Timothy Lane: Inflation targeting – a matter of time

Remarks by Mr Timothy Lane, Deputy Governor of the Bank of Canada, to the CFA Society Atlantic Canada, Halifax, Nova Scotia, 27 October 2015.

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Introduction

Thank you for inviting me to speak to you here in Halifax. In my remarks today, I want to take you inside the Bank of Canada and walk you through our monetary policy decision making. In particular, I want to discuss how we take into account the dimension of time.

Let's start with a very basic reality: all Canadians make choices in the present that we know will have consequences far into the future. Anyone who makes a decision on whether to take a job, pursue further education, buy a house or save for retirement has to form a view of what the results will be. Businesses deciding whether to hire more workers, expand their plant and equipment, seek new customers, adjust their prices, or finance their operations face a similar reality. As CFAs, you know that time is at the centre of every financial decision you make or advise on.

The Bank of Canada's mandate – to deliver low, stable and predictable inflation – is fundamentally rooted in the importance of time. Our job is to make sure that those longer-term decisions are not wrong-sided by unexpected changes to the value of money. The confidence Canadians have in their money can't be taken for granted: it's something we work hard to achieve and maintain. When we look around the world or even back over Canadian experience, we see many cases in which either high inflation – or its opposite, deflation – has had damaging, or sometimes even devastating, effects.

The second aspect of time that we have to address is that, for the Bank of Canada too, our short-term decisions have long-term results. To achieve a good inflation outcome, we need to make decisions on our policy interest rate in the short run – every six weeks. These decisions influence how the economy and inflation will evolve over a much longer period.

As you know, six weeks can be a long time for the economy and the markets. We approach each decision with a vast set of new information. To start with, inflation itself can fluctuate, both for fundamental reasons and as a result of various temporary and one-off factors. In addition, we receive all kinds of other economic data from Canada and the economies that affect us; financial market and commodity price data; as well as many relevant news items about economic policies, foreign conflicts and even the weather.

So how do we react to all that information – without overreacting – and keeping our eyes on the prize?

I hope you aren't disappointed that I won't tell you what we will do next. To tell the truth, I don't really know. A lot can happen between now and our next policy announcement on December 2! What I will do is spell out the logic of our approach – how we think about the underlying trend in inflation and how we make sense of the stream of information coming in.

The test of time

Let's start with some background on our inflation-targeting framework. Canada's decision in 1991 to set a target for inflation did not come out of the blue: it was a product of two decades of unacceptably high and variable inflation.

During the 1970s and 1980s, inflation became part of everyone's calculations. Adjustments for inflation were a contentious element in wage negotiations. Interest rates rose into high double digits, building in a premium for the high expected rate of inflation and the uncertainty around it. High and variable inflation also had very different effects on different groups: some

saw their salaries, savings and pensions erode away, while others reaped windfalls on their houses and financial investments.

For most of that period, Canada's monetary policy struggled to find a clear direction. Half a century ago, it was anchored by the Bretton Woods system of fixed exchange rates.[1] That system collapsed in the early 1970s in the face of increasingly open financial markets and contradictory policies in the United States and other major economies.

In the mid-1970s, Canada, like many other advanced economies, tried targeting the rate of growth of the money supply. This approach was based on extensive research showing that inflation tended to be associated with increases in the supply of money in the economy. But with deregulation and financial innovation, the relationship between the rate of expansion of the money supply and the rate of inflation proved unstable. Money supply targets were no longer viable and were abandoned in 1982.

Before and after that money-targeting period, the Bank of Canada had no clear policy framework to guide monetary policy actions and anchor the public's expectations of inflation. Inflation rose higher as monetary policy reacted by accommodating the inflationary pressures coming from commodity prices, fiscal deficits and higher inflation in other countries. While inflation was eventually tamed during the 1980s, it was a long and arduous process that came at the cost of several years of sub-par economic growth.

In 1991, recognizing the importance of inflation to the economic and financial well-being of Canadians and the central role of monetary policy in controlling inflation in the longer run, the Bank began pursuing an explicit target for inflation. The results have been impressive. Since 1991, inflation in Canada, as measured by the consumer price index (CPI), has been remarkably stable. Inflation has averaged 2 per cent (Chart 1), and its variability has fallen by roughly two-thirds.

Canadians have benefited in a number of important ways. Greater price stability has allowed consumers and businesses to manage their affairs with greater certainty about the future purchasing power of their incomes and financial assets. Real and nominal interest rates have also been lower across a range of maturities, in part, because they no longer include a substantial premium to compensate investors for inflation risk. More broadly, low, stable and predictable inflation has facilitated more stable economic growth in Canada and lower and less-variable unemployment (Table 1).

Our inflation-targeting regime has also stood the test of the 2007–09 global financial crisis. As the fallout was hitting the Canadian economy, the Bank of Canada responded. We eased monetary policy aggressively to forestall a deeper and more prolonged economic slump. Inflation targeting gave us the flexibility to allow that strong policy response. It provided an analytical framework for calibrating how far we should go, and for how long. It also anchored the public's confidence that, despite the extreme conditions of that period, policies would remain on track to achieve the 2 per cent inflation target.

A particularly useful feature of our inflation-targeting framework is that, every five years, we renew our agreement with the federal government. The agreement sets the target for inflation and the parameters for achieving it. And the renewal process provides the opportunity and the discipline to reassess our approach in a systematic way and look for room for improvement.

But the bar for any major change is high. We know that inflation targeting has turned out to be far superior to any other framework that has been tried. Also, as I have stressed, part of

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[1] Canada adhered to Bretton Woods for only part of the post-war period. See M. Bordo, T. Gomes and L. Schembri, "Canada and the IMF: Trailblazer or Prodigal Son?" Discussion Paper 2009–1, Bank of Canada, 2009; and D. Dodge, "The Evolving International Monetary Order and the Need for an Evolving IMF" (speech to Woodrow Wilson School of Public and International Affairs, Princeton, New Jersey, 30 March 2006).

the purpose of a monetary policy framework is to allow Canadians to make longer-term decisions without having to worry too much about inflation – and that argues against changing our framework unless it's really necessary.

A matter of time

Let's now look at time and the way in which it enters into *how* we target inflation.

Targeting inflation involves important challenges, because we don't control inflation directly. Normally, we influence inflation through our policy interest rate – more precisely, a target for the overnight interbank rate.

Our policy rate affects other interest rates in the economy, overall financial conditions and, in turn, the economy at large. It affects inflation through the amount of excess demand or supply in the economy – the output gap – which can generate pressures for inflation or disinflation. The exchange rate and expectations can also play important roles in transmitting the effects of monetary policy to inflation.

There can be long lags in this transmission process – and these lags can vary significantly, depending on the economic context.

Total inflation can be "noisy" because many temporary sector-specific factors impinge on inflation in the short run and, in many cases, are quickly reversed (Chart 2). Some examples are consumer energy prices such as gasoline prices, or prices of certain food products that may fluctuate because of weather and other factors. In Canada, for example, 90 per cent of the observed monthly variations in the CPI are linked to price changes in just eight categories of goods and services, which together amount to only about one-seventh of the whole CPI basket.

There are many examples of such temporary factors, but let me take just one. In the early 2000s, auto insurance premiums soared by about 30 per cent over a span of one year. By itself, this one component of the CPI basket was adding a full percentage point to inflation (Chart 3).[2] This outcome was not reflective of broader inflationary processes.

In this setting, we can't hit our inflation target precisely or continuously – and we don't try to. To illustrate, consider what would happen if we raised our policy rate mechanically whenever inflation was above target and lowered it whenever inflation was below target. We would end up reacting to a lot of temporary factors. And because our policies work with long lags, we would have to overreact, making huge adjustments in our policy rate to have any effect, followed by huge corrections to compensate for the lagged effects of our own policies. This would lead to what has been called "instrument instability" – a kind of policy over-steering that would quickly land us in the ditch.

This reasoning points us in two directions. First, we need to be able to look through temporary factors that affect inflation in the short run, so that we don't overreact to shocks that are going to reverse themselves anyway. Second, we need to understand and anticipate the forces that will affect inflation in the future so that our policy decisions will keep inflation on target until their effects have worked their way through the economy.

Both of these elements go into making a judgment on the underlying trend in inflation and how it is evolving.

So, rather than trying to hit the inflation target continuously, we set a time horizon for reaching it. Normally it's two years, based on estimates of what is a reasonable time frame for policies to have their effects and for temporary shocks to dissipate.

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[2] M. Khan, L. Morel and P. Sabourin, "A Comprehensive Evaluation of Measures of Core Inflation for Canada," Discussion Paper No. 2015–12, Bank of Canada, 2015.

But we have the flexibility to return sooner or to take longer, depending on the nature of the shocks affecting the economy. In particular, under flexible inflation targeting, we have the scope to take longer to get back to target in a situation where returning to target within two years would require aggressive policies that could result in a buildup of imbalances in our financial system and possible instability down the road. This point was made explicit in our inflation-targeting framework the last time we renewed it in 2011. The timing for a return to target thus requires a judgment on the balance of risks.

Even when inflation is at target, we can't afford to be complacent. Sometimes there are forces pushing inflation higher or lower, and we need to use monetary policy to counteract them. In such cases, the policy rate will need to deviate from its long-run level to provide the stimulus or restraint necessary to offset these forces.[3]

There are also some situations in which we need to get ahead of shocks that we can see will have a significant effect on inflation in the future. Otherwise, we would be in a situation of trying to catch up with these effects after they have already become entrenched. That was the logic of our January 2015 rate cut. We could see that a 60 per cent decline in the price of oil would, on balance, be bad for the Canadian economy. So even though it was still uncertain how large and prolonged that effect would be, we needed to act promptly to achieve our inflation target.

The combination of long- and short-run factors affecting inflation, the lags in the effects of our policies, and the uncertainties around each element makes monetary policy fundamentally an exercise in risk management. While one can try to write a reaction function or rule to describe monetary policy, a rule or function can only go so far. For example, the Taylor rule holds that monetary authorities adjust the policy rate in response to deviations of the inflation rate from target and output from potential. That's a useful rule of thumb, but too mechanical to go very far in explaining how policy actually behaves.

Inflation targeting is also "informationally inclusive," meaning it doesn't just react to the current inflation rate and GDP. It also takes account of a broad range of other information. That information includes economic data as well as soft information such as the responses to our *Business Outlook Survey* and a wide range of more informal conversations that we conduct with businesses and other Canadians. We use a combination of models and our own judgment to understand the underlying forces working on inflation. We want to get as clear a picture as possible, not only of what is actually going on, but also of what could go wrong if the unexpected happened.

Underlying inflation

In thinking about targeting inflation over time, an aspect that has received a lot of attention recently is underlying inflation: the inflation rate that would prevail in the absence of various sector-specific and one-off factors that can affect the measured CPI from month to month. Conceptually, underlying inflation should be driven mainly by the amount of excess supply or demand in the economy, together with the public's expectations of inflation.

Underlying inflation has been a particularly important concept this year. We have the impact of the oil price shock, which is pushing inflation down via prices of gasoline and other consumer energy products. At the same time, the weaker Canadian dollar, which is largely associated with the lower prices of oil and other Canadian commodity exports, has been pushing measured inflation upward. A number of other one-off factors have also been affecting inflation. Our challenge is to distinguish the *trend* from the *temporary* to avoid

[3] For a more detailed discussion of the use of monetary policy to counteract headwinds or tailwinds, see Technical Box 2, Bank of Canada *Monetary Policy Report* (July 2011): 28.

overreacting to the temporary – and give the public confidence that inflation will return to the right track.

For this reason, the Bank of Canada, along with many other central banks, uses a number of measures to calculate core inflation, which are designed to minimize the influence of transitory price movements (Table 2).

An effective core measure must have four key properties. It must be less volatile than total inflation; closely track long-run movements in the total CPI (in other words, be "unbiased"); be related to the underlying drivers of inflation, notably the output gap, in order to reliably predict future trend movements in the total CPI; and be easy to understand and explain to the public.

Since 2001, the Bank of Canada has featured one measure of core inflation as our operational guide for monetary policy: CPIX, which excludes eight of the most volatile components of the CPI and adjusts the remaining components for the effects of indirect taxes (Chart 4).[4] Included in those eight components are mortgage interest costs, which CPIX strips out for a different reason: to avoid giving a perverse reading of the impact of monetary policy on core inflation. (A measure of core inflation that includes mortgage interest costs increases when policy is tightened to bring down inflation.)

Another exclusion-based core measure, CPIXFET, takes out food, energy and indirect taxes. Yet others calculate core inflation using a trimmed mean, which excludes different components each month based on whether or not they are exhibiting volatility at that specific point in time.

More sophisticated methods track common price movements across categories in the CPI basket. Such movements are more likely to reflect aggregate demand fluctuations than sector-specific developments. The advantage of these tools is that they take information on all the prices in the CPI and use objective methods to filter that information. The disadvantage is that in some cases they are constructed using techniques that, while firmly founded in logic and statistical theory, are very opaque.

All the measures have followed similar tracks (Chart 5). Each measure satisfies the key properties identified above to differing degrees. They all display less volatility than total inflation (Chart 6). And all but one track long-run movements in total CPI very closely. While the various measures are correlated with the output gap to differing degrees, they all have some predictive power for total inflation (Chart 7).[5]

But no formula can completely exclude idiosyncratic factors. We've had some examples of those lately with automobile pricing, telecoms, consumer electricity and natural gas. The products that are subject to idiosyncratic factors can change from period to period; obviously, we can't change our measure each time that happens. Nor should we ignore those sector-specific factors: sometimes, movements in individual prices can be an advance warning of wider price movements, so we have to look at them in the right context.

As we prepare for the renewal of our inflation-control agreement with the federal government in 2016, we are examining the properties of these measures of core inflation to determine whether the Bank should continue the practice of identifying one pre-eminent measure as its

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[4] The excluded items in CPIX are fruit, vegetables, gasoline, fuel oil, natural gas, mortgage interest costs, intercity transportation and tobacco products, as well as the effects of changes in indirect taxes such as the GST.

[5] All the core measures are generally better predictors of total inflation than total inflation itself. However, none of the measures outperforms a naïve forecast of 2 per cent.

operational guide and, if so, whether CPIX should continue to play that role. We published today on our website our latest technical assessment of these measures of core inflation.[6]

Exchange rates and inflation targeting

I want now to discuss one factor that can have a particularly important effect on inflation: the exchange rate. Inflation targeting can only work with a flexible exchange rate, which gives the Bank of Canada room to set monetary policy independently of other countries. We don't target the exchange rate or even publish a forecast.

With a floating exchange rate, the external value of the Canadian dollar can change for a variety of reasons, and that affects inflation in Canada through two channels. It has a direct pass-through effect on the prices of imported goods. The exchange rate also affects inflation more indirectly through its impact on aggregate demand in the Canadian economy, mainly through its effects on the competitiveness of Canadian-produced goods and services relative to those produced elsewhere. The pass-through effects are transitory, while the effects on aggregate demand will generally persist over a longer period.

The importance of both of these kinds of effects is particularly clear when the change in the exchange rate is as large as it has been recently: in less than two years, the Canadian dollar has lost more than 20 per cent in value against the U.S. dollar.

The effect of this depreciation on exports and the real economy is already evident. It has improved the competitiveness of Canadian producers. Export categories that historically have been sensitive to exchange rate movements are showing stronger activity. Examples include building and packaging materials, furniture and fixtures, clothing and textile products, and large motor vehicles (e.g., heavy trucks and buses). Exports of services, which constitute about 15 per cent of total exports, are also benefiting.

The pass-through effects are also quite significant. They are estimated to be adding 0.9 to 1.1 percentage points to total CPI inflation (Chart 8).[7]

So how does monetary policy react? If the change in the exchange rate is seen as a temporary factor reflecting other structural changes, it is clearly appropriate to look through the pass-through effects in assessing underlying inflation and in making policy.

That is the case at the present time. The depreciation of the Canadian dollar is driven mainly by two factors. First, it is associated with the sharp decline in Canada's terms of trade as the prices of oil and other Canadian commodity exports have decreased. These commodity price developments are, in turn, a result of the dynamics of supply and demand for those commodities in a global market, certainly not a result of Canadian monetary policy.[8] Second, it is part of the general strengthening of the U. S. dollar as that economy strengthens and the Federal Reserve moves closer to normalizing monetary policy.

By that logic, we exclude the direct impact of the pass-through effect of the exchange rate movement in assessing underlying inflation. Therefore, we judge that underlying inflation is around 1.5 to 1.7 per cent. Of course, the effect of the weaker Canadian dollar in stimulating the Canadian economy is an essential element of our projection that underlying inflation will return sustainably to target, with the economy back to its potential, over the next couple of years.

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6 M. Khan, L. Morel and P. Sabourin, "A Comprehensive Evaluation of Measures of Core Inflation for Canada," Discussion Paper No. 2015–12, Bank of Canada, 2015.

7 L. Savoie-Chabot and M. Khan, "Exchange Rate Pass-Through to Consumer Prices: Theory and Recent Evidence," Discussion Paper No. 2015–9, Bank of Canada, 2015.

8 T. Lane, "Drilling Down – Understanding Oil Prices and Their Economic Impact" (speech to the Madison International Trade Association (MITA), Madison, Wisconsin, 13 January 2015).

Although we believe that's the right decision at the present time, it would not always be the right call. There are times, as in the 1970s, when exchange rate movements are part of a broader inflationary process. In such cases, looking through the pass-through could put us on a treadmill of accommodating higher inflation. Moreover, identifying pass-through depends on a combination of estimation and judgment. For that reason, we issue our estimate of the underlying trend in inflation as our own judgment in the current policy context, rather than as an alternative measure of core inflation.

Expectations

Expectations of inflation, which are based on actual inflation as well as the credibility of our target, also play a central role in the conduct of monetary policy.

Many economic decisions depend on expectations of *future* inflation. For businesses, inflation expectations influence their stance in wage negotiations and price setting, as well as in assessing rates of return for decisions on production, hiring and investing in productive capacity. For households, expectations have an impact on savings decisions as well as on their choice of alternative savings vehicles.[9]

Through their influence on all of these decisions, expectations tend to become self-fulfilling. It would be much more challenging to keep inflation on target if expectations were to become unanchored – or anchored at a lower or higher level. For these reasons, we keep a close eye on expected inflation.

We measure business expectations with our own quarterly *Business Outlook Survey* and recently began tracking household expectations with a quarterly online poll of 1,000 Canadian consumers. The poll measures both the inflation expectations of participants over various time horizons and the uncertainty surrounding those expectations. It also covers a wide array of other economic expectations that will inform the Bank, and Canadians in general, on issues ranging from labour market prospects to personal finances.

Conclusion

Let me wrap up. Our inflation-targeting framework has stood the test of time. It has proved vastly superior to any other policy alternatives that have been tried.

Our periodic renewals are important opportunities to make sure it continues to serve its purpose and to suggest improvements. I have focused on one set of improvements that we are considering: how we assess the underlying trend in inflation, separating it from price movements that are likely to be temporary.

The critical test is the confidence you have that inflation will remain within our target range. We would like the public to take 2 per cent inflation for granted. We don't, however, take your confidence in us for granted. We know we have to earn your trust by delivering, without fail, on that commitment.

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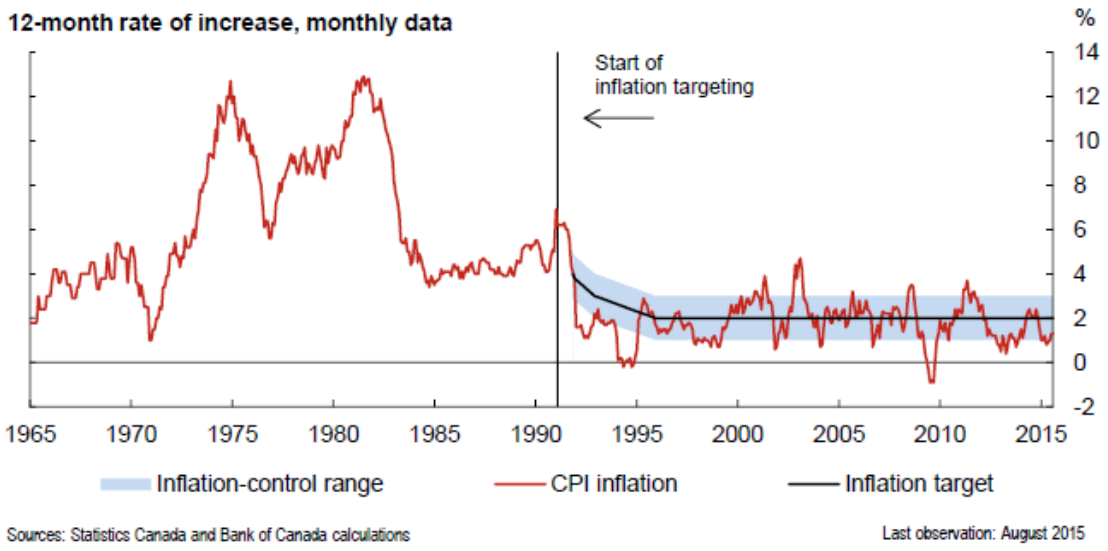
[9] A. Côté, "Inflation, Expectations and Monetary Policy" (speech to the Association québécoise des technologies, Mont-Tremblant, Quebec, 19 February 2015.

Chart 1: Inflation has been remarkably stable since the early 1990s



Sources: Statistics Canada and Bank of Canada calculations

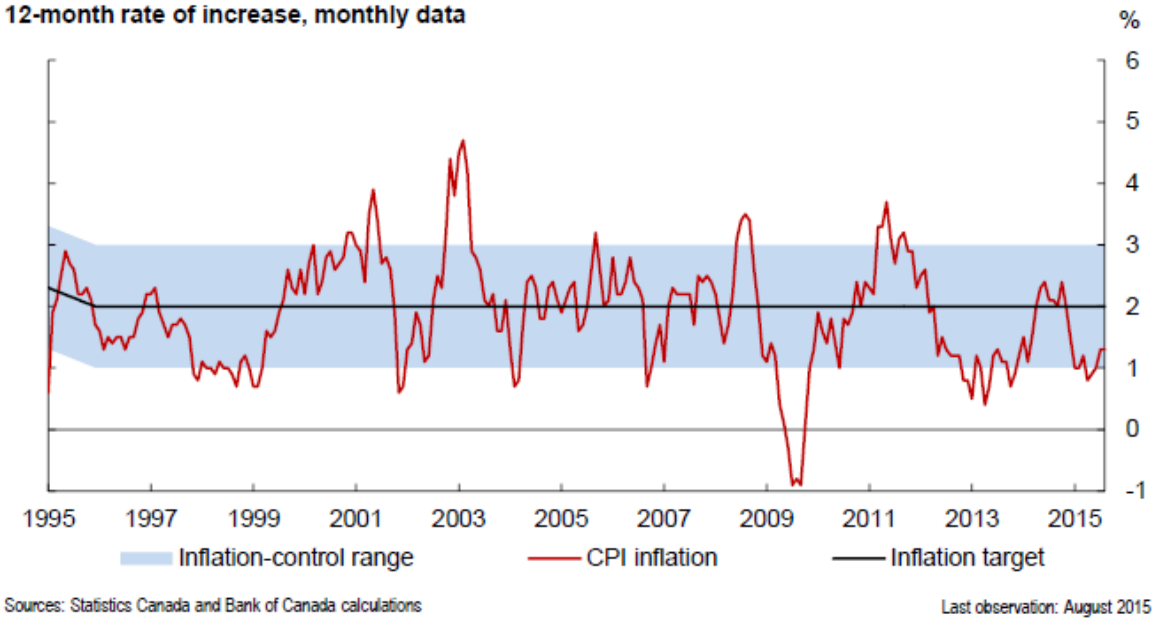
Last observation: August 2015

Table 1: Inflation targeting has facilitated stable economic growth

	Average (%)			Standard deviation		
	1975M1 to 1991M1	1991M2 to 2014M12	1995M1 to 2014M12	1975M1 to 1991M1	1991M2 to 2014M12	1995 M1 to 2014M12
CPI: 12-month increase	7.1	2.0	1.9	2.9	1.2	**0.9**
Real GDP growth	2.8	2.5	2.6	3.7	2.5	2.4
Unemployment rate	8.9	8.1	7.5	1.7	1.6	**1.0**
3-month interest rate	10.9	3.7	3.2	3.0	2.2	1.8
10-year interest rate	10.7	5.1	4.5	2.0	2.1	1.7

Source: Bank of Canada

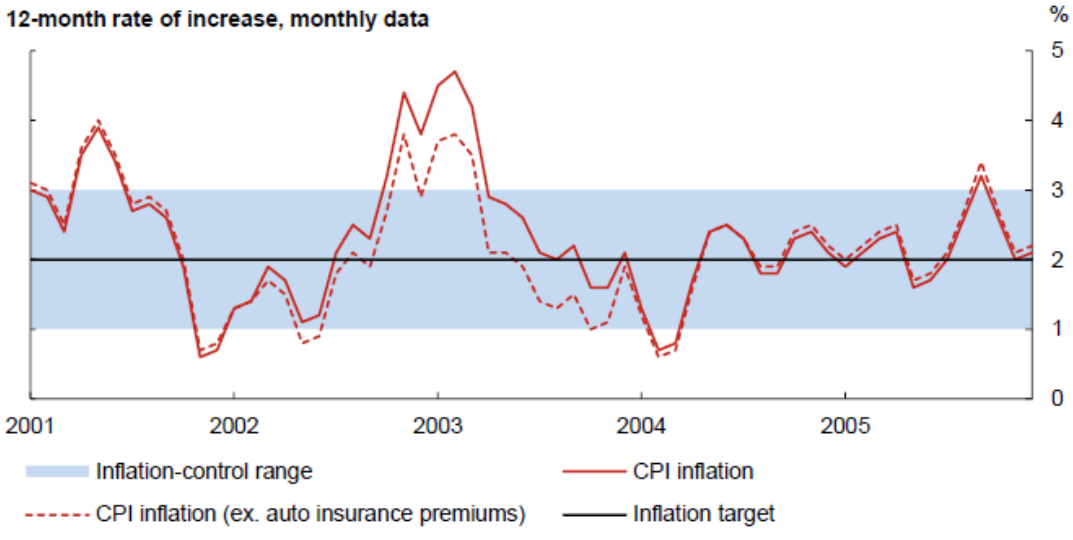
Chart 2: Total CPI inflation can be "noisy"



Sources: Statistics Canada and Bank of Canada calculations

Last observation: August 2015

Chart 3: Total CPI inflation during the episode of high auto insurance premiums



Sources: Statistics Canada and Bank of Canada calculations

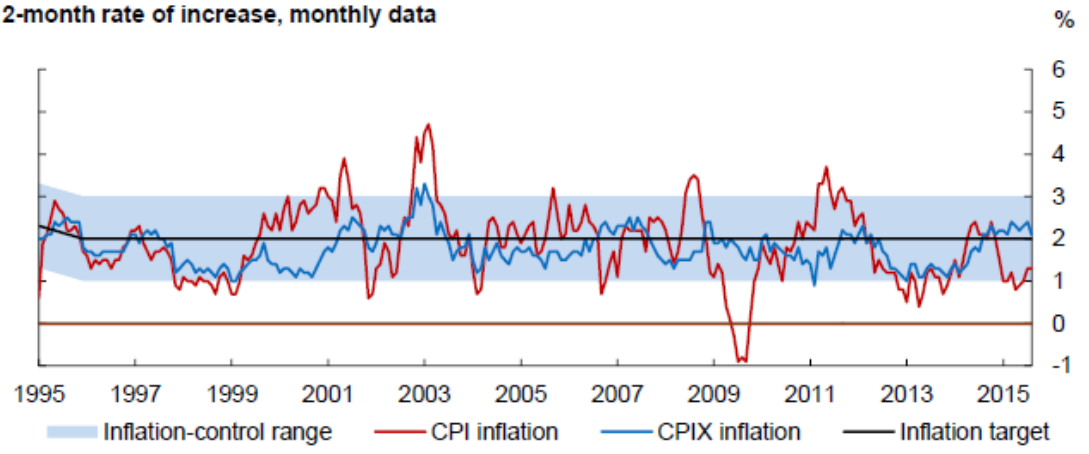
Table 2: Select central bank practices regarding core inflation

	Exclusion-based	Trimmed mean	Weighted median	Volatility-weighted	Factor model
U.S. Federal Reserve System	★	✓	✓		✓
European Central Bank[a]	★				
Bank of England[a]	✓				
Bank of Japan	★	✓			
Swiss National Bank	✓	✓			
Reserve Bank of Australia	✓	★	✓		
Reserve Bank of New Zealand		✓	✓		★
Sveriges Riksbank	★	✓		✓	
Norges Bank	★	✓	✓		

a. The Bank of England and the European Central Bank have recently published analyses using a broader set of measures than what is shown in the table. These were excluded since they are not yet a regular feature of these central banks' communications.
★ Indicates the preferred measure

Chart 4: Measures of core inflation such as CPIX help to discern genuine movements in the underlying trend of inflation

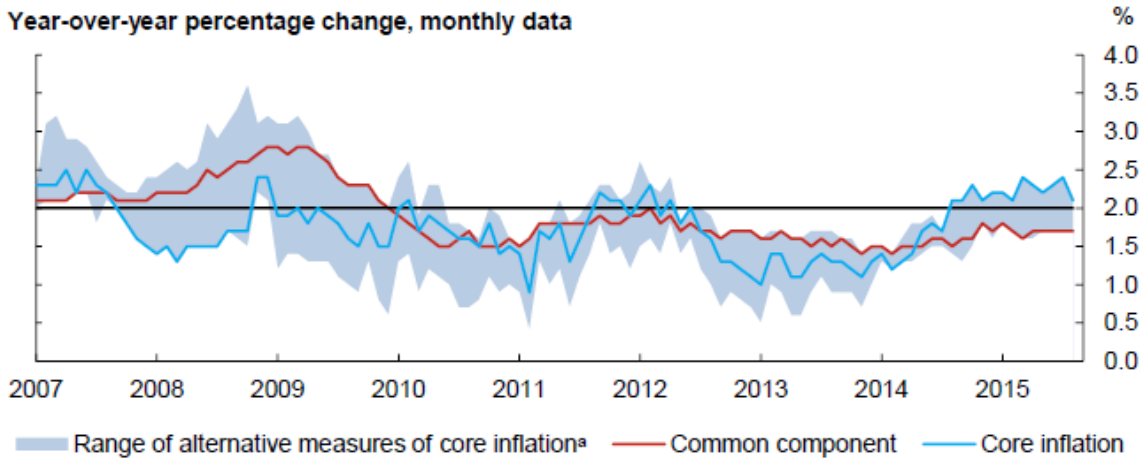
12-month rate of increase, monthly data



Sources: Statistics Canada and Bank of Canada calculations

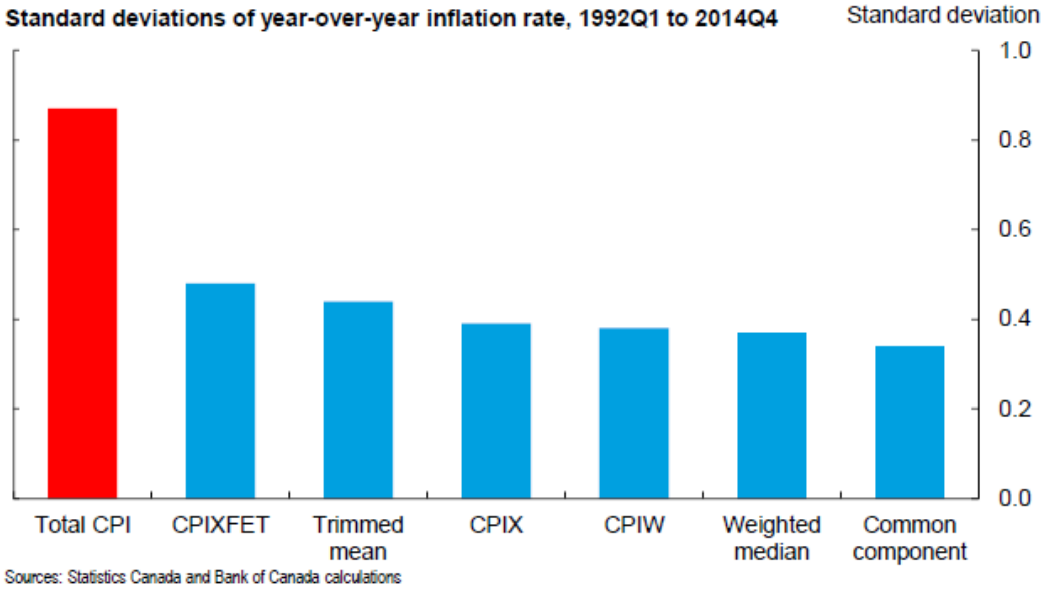
Last observation: August 2015

Chart 5: Core inflation measures are near 2 per cent



a. These measures are CPIX; MEANSTD; the weighted median; CPIW; CPI excluding food, energy and the effect of changes in indirect taxes; and the common component.
For definitions, see Statistics > Indicators > Indicators of Capacity and Inflation Pressures for Canada > Inflation on the Bank of Canada's website.
Sources: Statistics Canada and Bank of Canada calculations
Last observation: August 2015

Chart 6: All core measures display less volatility than total CPI



Sources: Statistics Canada and Bank of Canada calculations

Chart 7: Core measures reflect slack to differing degrees

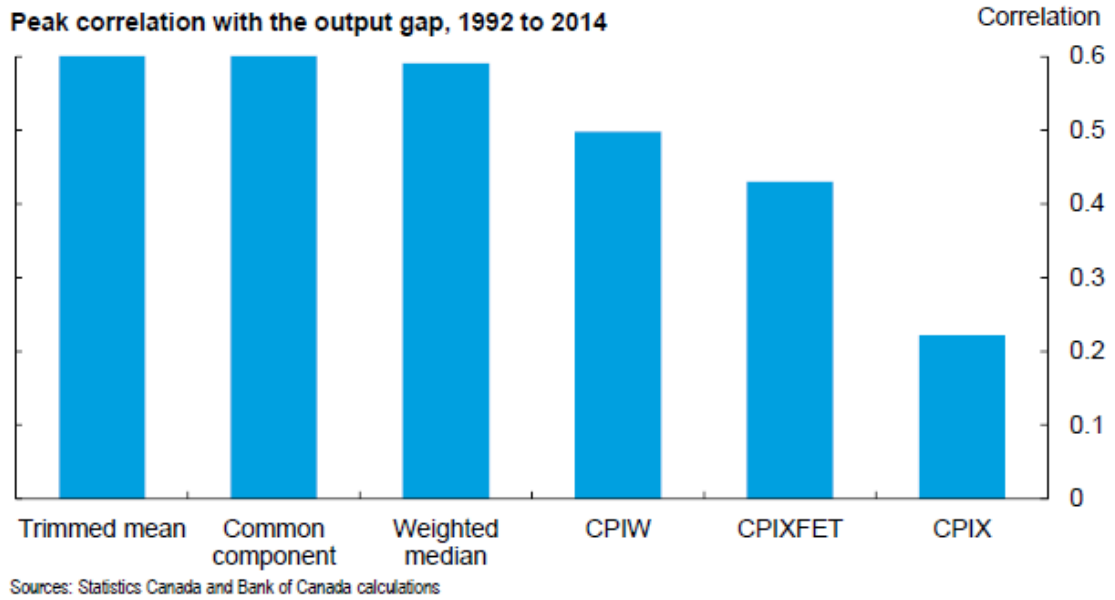


Chart 8: The exchange rate pass-through effects on inflation are significant