates, in particular, can change sharply in response to international events, and this results in a change in domestic monetary conditions. The challenge for monetary policy is that, although the appropriate response depends on why the exchange rate is changing, it is often difficult to identify the underlying reasons for exchange rate changes. The central bank must therefore do its best to track down why the exchange rate is changing and, at the same time, recognize that its conclusions are subject to some uncertainty.

Lars Heikensten from the Bank of Sweden also stressed that handling exchange rate turbulence has been an important practical problem for Swedish monetary policy. He went on to discuss the relationship between output stabilization and inflation targeting. He stressed that just because monetary policy is framed around an inflation target, this does not imply that the central bank cares only about inflation—in practice, the central bank is also concerned with the variability of output and employment. This concern, he suggested, is reflected in the speed with which the central bank tries to bring inflation back to its target following a shock. If the central bank cared only about inflation, it would attempt to bring inflation back to target very quickly, implying large changes in interest rates in the short run. In practice, however, the central bank does not attempt to bring inflation back to target as quickly as possible. This more gradual approach reflects the desire both to avoid large and sudden changes in interest rates and to minimize output fluctuations.

On the Costs and Benefits of Price Stability

Acrobat PDF (150 kb)
Richard Black, Don Coletti, and Sophie Monnier (Bank of Canada)

In this paper, the authors provide a review of the evidence on the benefits of low inflation together with new evidence on the macroeconomic implications of several potential costs of low inflation. The literature on the

benefits of low inflation has suggested a number of channels through which inflation reduces our standard of living. Inflation imposes unnecessary costs on individuals who hold cash, it interacts with the tax system to distort effective tax rates, and it causes confusion between changes in relative prices and changes in the general price level. Inflation also increases the uncertainty about future inflation, since inflation tends to be more variable when it is high than when it is low. The authors review the international evidence on these various costs of inflation. Their survey shows that estimates of the cost of inflation that are based on costs of holding cash are small, while estimates of the distortionary effects resulting from the interaction between inflation and the tax system are much larger. The importance of other channels is typically assessed indirectly by estimating the relationship between inflation and growth, and here estimates range widely, making it more difficult to draw firm conclusions.

The authors then compare the costs of inflation or, correspondingly, the benefits of low inflation, with the costs of reducing inflation. Traditionally, assessments of the cost of reducing inflation are based on estimates of the amount of output that must be forgone in the short run to reduce inflation to the desired rate, assuming inflation is initially above this desired rate. The authors calculate this cost in terms of the present value of forgone consumption, in order to make valid comparisons with the estimates of the benefits of reducing inflation. They conclude that the benefits of reducing inflation, which stem from both the reduced cost of holding money balances and the elimination of inflation distortions in the tax system, outweigh the costs.

The authors then go on to revisit their cost-benefit analysis while considering several arguments that there may be permanent costs to achieving and maintaining low inflation. These include the possibility that some of the effects of disinflation on output are permanent (the hysteresis hypothesis) and the potential for low inflation to limit the ability of monetary policy to stimulate the economy because nominal interest rates cannot go below zero (the Summers effect). On the former, the authors suggest that any hysteresis effects cannot be large, since such effects have proven very difficult to isolate empirically. Using a range of estimates of the hysteresis effect, they find that including this effect does not reverse their previous cost-benefit conclusion, although a generous assumption on the degree of hysteresis can noticeably reduce the net benefits of reducing inflation. To examine the implications of the Summers effect, the authors use the Bank's main model of the Canadian economy (the Quarterly Projection Model) to estimate how often the nominal interest rate would hit zero at different rates of inflation. They find that the costs of the Summers effect are very small, even for an inflation target as low as zero, and have little impact on their previous cost-benefit analysis.

The Credibility of Monetary Policy: International Evidence Based on Surveys of Expected Inflation

Acrobat PDF (151 kb)

David Johnson (Wilfrid Laurier University)

A credible monetary policy produces better economic outcomes, because it fosters a shared understanding of the monetary response to unavoidable shocks, which reduces confusion and makes the necessary economic adjustments easier. The practical problem with credibility is that, despite its importance, it is not directly observable.

In his paper, Johnson attempts to measure the credibility of low inflation. As a measure of inflation expectations, he uses survey data on projections for inflation made by professional economic forecasters. The data span 18 countries, including Canada, and run from 1984 to 1995. Johnson considers two measures of credibility. For countries with an explicit inflation target, inflation forecasts are evaluated relative to the midpoint of the target range. The closer the forecast is to the midpoint of the target range, on average, the greater the credibility of monetary policy. For the pre-inflation-targeting period and for countries without an explicit target, the measure of credibility is the average size of the forecast error. This is based on the idea that there are fewer surprises with a more credible monetary policy.

Johnson draws several conclusions from his empirical analysis. First, he suggests that the results shed light on why some countries have decided to adopt an explicit inflation target while others have not. In particular,

he finds that the inflation-targeting countries occupy six of the seven highest slots in terms of the average size of the forecast errors, and he interprets this as evidence that it is the countries where monetary policy has had low credibility that have turned to targets. Second, he concludes that, among the inflation-targeting countries, Canada and New Zealand have the most credible targets. Third, he finds that the average size of the forecast errors in the inflation-targeting countries has declined with the adoption of inflation targets, suggesting that targets may have been successful in increasing credibility. At the same time, he also finds that the reduced inflation in the 1990s in countries without explicit inflation targets led to a decline in the average size of the forecast errors in those countries. He concludes that, while the credibility of monetary policy has increased with the move towards low rates of inflation, it is difficult to draw firm conclusions as to whether explicit inflation targets have made any extra contribution to that credibility.

On Policy Rules for Price Stability

Acrobat PDF (335 kb)

Richard Black, Tiff Macklem (Bank of Canada), and David Rose (QED Solutions)

An inflation target describes the objective of monetary policy, but it does not describe how policy will be conducted to achieve this target. In practice, there are always unexpected events—shocks—that push inflation away from its target, and the central bank has to react to these shocks to adjust monetary conditions so as to bring inflation back to its target. In their paper, Black, Macklem, and Rose consider the potential for the monetary policy response to shocks to be governed by relatively simple rules that could be communicated as part of a policy of price stability. In doing so, they consider a number of interrelated questions including: How quickly should the central bank return inflation to its target? How wide should the band be around the inflation target? And what types of rules work best?

To address these questions, the authors use a model of the Canadian economy and subject it to random shocks that are designed to be representative of the shocks that have buffeted the Canadian economy over the past 30 years. The authors begin by considering rules that call for the central bank to adjust short-term interest rates in response to expected (that is, forecasted) deviations of inflation from target. Thus, if inflation is expected to be above the target, the central bank would raise interest rates. Their results highlight that controlling inflation requires the central bank to raise interest rates to dampen spending when aggregate demand is running ahead of supply, and to reduce interest rates to stimulate spending when aggregate demand is below supply. The pursuit of the inflation target therefore acts as an automatic stabilizer on the business cycle, while at the same time controlling inflation. In determining how fast to bring inflation back to target, however, the central bank faces a trade-off. If it attempts to bring inflation back to its target very quickly, this will destabilize output, so the improved inflation control will come at the cost of larger fluctuations in output. The authors suggest that rules that bring inflation most of the way back to target in about two years do a good job of stabilizing output while at the same time providing adequate inflation control. Using this type of rule, they suggest that inflation would be inside bands of plus or minus 1 percentage point around the target about two-thirds of the time.

The authors then go on to compare rules that target the price level with those that target the inflation rate. They find that, provided the price-level target is credible and private-sector expectations of inflation adjust accordingly, the economy performs better with a price-level target than with an inflation target, in the sense that the variability of both inflation and output are lower with the price-level target. The authors caution that these results should be taken only as suggestive, but conclude that they do establish a strong case that future research should place more emphasis on the possible role of a price-level target as part of an overall policy of price stability.

Wrap-Up Discussion

W. Paul Jenkins (Bank of Canada) *Acrobat PDF (30 kb)*
Norman Cameron (University of Manitoba) *Acrobat PDF (28 kb)*
William Scarth (McMaster University) *Acrobat PDF (25 kb)*

In his wrap-up, Jenkins began by observing that the conference papers had significantly advanced our knowledge in a number of areas, and that this research should be a valuable input to the decisions that have to be taken regarding the design and specification of the inflation target for the period beyond 1998. In particular, he suggested that significant progress had been made on understanding the extent of the CPI bias, on the relevance of the Summers effect and downward nominal wage rigidity, on the measurement of credibility, and on understanding the implications of alternative definitions of price stability. At the same time, he also highlighted several issues for future research. With regard to downward nominal wage rigidities, he pointed out that Crawford and Harrison's results reveal a clear decline in the dispersion of wage changes across union wage settlements as inflation came down in the 1990s, and he suggested that this is consistent with the view that low inflation reduces confusion between changes in relative wages and changes in the average level of wages. On the cost-benefit analysis of moving to lower rates of inflation, he suggested that the economics profession has done a good job of measuring the distortionary effects of inflation arising from the interaction between inflation and the tax system, but that further work is needed to quantify the effects of reducing inflation uncertainty. Finally, on price-level targets, he suggested that the conference papers had advanced the debate by challenging the conventional wisdom that a price-level target would result in larger fluctuations in output. At the same time, he cautioned that we need a better understanding of how expectations would be formed with a price-level target, and how the economy might adjust during the transition period to a price-level target.

Cameron organized his comments around the following question: How should the central bank respond to shocks? On the issue of whether the central bank should attempt to return inflation or the price level to an explicit target following a shock, he expressed a preference for an inflation target. A price-level target, he argued, would not be credible because it would be hard to justify why, following an increase in inflation above its long-run average, inflation had to be reduced below this long-run average for some time to drive the price level back to its target. Cameron also suggested that since the Bank's 1993 research conference, the case for a little bit of inflation had strengthened on the margin. In particular, he suggested that it had proven difficult to find significant evidence that the inflation target should be low—1 to 2 per cent—instead of just moderately low—3 per cent. Moreover, although Crawford and Harrison find little evidence that low inflation will seriously impede real wage adjustment, Cameron suggested that downward nominal wage rigidity remains a risk, and that further research is required in this area. He concluded by suggesting that the central bank should place more emphasis on private sector forecasts of inflation when deciding how to respond to a shock. If private sector forecasts suggest that inflation is expected to rise above the target, the central bank should tighten monetary conditions, and when private sector forecasts predict that inflation will be below the target, monetary conditions should be relaxed.

Finally, Scarth focussed his comments on three issues: inflation targets versus price-level targets, the monetary response to exchange rate changes, and the optimal rate of inflation. On the first issue, he used a small model to argue that policymakers face a trade-off when choosing between a price-level target and an inflation target. A price-level target, he argued, would result in shorter periods of weak economic activity, but the initial decline in economic activity would be sharper. While the conference papers suggest that the cumulative output loss is smaller with a price-level target, Scarth cautioned that the severity of recessions is also a consideration when choosing between these two regimes. On exchange rates, Scarth pointed out that, because the monetary policy response to an exchange rate shock depends on the interpretation of the shock, policymakers face a communications challenge whenever the exchange rate changes. He went on to suggest that if central banks want to be more transparent, they need to do a better job of explaining how they interpret exchange rate movements and particularly what the implications are for the desired stance of monetary policy. Finally, on the optimal rate of inflation, he applauded Black, Coletti, and Monnier for taking seriously some of the arguments against low inflation and attempting to integrate them into an overall cost-benefit analysis for lower inflation. At the same time, he encouraged future work in this area to explore the macroeconomic implications of downward nominal wage rigidity.