

David Dodge: Low and predictable inflation and the performance of Canadian labour markets¹

Lecture by David Dodge, Governor of the Bank of Canada, to the Memorial University of Newfoundland, St. John's, Newfoundland and Labrador, 20 November 2003.

The references can be found at the end of the speech on the Bank of Canada's website: www.bankofcanada.ca.

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The goal of Canadian monetary policy is to contribute to solid economic performance and rising living standards. The best way we can do this is by keeping inflation low, stable, and predictable. This has important implications for labour market performance.

Although inflation is now low, stable, and predictable, this has not always been the case. Indeed, in the 1970s, inflation was high, unstable, and unpredictable. This led to the establishment of the Anti-Inflation Board (AIB) in 1975, where I worked as Research Director.

Tonight, I would like to reflect on what we have learned since the AIB closed its doors almost 25 years ago to the day. I'll begin with a brief discussion of the theoretical foundation for the role that inflation expectations play. Expectations are important for both price- and wage-setting, but I will concentrate on the wage-setting aspects. I would next like to discuss the Bank of Canada's inflation-targeting framework, which serves to anchor inflation expectations. I will also address the issue that our inflation target may be too low because nominal wages are downwardly rigid. And I will discuss Canada's labour market performance and how it has improved substantially with the change in our monetary policy framework since 1991. Finally, I will say a few words about the conduct of monetary policy today, and offer some brief concluding remarks.

1. Inflation and the role of inflation expectations

Let me begin by going back to the 1970s. When we started that decade, the inflation rate was around 3 per cent. But it quickly rose to over 12 per cent in the span of three years. Not only was inflation rising, it had become more variable, creating uncertainty over the future rate of inflation.² This made it difficult for workers and employers to decide on the appropriate rate of inflation to incorporate into wage settlements. In this environment, it was not surprising that some workers demanded wage increases, both as compensation for past inflation and as a precaution against future inflation. And many employers granted them. When they did not, workers often went on strike. On average, in the 1970s, over seven million person-days were lost to strikes each year. This was an enormous loss of output. High and variable inflation also triggered large wage settlements. This fuelled inflation expectations and contributed to both a wage-price spiral and a wage-wage spiral.³

In the economics literature of the day, there was a lot of confusion over the role that inflation expectations play in the wage-formation process. The literature stressed that workers and unions sought to catch up with inflation that had already occurred. But against this background, Milton Friedman argued that forward-looking expectations were more important in wage bargaining than catching up with past inflation. In particular, he stressed that workers bargain over real, and not nominal, wages. When signing a new contract, workers demand higher wages if they expect prices to increase over the life of the contract so as to preserve their real wages.

¹ The oral presentation by Governor Dodge at Memorial University is an abridged version of this paper. The Governor would like to thank Robert Fay, Assistant Chief, Research Department, Bank of Canada, for his contribution to this paper.

² Variability is measured as the standard deviation.

³ At the time, workers and unions were pushing for wage increases to compensate them for the risk of higher inflation over the life of their contracts. But employers in some sectors were also willing to offer high wage increases. The public sector, for example, saw larger revenues with rising inflation. And some firms in the private sector experienced a boost in profits generated by inflation and were therefore willing to grant relatively large wage increases. In some cases, this led workers and unions to demand similarly large wage increases, irrespective of the conditions in their particular sector.

Thus, he argued that it is not the recently observed rate of inflation, but rather the *expected* rate of inflation that plays a prominent role in wage-setting. But with inflation rising and becoming more variable, there was considerable uncertainty over what the future rate of inflation would be. Indeed, high and variable inflation meant that there was no anchor for inflation expectations, and this lack of an anchor led to considerable turbulence in wage-setting.⁴

Although contractionary macroeconomic policies were required to lower the double-digit inflation rate, such policies operate with a lag and would have resulted in higher levels of unemployment during the transition period. One train of thought in the early to mid-1970s was that temporary wage and price controls could alleviate the negative impact on unemployment by ensuring that, over a period of time, wage- and price-setting behaviour would become consistent with the more restrictive macroeconomic policies.

The Anti-Inflation Board was therefore established to try to anchor inflation expectations through wage and price controls. The objective was to ensure that wage growth was in line with a set of targets for inflation of 8, 6, and 4 per cent over a 3-year period. This was done with the assumption that monetary and fiscal policy would be set to be consistent with such a result.⁵

The imposition of wage and price controls was very controversial, to say the least. One well-known academic even described them as “how to do a lot of harm by trying to do a little good.”⁶ There were three principal arguments against the use of controls. The first was that they would create distortions in the economy and that the longer the controls were in place, the greater these distortions would grow. The second was that controls are very difficult and costly to administer. Third, there was doubt as to whether the controls could really engineer a permanent reduction in inflation. In particular, would policy-makers place too much emphasis on controls and not enough on supporting macroeconomic and structural policies?

The empirical evidence that followed suggested that the controls were responsible for a reduction of about 2 to 3 percentage points in wage increases.⁷ Ultimately, however, neither monetary nor fiscal policy was restrictive enough to maintain a lower rate of inflation, although, at the time, monetary policy was thought to be sufficiently tight. Subsequent research at the Bank, however, showed that the links between movements in the narrow monetary aggregate M1 and changes in prices were not as close in the short run as had been expected. And the size of the short-run changes in interest rates required to keep the money stock within its target band were not enough to have much of an impact on real output or prices.⁸

The fact that the link between any monetary aggregate and inflation did not prove to be very tight over time led the Bank to suggest in 1988 that it should focus directly on price stability as the anchor for monetary policy.⁹ This led to the introduction of the inflation-targeting framework in 1991, one important objective of which is the anchoring of inflation expectations.

We did this because we had learned that, once inflation expectations are anchored, they contribute to more stable output and employment growth, allowing for more durable gains in real income over time.

2. Inflation targeting and the behaviour of inflation

In February 1991, the Bank and the Government of Canada jointly announced a series of inflation-reduction targets.

⁴ In addition, the economy was buffeted by shocks that had not been seen before. For example, the economy was hit by adverse oil-price shocks that fed directly into inflation expectations in the absence of a clear nominal anchor for monetary policy. And these shocks, combined with other structural changes, made it difficult for workers and employers to judge how to respond.

⁵ For an overview of the causes of inflation, as well as the goals of the AIB, see Dodge (1976).

⁶ Lipsey (1977).

⁷ Auld et al (1979).

⁸ Thiessen (2000). In other words, the interest rate elasticity of M1 demand was too high. In the second half of the 1970s, the nominal anchor for monetary policy was a series of target ranges for growth in M1. These were abandoned in the early 1980s as the relationship between movements in the narrow money aggregate and changes in nominal spending broke down. Another problem with using the monetary aggregate M1 as the target for monetary policy was the uncertain impact of financial innovation, which weakened the relationship between M1 and other macroeconomic variables.

⁹ Crow (1988).

These targets were aimed at gradually bringing the 12-month rate of inflation down to 2 per cent, the midpoint of the inflation-control target range, by December 1995. Given the empirical evidence for Canada, which showed that the appropriate horizon for aiming at an inflation target was about 1½ to 2 years, the first formal target was set for December 1992 at a rate of 3 per cent (plus or minus 1 per cent). Since that initial agreement, the inflation target has been extended three times, with the latest agreement covering the period to the end of 2006. In each case, the midpoint of the inflation-control target range has been maintained at 2 per cent.

The measure of prices chosen for the target was the consumer price index (CPI). This index is well understood by workers, unions, and employers, partly because of its use in cost-of-living (COLA) agreements. The operational guide for the Bank, however, is core inflation.¹⁰ The reason for using a core inflation measure is to focus on the underlying trend in inflation on which monetary policy can have an effect. Given the lags between monetary policy actions and their impact on inflation, shocks that are expected to dissipate within that time frame are generally outside the scope of central bank action, unless such shocks have an impact on inflation expectations.

Since the adoption of inflation targeting, the inflation rate has fallen significantly. Indeed, by January 1992, inflation was already close to 2 per cent, down from its average of over 5 per cent between 1988 and 1991. Although at times it has approached the boundaries of the range, and exceeded it earlier this year, over the medium term, the average inflation rate has remained around 2 per cent. Indeed, over the six-year period from 1996 to 2002, it was just under 2 per cent. Moreover, not only has the inflation rate fallen, it has become more stable. In other words, movements away from the target have not been persistent. When inflation has moved away from the midpoint, it has shifted back towards 2 per cent as the shocks have worn off.

Not surprisingly, the Bank has undertaken considerable research to better understand the dynamics of inflation. One strand of this research has examined the persistence of inflation by allowing for potential changes in inflation regimes.¹¹ The results show that the inflation process in Canada can be divided into three distinct regimes: one with extremely high persistence and high inflation rates, one with fairly low persistence and moderate inflation rates, and one with low persistence and low inflation rates. In the first regime, which prevailed in the 1970s and early 1980s, when inflation moved up, it tended to stay up. Since that time, the economy has moved into the second and third regimes, with inflation becoming much less persistent. Indeed, persistence fell considerably over the 1980s and essentially disappeared in the late 1990s.¹²

This decline in the persistence of inflation was the result of the change in the monetary policy regime that has fostered more forward-looking inflation expectations. Traditional analysis of the inflation-unemployment trade-off using the Phillips curve, however, has typically modelled inflation expectations as the weighted sum of past lags of inflation.¹³ More recent research has therefore moved towards embedding forward-looking expectations in this analysis. Cross-country analysis covering OECD inflation-targeting countries indicates that, since the adoption of the targets, inflation expectations have become more forward-looking, and that they are anchored around the official targets.¹⁴ In our own empirical research for Canada, we have also found that expectations have become more forward looking.¹⁵

¹⁰ When the targets were first introduced, core inflation was defined as the CPI excluding food and energy prices and the effects of changes in indirect taxes on the remaining CPI components. We now have a more refined measure that excludes only the eight most volatile elements of the index as well as the effects of changes in indirect taxes on the remaining components. One reason for moving to the new measure of core inflation was that it is a better predictor of future inflation than the previous measure (Macklem 2001).

¹¹ Ricketts and Rose (1995), Demers (2003).

¹² St-Amant and Tessier (1998) find that this has also been the case in other major inflation-targeting and non-targeting countries.

¹³ The restriction that these lags sum to one is usually imposed so that there is no long-run trade-off between inflation and unemployment.

¹⁴ Clifton, Leon and Wong (2001).

¹⁵ Khalaf and Kichian (2003). Because traditional Phillips curves are reduced-form equations, changes in the monetary policy regime can undermine their use for policy purposes (the Lucas Critique). Research at the Bank has therefore also examined whether the New Keynesian Phillips curve adequately represents inflation dynamics in Canada. Guay, Luger and Zhu (2002) have found that this is not the case, although their work highlights the importance of including forward-looking expectations in the analysis. Work has also been undertaken on estimating the so-called sticky information Phillips curve based on the premise that firms change prices slowly because of the costs of acquiring new information relevant to that decision. See Khan and Zhu (2002).

Another fact about the inflation process in Canada is that inflation has become less uncertain - in other words, more predictable. After the oil-price shocks of the 1970s, inflation variability rose sharply. Although it fell during the years when the AIB was in operation, it rose again in the 1980s. However, between the 1980s and the latter part of the 1990s it dropped almost fourfold.¹⁶ This reduction in inflation variability linked to the low-inflation environment allows people to take a longer-term view with respect to their planning, which leads to a better allocation of economic and financial resources.

In Canada, policy credibility has clearly increased over time. Work carried out using data to the mid-1990s suggested that, while central bank credibility had improved in inflation-targeting countries, it was difficult to say whether explicit inflation targets had made any additional contribution to that credibility.¹⁷ More recent evidence suggests that the inflation target has, in fact, played an important role in enhancing credibility. For example, since the mid-1990s, long-term inflation expectations have fallen close to the midpoint of the target range, which is also close to the mean of inflation.¹⁸

In Canada, expectations of forecasters and businesses began to fall in line with the targets soon after they were introduced.¹⁹ At first, this was for expectations at the 2-year horizon. Gradually, this lengthened to 6 to 10 years. By 1997, long-term expectations of inflation in financial markets, as expressed by the difference between 30-year yields on conventional and index-linked bonds, had fallen in line with the 2 per cent target midpoint. They have been firmly anchored at that level ever since, despite the various shocks that have hit the Canadian economy. This is in strong contrast to earlier periods in our history when future expectations had been fairly tightly linked to recently observed inflation rates.²⁰ And this change in behaviour is not because there have been fewer economic shocks. In fact, over the past few years, we have witnessed economic crises in Asia and Russia, oil-price shocks, and the tragic events of 11 September 2001 in the United States. Despite all of this, inflation expectations have remained well anchored. This is in absolute contrast to earlier periods. And it points to the important role that monetary policy plays in anchoring inflation expectations.

In general, there is real evidence to support the argument that, with the inflation target becoming increasingly credible, the whole nature of the inflation process has changed. The short-run response of inflation to measures of excess demand and supply appears to have fallen. And similarly, the response of inflation to relative price shocks, such as changes in the exchange rate and energy prices, also seems to have declined. These changes have had the effect of reinforcing the stability of the inflation process and, therefore, of inflation itself. And this, in turn, has produced a more stable macroeconomic environment.

Moreover, by keeping average rates of inflation close to the inflation target, and by indicating that the Bank will act symmetrically to shocks that drive inflation away from the target in either direction, we have been able to contain inflation expectations. Indeed, under a credible monetary regime, there should be fewer forecasting errors in the bargaining process, since uncertainty about inflation is low. Thus, there is less need for workers to demand additional wage increases to protect themselves against the risk of unexpectedly high future inflation - increases that can contribute to a wage-price spiral. Nor are employers as likely to offer such increases. Similarly, both employers and workers can look through periods when inflation is below the target. Thus, wage-setting becomes focused on actual developments in the particular sector. And workers and unions are able to place greater emphasis on real factors, such as productivity, that will help to boost income and living standards.

3. Inflation targeting: is the target set too low?

Now I would like to turn to concerns by some analysts that the level of the inflation target is set too low.

¹⁶ This is measured by the standard deviation of inflation, which fell from about 3 in the 1980s to 0.7 in the last part of the 1990s.

¹⁷ Johnson (1997).

¹⁸ In addition, long-term inflation expectations would appear to be better anchored in Canada than in the United States. See Kozicki and Tinsley (2002).

¹⁹ Perrier and Amano (2000).

²⁰ Dodge (2002a).

Inflation targets, whether in Canada or elsewhere, have typically not been set at zero. One argument for excluding zero is that there is downward rigidity in nominal wages. More specifically, it says that a little inflation is needed to “grease the wheels” of the labour market because nominal wages are downwardly rigid. Thus, it is argued that the target for the inflation rate should be in the 2 to 4 per cent range to facilitate adjustments in the real wage.²¹ You will recall that, in Canada, the target range is set at 1 to 3 per cent.

One reason behind this argument is the belief that inflation allows firms to provide real wage increases to workers whose productivity is rising, while reducing real wages to less-productive staff without having to cut nominal wages.²² Therefore, for firms to achieve the desired adjustment in real wages in the face of adverse demand shocks, inflation would have to be above zero. Otherwise, unemployment would rise, perhaps at an increasing rate, as inflation approaches zero, because firms would have to resort to layoffs to keep wage bills at their desired level.

Why might nominal wages be downwardly rigid? This could result from money illusion - for example, workers refusing to accept nominal wage cuts when, in fact, they may have suffered a similar reduction in real wages in the past because of inflation. Firms might also be reluctant to cut nominal wages because of notions of fairness. They might also have concerns that such cuts would adversely affect the quality of candidates they seek to attract, or lead to higher quit rates.

On the face of it, downward nominal wage rigidity would seem to have little relevance for Canada.²³ As I will discuss in more detail later, in the late 1990s, the unemployment rate fell sharply even though inflation had stabilized around 2 per cent.

The question is, how far above zero should the inflation target be set? This is an empirical question about how important downward nominal wage rigidity is in practice. Is there evidence that there is so much resistance to nominal wage cuts in Canada that our inflation target of 2 per cent is too low?

In the period leading up to the May 2001 renewal of the latest inflation target, the Bank undertook considerable research using a variety of tools and addressing a number of hypotheses to determine the extent of nominal wage rigidity in Canada.²⁴

One way to examine the likely impact of downward nominal wage rigidity is to estimate what the wage distribution would look like in the absence of rigidity. On balance, this line of research demonstrates that downward nominal wage rigidity has not been an important feature of the Canadian labour market. Relatively more wage freezes do occur at low inflation rates, but this would be expected anyway, since the mean of the wage-change distribution varies with the rate of inflation. Econometric estimates suggest that the net effect of downward nominal wage rigidity on wage growth was in the range of only 0.07 to 0.18 per cent in the unionized private sector in the 1990s.²⁵

It is important to note that what might appear to be downward nominal wage rigidity could also be a form of menu costs. By this, I mean the fixed costs associated with changing pay scales, a task that firms may be reluctant to undertake unless a large wage adjustment is required.²⁶ The estimates of rigidity that I just mentioned incorporate these effects.

Another strand of research has examined the employment effects of downward nominal wage rigidity in Canada. There are relatively few papers on this subject. Moreover, estimates of the employment impact tend to be sensitive to model specifications, which are typically reduced-form equations linking changes in employment growth to changes in output growth and to a variable that measures wage cuts or freezes. On balance, however, these studies do not support a significant employment impact.²⁷

²¹ Fortin (1996), Akerlof, Dickens and Perry (1996), Fortin, Akerlof, Dickens and Perry (2002).

²² Tobin (1972).

²³ Thiessen (1996).

²⁴ See Technical Background Document 1 from the renewal of the inflation-control target (May 2001). This can be found at <http://www.bankofcanada.ca/en/press/annexe1.pdf>.

²⁵ Crawford (2001), Crawford and Wright (2001).

²⁶ In addition, there are few small wage changes (up or down) in the data.

²⁷ Simpson, Cameron and Hum (1998) find relatively large effects, but Farès and Hogan (2000) and Faruqui (2000) show that, once their model is adjusted for possible endogeneity between wage freezes and output growth, the impact is insignificant.

Most of the data used in the research I have cited come from wage settlements in the unionized sector, which begs the question as to whether the results would hold more generally for all workers in the economy. Evidence suggests that the wage-settlements data tend to overstate the amount of nominal wage rigidity in the economy, since base wage rates for workers outside the unionized sector are typically more flexible.²⁸ For example, small firms tend to have more flexible pay practices, while variable compensation, including adjustments to non-wage benefits, also allows for more nominal wage flexibility.

In addition to using micro-level data to examine downward nominal wage rigidity, aggregate data can also be used to examine the effect of unemployment or the output gap on inflation - in other words, the slope of the Phillips curve. If downward nominal wage rigidity exists, then the slope of the Phillips curve should have become flatter in the period of excess supply during the low-inflation period of the 1990s. Evidence from this research, however, does not support this hypothesis.²⁹

Another line of argument that has been tested using aggregate data has been referred to as “near-rational” wage setting. It suggests that workers and firms might not worry as much about inflation when it is at low levels and, therefore, do not fully incorporate small changes in inflation into their inflation expectations.³⁰ Supporters of this line of reasoning argue that unemployment can be sustained below the equilibrium rate over a range of low and moderate rates of inflation. Thus, there is some positive inflation rate that should be chosen as the target.

One problem with this argument is that it is difficult to imagine why agents would continuously ignore the negative impact of low inflation.³¹ Although the cost might be small in a single period, it would clearly accumulate over time, which should induce them to become fully rational in their wage- and price-setting. There is little Canadian evidence in this area. That which exists, however, suggests implausibly high estimates of near-rational behaviour when inflation is at 3 per cent.³²

In summary, there is little substantive evidence to suggest that downward nominal wage rigidity or near-rationality in wage-setting impedes appropriate adjustment at our currently targeted inflation rate of 2 per cent. But equally, there is little substantive evidence to suggest that a target lower than 2 per cent would lead to a measurable improvement in economic behaviour. Thus, because inflation expectations have become well anchored around 2 per cent, maintaining the 2 per cent target was judged to be appropriate.³³

4. Canadian labour market performance

In this part of my lecture, I would like to discuss how the labour market functions better than it did a decade ago and, indeed, better than when the AIB was wrapped up in 1978.

First: As I said, inflation has become low, stable, and predictable. The impact of this development can be seen in the path of nominal wages.³⁴ Indeed, the growth in nominal wages has also slowed, along with falling inflation. Since the introduction of the inflation target, average annual growth in nominal wages has been about 4 per cent, down from the approximately 14 per cent average growth recorded in the 1970s and the 8 per cent witnessed in the 1980s.³⁵

²⁸ Crawford and Harrison (1997).

²⁹ Farès and Lemieux (2000).

³⁰ Akerlof, Dickens and Perry (2000).

³¹ O'Reilly (1998).

³² Fortin and Dumont (2001). Their results imply that less than 50 per cent of agents take inflation into account when it is near 3 per cent.

³³ See Technical Background Document 1 from the renewal of the inflation-control target (May 2001).

³⁴ The relationship between movements in nominal wages and prices leads inevitably to the question of the direction of causality. The nature of these dynamics has been a source of debate over the years. In the 1970s, the prevailing view was that nominal wage inflation led to price inflation, largely because of wage “catch up”; i.e., workers and unions demanding additional wage increases to compensate them for unexpected inflation and to match settlements in other sectors of the economy, such as the public sector. In this context, the setting of wage guidelines by the Anti-Inflation Board was seen as instrumental in controlling inflation. Since then, our research suggests that causality tends to run - at least primarily - from prices to wages, and not the reverse. See Cozier (1992).

³⁵ These numbers refer to average annual growth in nominal wages, salaries, and supplementary labour income from the System of National Accounts over the periods 1971-1980, 1981-1990, and 1991-2000.

In addition, the distribution of wage changes has narrowed as inflation has become more predictable. There are at least a couple of reasons why this might be the case. First, research points to a significant link between higher inflation and greater inflation uncertainty. Where there is increased uncertainty about inflation, firms and workers may set inflation adjustments incorrectly, creating relatively more dispersion in wage changes.³⁶ Thus, as uncertainty about inflation falls in line with declining inflation, so should the dispersion around average wage changes. I will have more to say on inflation uncertainty in a few moments. Second, a lower cross-sectional variation in wage settlements could arise because downward nominal wage rigidity would impose a floor on the distribution. As I have already discussed, this seems unlikely to have had a significant impact in Canada.

By contrast, others have argued that the variability of relative wage changes decreases when inflation rates accelerate. Essentially, the argument here is that higher inflation leads to a greater demand for indexed wage contracts - either explicitly through COLA clauses or implicitly when setting wages with employers - to protect workers from unexpected increases in inflation.³⁷

Clearly, what actually happens to the dispersion of wage settlements when inflation and inflation uncertainty decline is an empirical proposition. A stylized fact of the Canadian economy is that, in the unionized private sector, the variance in wage settlements fell by about two-thirds as inflation declined.³⁸ Although some have suggested that this could be because of greater downward nominal wage rigidity, this is not the case. We know this because the variability of wage changes above the median has also fallen significantly. Moreover, it has become apparent that wages no longer react quickly to large changes in relative prices such as those generated by oil-price shocks or, more recently, by auto insurance premiums. This is a very important contribution to labour market performance in Canada because it suggests that relative wages tend to better reflect demand and supply conditions in particular markets. There is, however, very little research in this area, and it is one where more in-depth analysis would be useful.

Second: Another development in the 1990s was the relatively sharp increase in the average duration of labour contracts in the private unionized sector of the economy. Compared with the 1980s, the average duration increased by almost 10 months.³⁹

Reduced inflation uncertainty is one explanation for this. As the variability of inflation has fallen, this has likely lowered the amount of uncertainty in the economy and has led to labour contracts that are longer in duration. Theoretical work in the late 1970s and early 1980s showed that lower uncertainty about inflation should result in longer contracts.⁴⁰ Empirical evidence for Canada gathered in the early 1980s was consistent with this theoretical work.⁴¹

Using several measures of inflation uncertainty, researchers at the Bank of Canada have confirmed a robust negative relationship between inflation uncertainty and the duration of union contracts in the private sector.⁴² In other words, as uncertainty about inflation has fallen, the duration of labour contracts has lengthened. Indeed, it has been estimated that each percentage point decrease in inflation uncertainty increases contract length by about two months.⁴³ One positive implication of

³⁶ Groshen and Schweitzer (1999).

³⁷ Hammermesh (1986).

³⁸ Crawford (2001). In the early 1980s, the annual standard deviation of wage settlements in the private sector was just over 3 per cent. This fell to about 1 per cent in the year 2000. The data are drawn from a database maintained by Human Resources Development Canada, which contains information on agreements signed in the unionized sector of the economy. Note that wage settlements in the public sector are excluded from the numbers presented in the text. Data in this sector are distorted by wage freezes in the 1990s as governments at various levels sought to control budget deficits.

³⁹ In 1980, average duration across all contracts in the private sector was approximately 27 months. In 2001, it was about 36 months.

⁴⁰ Gray (1978), Canzoneri (1980).

⁴¹ Since then, advances in econometric techniques have allowed researchers to better specify and construct uncertainty variables and thus to measure the impact of inflation uncertainty on contract duration. For example, early empirical work by Christofides and Wilton (1983) used a rolling regression technique to calculate inflation uncertainty. New techniques, such as autoregressive conditional heteroscedasticity (ARCH) models, now allow researchers to better construct uncertainty variables.

⁴² Fay and Lavoie (2002).

⁴³ This refers to the uncertainty measure derived from an ARCH model, and expressed in terms of the standard deviation of inflation uncertainty. Other measures of inflation uncertainty give different results.

longer labour contracts is a savings in the resources dedicated to negotiation, or in other words, lower transactions costs.

Another interesting finding is that the proportion of COLA clauses in private sector contracts has not changed much over the last decade, even though contract duration has increased.⁴⁴ Once unions have bargained for such clauses, they appear reluctant to give them up, even if they are seldom triggered.

Unions, of course, bargain for more than just wages and cost-of-living agreements. In the early 1990s, they became more preoccupied with job security for their members in the face of weak aggregate demand, increased contracting out, and the move towards hiring temporary staff as employers sought to contain costs.⁴⁵ Thus, uncertainty over developments in the real side of the economy - which I shall refer to as real uncertainty - may have become more prominent at that time. Work at the Bank, however, finds no empirical support for the proposition that this type of uncertainty affects contract length.⁴⁶

Third: Another concrete benefit of low, stable, and predictable inflation has been less disagreement over future inflation, leading to fewer strikes and, therefore, lower output losses. The number of person-days lost to strikes peaked in the early to mid-1970s when inflation was at double-digit levels and uncertainty was high. Since then, the number of days lost has trended down. Between the 1970s and 1980s, the number of days lost to strikes fell by about one-third. In the 1990s, it declined again by over 50 per cent relative to the previous decade. This represents a clear gain for workers and, indeed, for all Canadians.

Fourth, and very importantly: greater stability has also been observed in output growth.⁴⁷ Several reasons have been put forward for this, including better inventory management. The conduct of monetary policy has certainly been an important factor. By responding promptly and symmetrically to demand shocks, and by focusing on the underlying trend of inflation - thus ignoring temporary inflation shocks unless they feed into inflation expectations - monetary policy will produce greater stability in output growth.

Alongside greater stability in output growth, there has been more stable employment growth and less volatility in the unemployment rate.⁴⁸ On the margin, other factors may have been at play as well. For example, there is evidence that the use of variable forms of compensation has increased over time.⁴⁹ Variable compensation programs allow firms to adjust pay in the face of adverse shocks, rather than resorting to layoffs. This contributes to greater employment stability. It is also worth noting that changes in compensation practices that link individual performance to that of the firm also move in the direction of bolstering productivity growth.⁵⁰

Greater stability in output growth has paved the way for a labour market with rising labour force participation rates, higher employment/population ratios and lower unemployment rates. Indeed, both Canada's participation rate and the employment/population ratio hit record high levels this year. Moreover, this rising employment/population ratio has helped to boost our standard of living, and is a reflection of just how well the labour market is functioning. Newfoundland has also seen its aggregate

⁴⁴ In the 1980s, on average, 32 per cent of private sector contracts contained COLA clauses. This fell to an average of 25 per cent over the 1990s. In contrast to the private sector, the incidence of COLA clauses in public sector agreements fell substantially in the early part of the 1990s, after which it levelled off in the 1 to 7 per cent range.

⁴⁵ One indicator of the importance of labour unions is union density - the number of workers who are union members. This measure suggests that the importance of unions has not changed substantially. Trade union density over the 1980s averaged about 36 per cent in Canada. The average over the 1990s was only slightly lower, although it did begin to fall after 1997, closing the decade at around 33 per cent.

⁴⁶ Fay and Lavoie (2002). See also Murphy (2000), Rich and Tracy (2000), and Wallace (2001) for evidence in the United States.

⁴⁷ Debs (2001).

⁴⁸ This is measured as the standard deviation of each variable in the 1980s and 1990s.

⁴⁹ Crawford and Harrison (1997). The Conference Board of Canada (2002) also notes that while base pay represents the main element of compensation, it has made up a smaller percentage of total compensation over the past few years. In fact, 87 per cent of Canadian organizations had one or more types of variable pay plans in place in 2002, with cash bonuses being the most common type of short-term incentive plan. Stock options were the most common type of long-term incentive.

⁵⁰ Lebow et al (1999).

labour force participation rate and employment/population ratio rise to record levels, although they still remain below the national average.

The current situation is in contrast to that of the late 1980s and early 1990s when Canada faced a number of economic challenges that required painful policy action and difficult adjustments. Among these, inflation had to be lowered and public sector deficits had to be tamed. I discussed the linkages between monetary and fiscal policy elsewhere.⁵¹ Overall, an extraordinary effort was made to get the macroeconomic framework - that is, both monetary and fiscal policies - right, and we are now reaping the benefits of those efforts.

To be sure, a number of other difficult policy choices have also contributed to better labour market performance, although it is difficult to isolate the specific contribution of each one of them. For example, there were reforms to labour market institutions such as changes to the Unemployment Insurance program. Trade has also been opened up to improve the efficiency of markets, namely through the FTA and NAFTA. The main point here is that all of these policies have worked in the same direction - towards improved labour market performance.

Now let me turn to prospects for income growth.⁵² An important determinant of aggregate income growth is labour-productivity growth. On an economy-wide basis, productivity growth averaged about 1.4 per cent between 1970 and 1997. It then picked up, accelerating to 1.8 per cent, on average, between 1997 and 2002. This is still well below that in the United States, but the acceleration is a promising sign. Indeed, increased investment in machinery and equipment as well as in communications technologies in the late 1990s, combined with sound economic policies, will likely see productivity gains remain strong in the near and medium term. Furthermore, as I discussed earlier, the Bank of Canada plays an important role here by keeping inflation low, stable, and predictable, which is conducive to innovation, risk-taking, and investment.⁵³

5. The conduct of monetary policy

But keeping inflation at the 2 per cent target is not an easy task. And there are times when inflation temporarily moves away from the target because of unexpected developments and shocks. Recent experience provides a case in point.

In early 2003, inflation was well above the 2 per cent target, and short-term inflation expectations had edged up. Although inflation was being pushed up by special factors, such as sharply higher oil prices and auto insurance premiums, there were also signs that strong domestic demand was working to broaden price pressures. Since then, however, the economy has weakened more than expected, and core inflation has fallen to 1.8 per cent. And virtually all measures of inflation expectations have decreased. Although we at the Bank had expected core inflation to ease, several unforeseen developments have caused this to occur sooner, and to be more pronounced, than we projected last April. These have included a slightly faster easing in pressures from insurance premiums and price discounting in certain service industries because of SARS. As well, the U.S. dollar has fallen substantially, adding to the recent weakness in goods prices in Canada. The average value of the Canadian dollar in terms of the U.S. currency in recent months represents a sharp increase from 69 cents in April.

Clearly, the appreciation of the Canadian dollar is an important factor that we at the Bank are considering carefully as we evaluate the economic situation and the risks attached to our outlook. At the same time, we continue to assess other developments, notably a somewhat stronger-than-expected recovery in world demand.

⁵¹ Dodge (1998, 2002b).

⁵² One way to approach this topic is to examine the share of labour in national income. Since the late 1970s, it has shown no observable trend, hovering around 64 per cent. The labour share of income rose sharply in the early 1990s when profits fell during the recession and payroll taxes rose. After this period, profits rose, and the labour share declined. When the share of labour income in GDP is unchanged, we would expect growth in labour income to be close to the projected growth in nominal GDP. A general rule of thumb would be for nominal GDP to increase by roughly 5 per cent per year, on average, over the medium term - 2 per cent from inflation and 3 per cent from average potential output growth. This 5 per cent growth in labour income can be roughly divided into 1 per cent growth in labour input (person-hours) and 4 per cent growth in labour compensation per person-hour. See Longworth (2003).

⁵³ Dodge (2002c).

In this context, if it looked as though the appreciation of the Canadian dollar would more than offset the effects of stronger world demand, or that world demand was weakening, we would act to stimulate domestic demand with the intent of returning inflation to the 2 per cent target over the next 18 to 24 months. Such action would take the form of lowering interest rates. As I said in my recent testimony before the Senate Banking, Trade and Commerce Committee, the Bank continues to assess the implications of *all* past developments - domestic and external - for output and inflation in Canada.

This kind of analysis and the typically difficult assessment of future developments are what we at the Bank have to consider at each monetary policy decision date.

6. Concluding thoughts

Let me now conclude. Changes in the conduct of monetary and fiscal policy, as well as increased emphasis on structural policies, have worked together to produce a better-functioning labour market in Canada.

The Bank's particular contribution has been to anchor inflation expectations at the 2 per cent target. Because our monetary policy framework reduces uncertainty about inflation, it helps both firms and workers make better planning decisions. Thus, wage bargaining can be concluded by focusing on factors that are relevant to wage-setting, such as productivity growth, without the noise of variable inflation. This, in turn, leads to a more efficient bargaining process with lower transactions costs and less loss of output,⁵⁴ as well as to a more productive allocation of labour in the economy.

This has contributed to an economic environment where there are rising employment/population ratios, higher participation rates, and lower unemployment rates.

⁵⁴ Longworth (2002).