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Mont-Tremblant, Quebec
19 February 2015

Inflation, Expectations and Monetary Policy

Introduction

Thank you for inviting me to be with you today. I am delighted to be here.

At the Bank of Canada we need a thorough understanding of what is happening in the economy—not only at the aggregate level, but also at the level of individual agents, such as entrepreneurs like yourselves. You have an impact on the economy, and thus on the Bank. Similarly, the Bank has an impact on business conditions, and in turn on you. This relationship is well illustrated by the topic of my speech today: inflation expectations and the role they play in the conduct of monetary policy.

Central banks have long understood the importance of inflation expectations. It is widely accepted that a key benefit of an inflation-targeting system, such as the one we have had in Canada since 1991, is that it provides a good anchor for expectations. That being said, there are still many questions about how people form their expectations. While central banks exercise a great deal of influence on expectations, there are many other factors that can come into play. So, therefore, it is critical to carefully measure and interpret the signals sent by a variety of economic agents.

In my remarks today, I will explain why inflation expectations are so important to monetary policy and what role they might have played in the puzzling evolution of inflation that followed the financial crisis. I will also talk about the survey that the Bank of Canada has just created to better understand the evolution of expectations. Finally, I will turn my attention to current events and talk about today's inflation expectations, including those of the Bank, in the wake of the steep decline in oil prices.

I would like to thank Michael Ehrmann and Marc-André Gosselin for their help in preparing this speech.

Not for publication before 19 February 2015
12:15 Eastern Time

The Surprising Evolution of Inflation After the Crisis

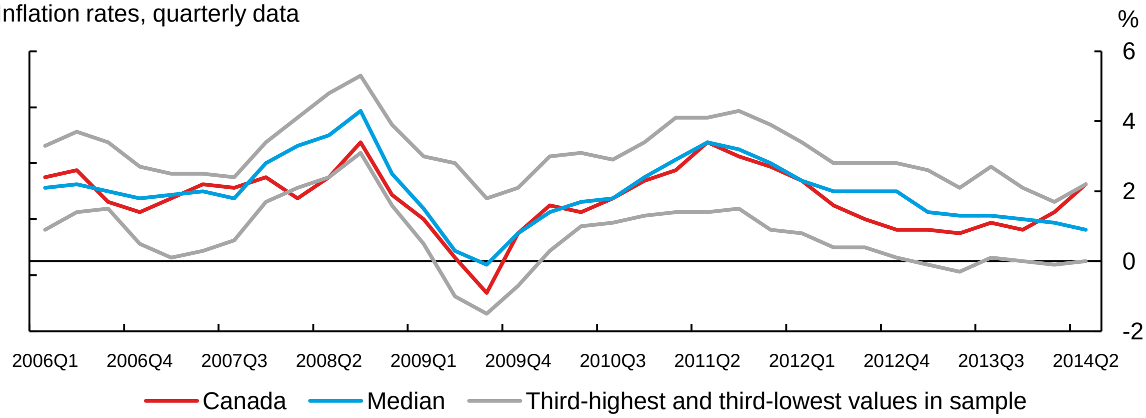
The Bank of Canada conducts monetary policy to maintain the inflation rate at 2 per cent—the midpoint of a 1 to 3 per cent target range. Since there is a lag in the transmission of monetary policy, the Bank needs to identify the factors that are likely to have a persistent effect on inflation.

The main determinant of underlying inflationary pressures is the output gap—the difference between actual output and potential output. When the demand for goods and services causes the economy to operate near capacity, there is upward pressure on prices. Conversely, a shortfall in demand tends to put downward pressure on prices.

However, a wide variety of factors can complicate the analysis of inflationary pressures, such as the transitory impact of exchange rate fluctuations or sector-specific price movements.

In recent years, the behaviour of inflation in Canada and other advanced economies has been surprising, even when we take into account these temporary factors (**Chart 1**).

Chart 1: The evolution of inflation in Canada and abroad since the crisis



Note: The grey lines represent the third-highest and third-lowest values of the sample in each quarter. The sample includes the following countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Israel, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.
Source: Organisation for Economic Co-Operation and Development (OECD)

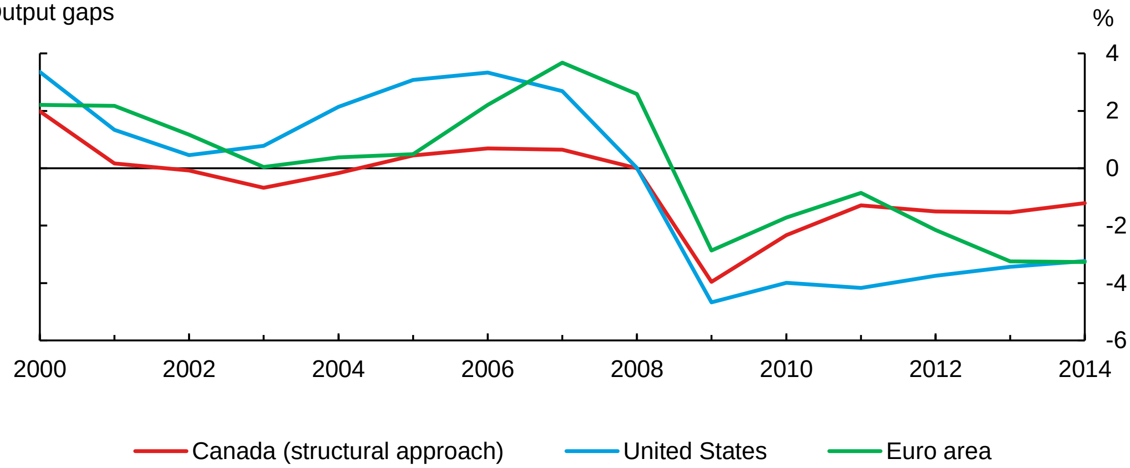
Last observation: 2014Q2

Indeed, following the global financial crisis, the dynamics of inflation gave rise to two puzzles. The first emerged in 2010–11, when inflation rates were consistently higher than expected, even as economic slack reached its highest level in recent history (**Chart 2** and **Chart 3**). The unexpected stability (or even, in some cases, increase) in inflation during this period led some economists to liken inflation to the dog that did not bark in the Sherlock Holmes story.[1]

The second puzzle was initially observed in 2012 (and lasted until at least mid-2014): inflation fell rapidly at the same time that the global economy was recovering and the output gap was shrinking. Once again, inflation surprised us—this time by its weakness.

Chart 2: The recession created a great deal of excess capacity in the economy

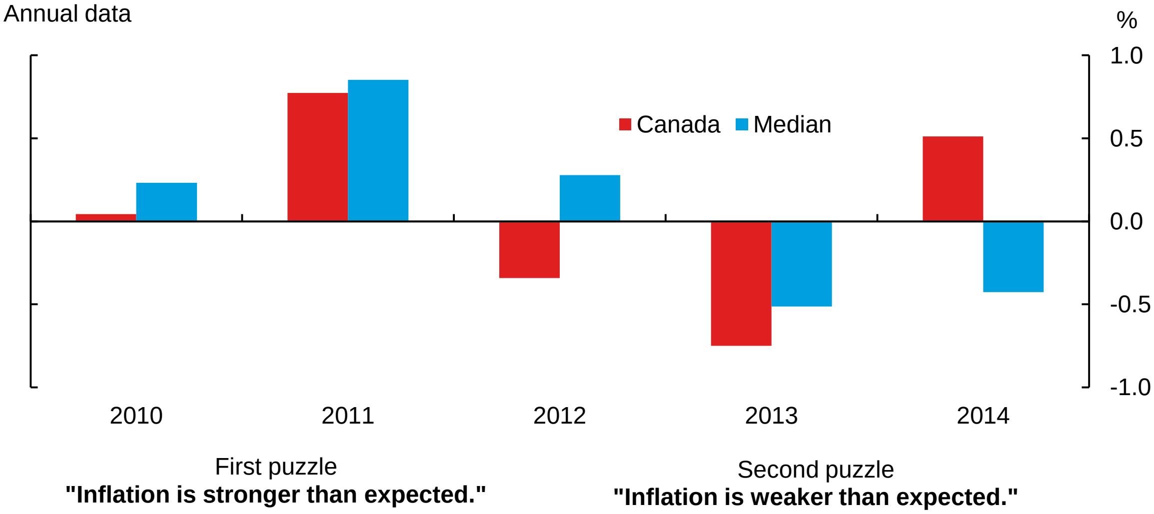
Output gaps



Sources: Bank of Canada (for Canada) and OECD (for the United States and the euro area) Last observation: 2014

Chart 3: Adjustments to the forecasts following the crisis illustrate the surprising evolution of inflation

Annual data



Note: The chart shows forecast revisions over time. Forecast revisions are measured by the difference between the CPI forecasts for the current calendar year made in January and December of the same year. Data are available for the following countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States.
Source: Consensus Economics Last observation: 2014

The Contribution of Household Inflation Expectations

Given inflation's importance to central banks, it is not surprising that a number of studies have examined its unusual behaviour during the crisis.

Several hypotheses have been proposed, including the possibility that the sensitivity of inflation to the output gap, or to its persistence, has changed, or that the extent of excess capacity had been misjudged. It is also possible that the effects of exchange rate fluctuations, commodity prices or the increasing trade with China were underestimated.

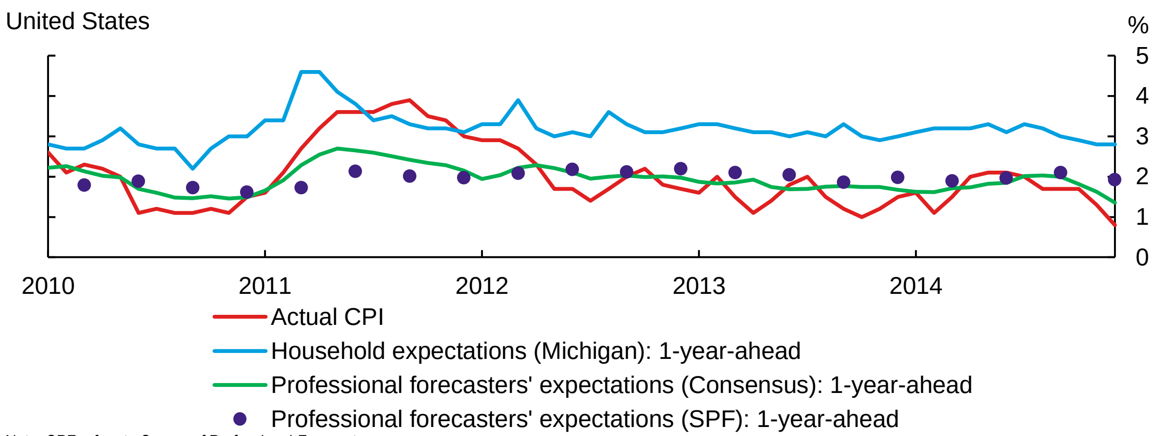
Our own work at the Bank, as well as that of other researchers, suggests that inflation expectations can help us resolve the twin puzzle.

Using econometric models that allow us to quantify the effect of individual variables on inflation, we learned that including household expectations with the usual determinants of inflation enabled us to explain a good portion of inflation dynamics in advanced economies since the crisis.[2] Household expectations increase the predictive power of models, even when those models already incorporate the expectations of professional forecasters.

In the United States, household expectations help explain the apparent stability of inflation after the crisis, as they increased following the rapid rise in oil prices and counteracted the output gap's dampening effect.[3] In Europe, where the economic recovery has been sluggish in recent years and some countries have recently reported negative inflation, falling household expectations have contributed to the decline in inflation.

Households' inflation expectations seem particularly useful in explaining the post-crisis dynamics of inflation, because they have exhibited greater variability than those of professional forecasters (**Chart 4**).

Chart 4: Households' inflation expectations have been more variable than those of professional forecasters



Note: SPF refers to Survey of Professional Forecasters.
The Consensus 1-year-ahead figure is a weighted average of the current- and next-calendar-year inflation expectations.
Sources: Consensus Economics, Federal Reserve Bank of Philadelphia, University of Michigan, U.S. Bureau of Labor Statistics and Bank of Canada calculations

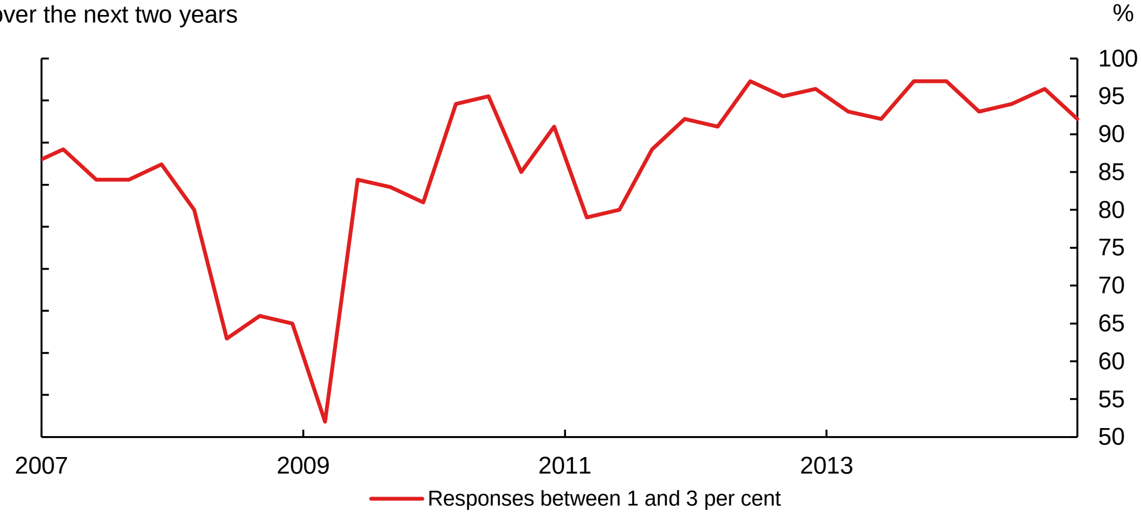
Last observation: December 2014

For Canada, it is difficult to say what role household expectations could have played, because we do not measure them. I will return to this later.

We know, however, that business expectations have remained well anchored to the target. Indeed, the Bank's *Business Outlook Survey* shows that, since the second quarter of 2009, at least 80 per cent of businesses canvassed have reported that they expect inflation to remain between 1 and 3 per cent over the next two years. This stability contributed to the resilience of inflation during the years immediately following the crisis (**Chart 5**).

Chart 5: The inflation expectations of Canadian businesses are solidly anchored

Percentage of firms indicating that they expect inflation to be between 1 and 3 per cent over the next two years



Source: Bank of Canada *Business Outlook Survey*

Last observation: 2014Q4

Regarding the subsequent decline in inflation, the Bank's analysis has highlighted the importance of increased competition in the retail sector. Indeed, the expansion of major retailers and the arrival of new ones in Canada have profoundly changed the retail landscape. The growing popularity of online shopping and new technologies have also contributed to intensifying competition.[4]

The impact of this increased competition, together with the large output gap, helps explain why inflation fell into the lower zone of the target range from mid-2012 to mid-2014.[5] Today, these same factors are contributing to underlying inflation being below 2 per cent in Canada.

Overall, and even if Canada's experience was slighty different, recent work suggests that the behaviour of expectations could explain part of the unexpected evolution of inflation in advanced economies since the crisis.

The Importance of Inflation Expectations for Monetary Policy

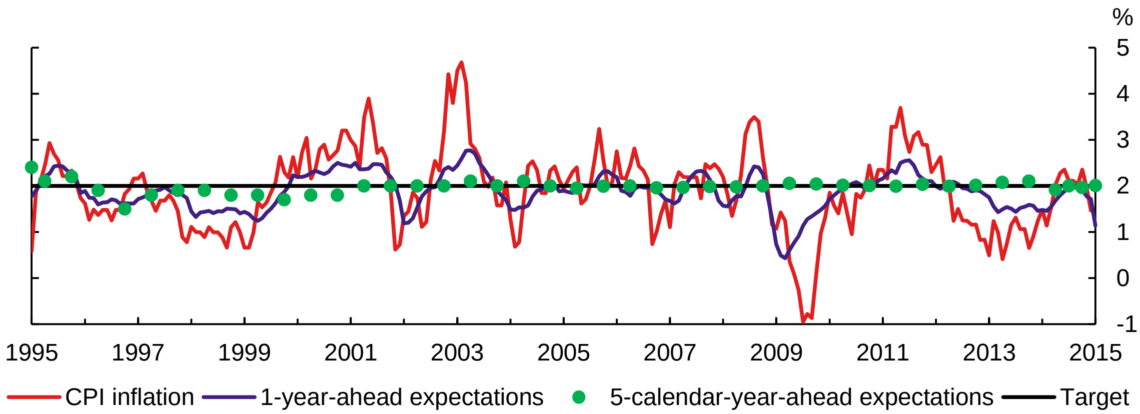
Why are inflation expectations so important for understanding observed inflation? After all, if forecasts about the weather have no influence on it, why is it any different with inflation?

In fact, the observed inflation rate reflects actions that people take today in light of their expectations of *future* inflation. For businesses, inflation expectations influence wage negotiations, price setting and financial contracting for investment; for households, expectations have an impact on consumption and savings decisions. If workers expect that the prices they currently face will increase in the future, they will ask for wage adjustments now, and entrepreneurs will do the same for the prices of their goods or services. Moreover, the key role played by household expectations in recent inflation dynamics could be partly explained by the fact that they approximate the expectations of small and medium-sized enterprises, which make up the vast majority of businesses in the developed economies.

The importance of inflation expectations was made clear to central banks in the 1970s and 1980s. In those years, inflation was high, volatile and unpredictable. Households and businesses relied on past inflation to predict its future level. Even with high interest rates, central banks struggled to contain inflation, because the anticipation of high inflation was a self-fulfilling prophecy.

The adoption of an inflation target helped correct the situation. In Canada, thanks to the public commitment made by the Bank in 1991 (and the Bank's success in fulfilling it over time), Canadians gradually began to expect that inflation would remain close to 2 per cent (**Chart 6**).[6] Since then, Canadians have been able to make decisions about their spending and savings with greater confidence, which has been favourable for investment and has contributed to improving the functioning of the labour market.

Chart 6: Forecasters' expectations do not stray far from the Bank of Canada's target



Note: The Consensus 1-year-ahead figure is a weighted average of the current- and next-calendar-year inflation expectations.
The 5-calendar-year-ahead expectations are semi-annual data from 1994 to 2013. The data change to quarterly frequency from 2014 onwards.
Sources: Statistics Canada, Consensus Economics and Bank of Canada calculations

Last observations: CPI, December 2014; remaining, January 2015

It is crucial that inflation expectations be well anchored, as it allows central banks to attain their inflation targets while reducing the volatility of other important variables, such as interest rates and output. Among other benefits, central banks will be less likely to reach the zero lower bound on interest rates.

Recent work conducted by the Bank confirms that inflation expectations are better anchored in countries that pursue an inflation target.[7] Moreover, this research suggests that the behaviour of expectations might be asymmetrical, depending on whether inflation lies above or below the target. There is a greater risk that expectations will become unanchored when inflation is persistently low, as is currently the case in a number of economies. This could have implications for monetary policy: when inflation is low for an extended period, central banks might have to expect a longer delay in returning it to the target.

Several Indicators Are Better than One

Given the importance of inflation expectations, central banks closely monitor the evolution of several indicators that measure expectations.

We are of course interested in the level of expectations—they are a key determinant of future inflation—but also in the degree of uncertainty surrounding those expectations and their sensitivity to observed inflation. These measures provide important signals about the extent to which expectations are anchored at the target.

In addition to monitoring expectations over various time horizons, we also compare the expectations of various types of economic agents: financial markets, professional forecasters, households and businesses. Each type of indicator has strengths and weaknesses,[8] and the signals will be more credible if they are corroborated by more than one indicator.[9]

Expectations are not static. It is normal to see them fluctuate in response to changes in business conditions. Currently, for example, short-term inflation expectations are decreasing in Canada and elsewhere, owing to the fall in oil prices.[10] This is not surprising, considering that the prices of frequently-purchased consumption goods, such as gasoline, typically have a more pronounced impact on expectations.[11]

However, if the inflation target is credible, we should not see significant fluctuations in medium- and long-term expectations; if it is not, economic agents will tend to modify their behaviour, thus compromising the effectiveness of monetary policy.

In the second half of 2014, long-term inflation expectations derived from financial instruments fell in some advanced economies, including Canada, but forecasters' expectations over the same horizon remained stable and very close to central bank targets (**Chart 7**). In most economies, the risk that expectations will become unanchored therefore appears limited.

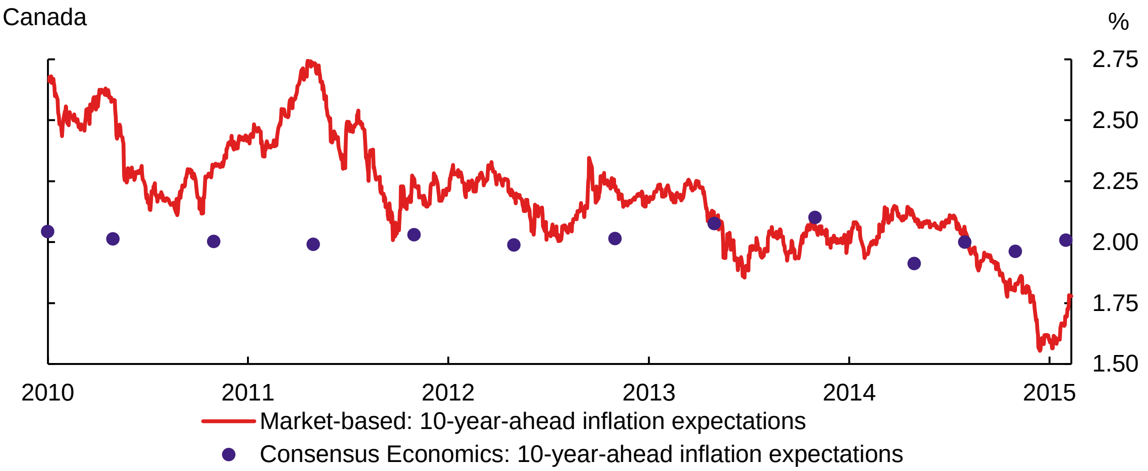
The Bank's New Survey

As I mentioned earlier, we do not have indicators of household inflation expectations in Canada. The Bank recently decided to fill this gap by creating a new survey.

To that end, the Bank examined the various techniques used to measure the inflation expectations of households elsewhere in the world and largely based its approach on the one created by the Federal Reserve Bank of New York.[12]

The Bank's new quarterly survey is an online poll of 1,000 Canadian consumers. It measures both the inflation expectations of participants over various time horizons and the uncertainty surrounding them.

Chart 7: The long-term inflation expectations of markets have declined, while those of forecasters have remained more stable



Sources: Bloomberg, Consensus Economics and Bank of Canada calculations

Last observations: Consensus Economics, January 2015; market-based, 10 February 2015

A preliminary analysis of the responses from the first wave of the survey, conducted last November, is promising. Indeed, the inflation rate perceived by households is similar to that measured by the CPI over the past year. As well, when households were asked to evaluate the probability of various inflation outcomes over the next two years, their answers centred around the Bank's 1 to 3 per cent target range. This is an encouraging sign that household expectations are anchored to the target.

Our new household survey 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.

The power of our new tool will truly reveal itself after we have conducted the survey several times, giving us the ability to compare results over time and analyze trends. We will present detailed findings later this year after taking the time to analyze the results carefully.

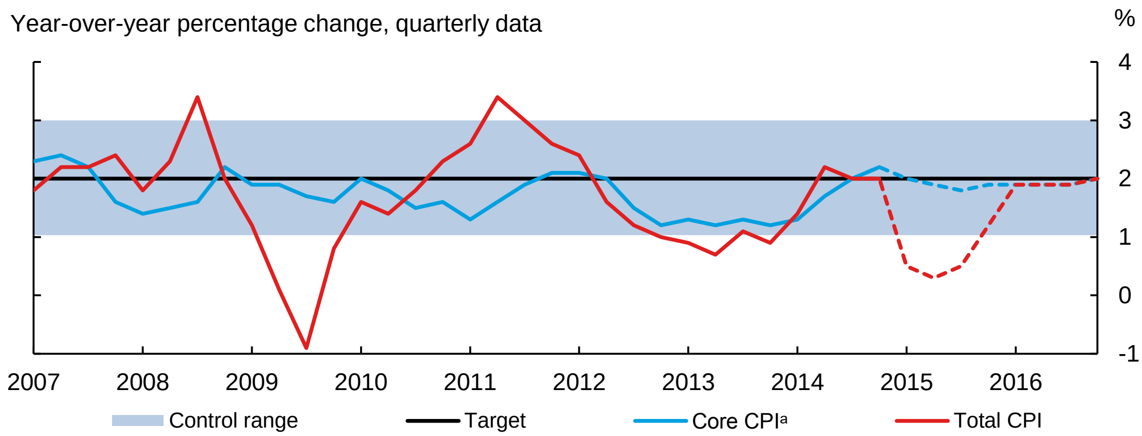
The Fall in Oil Prices Creates Disinflationary Pressures

After talking about the inflation expectations of other economic agents, I would be remiss if I didn't mention the Bank's expectations. If the expectations of households and businesses are central to the decisions they make, the same is also true of the Bank.

Since mid-2014, inflation has risen to around our 2 per cent target. This increase in inflation is being temporarily fuelled by the depreciation of the dollar since the beginning of 2013, as well as by some sectoral factors, particularly higher prices for meat and communications services. Since there is still material excess capacity in the economy and competitive pressures remain intense in the retail sector, the Bank estimates that underlying inflation remains below target.

On top of this, the economy is also faced with the steep decline in oil prices. Its impact is already being felt, and the inflation rate fell to 1.5 per cent in December. The Bank predicts that this rate will continue to decline, bottoming out at a level slightly above zero in the second quarter of 2015 (**Chart 8**). In light of the volatility of oil prices, it is possible that inflation will dip into negative territory for a brief interval.

Chart 8: Total CPI inflation is expected to drop under 1 per cent in 2015



a. CPI excluding eight of the most volatile components and the effect of changes in indirect taxes on the remaining components
Sources: Statistics Canada and Bank of Canada calculations and projections. Chart from January 2015 *Monetary Policy Report.*

Rest assured: even if inflation turns negative for some time, that would not constitute deflation, which requires a generalized decline in prices. When inflation expectations are solidly anchored, as is now the case in Canada, there is no reason to fear deflation.

The repercussions of falling oil prices will be felt well beyond their direct impact on the consumer price index. As the Bank explained in its January *Monetary Policy Report*, lower oil prices will have an unambiguously negative impact on the Canadian economy. This shock will delay the economy's return to full capacity by undermining both investment in the oil sector and gross domestic income. When oil prices fall, declining revenues from the oil sector are transmitted to the Canadian economy through a reduction in personal wealth via the impact on incomes and stock holdings. Interprovincial trade is also affected. In Western Canada, for example, purchases of machinery, primary metals and chemical products manufactured by companies in Central Canada will decrease. Together, these effects will outweigh the benefits derived from the decline in oil prices on the energy bills of households and businesses.

The net impact of this shock is significant: assuming no monetary policy response to the shock, we have calculated that average household disposable income would be reduced by 3 per cent by the end of 2016. Moreover, through its impact on the real economy, the decline of about 50 per cent in the price of oil since June would knock roughly one-half point off the underlying inflation rate during the same period.

It is against this backdrop that the Bank lowered its key policy rate by a quarter of a point in January. The Bank's policy action is intended to provide insurance against downside risks to the inflation profile and financial stability risks, support the sectoral adjustment needed to strengthen investment and growth, and bring the Canadian economy back to full capacity and inflation to target around the end of 2016. By doing so, it should also keep inflation expectations well anchored to the target.

The concept of insurance is important and should be explained in greater detail. Policy insurance is a logical part of our risk management framework for monetary policy. There is nothing mechanical about it. The cut in policy rate is intended primarily to provide insurance against the downside risks to inflation. Many of the negative effects of lower oil prices on growth happen swiftly. There will be some offsets, such as the stronger U.S. economy and a weaker Canadian dollar, but there are risks with regard to the timing and magnitude of these compensating effects. On March 4 we will come to our next interest rate decision. That decision will be based on a careful examination of how the economy, and the risks, are evolving.

Conclusion

Allow me to conclude.

Inflation expectations are central to the conduct of monetary policy. The Bank has recently developed a new indicator of inflation expectations to enhance its other indicators. We are therefore better equipped to closely monitor and analyze expectations.

I hope that my remarks have given you a clearer idea of the Bank's work and the challenges it faces. It is possible that, some day, one of our regional representatives will contact you to request your participation in the *Business Outlook Survey*. You might also be asked to participate, as a consumer, in our new online survey. In either case, I ask you to give us some of your time: this will help us to do our work better.

The Bank of Canada, in turn, will continue to contribute to the economic welfare of households and businesses by maintaining a level of inflation that is low, stable and predictable. Our inflation target has gained a great deal of credibility over time, which has helped to hold inflation expectations near our goal, but we are not taking this success for granted—we remain vigilant.

I thank you for your attention.

Endnotes

[1] International Monetary Fund (IMF). 2013. *World Economic Outlook* (April), ch. 3.

[2] Friedrich, C. 2014. “Global Inflation Dynamics in the Post-Crisis Period: What Explains the Twin Puzzle?” Bank of Canada Working Paper No. 2014–36.

[3] Coibion, O., and Y. Gorodnichenko. 2015. “Is the Phillips Curve Alive and Well after All? Inflation Expectations and the Missing Disinflation.” *American Economic Journal: Macroeconomics* 7 (1): 197–232.

[4] Consider the growing use of smartphones, which makes shopping considerably easier by allowing consumers to compare prices in real time.

[5] Unlike similar work on the United States, our research on Canada has not allowed us to identify any change in the sensitivity of inflation to the size or persistence of the output gap. Nor have fluctuations in the exchange rate or the prices of imported goods helped us solve the dual puzzle. With regard to the situation in the United States, see R. G. Murphy, “Explaining Inflation in the Aftermath of the Great Recession,” *Journal of Macroeconomics*, 2014, 40: 228-244.

[6] The credibility of the target is reflected, for instance, in wage bargaining: While 21 per cent of collective agreements signed between 1985 and 1989 included a cost of living adjustment clause, by 2014 only 4 per cent of them did.

[7] Ehrmann, M. 2014. “Targeting Inflation from Below - How Do Inflation Expectations Behave?” Bank of Canada Working Paper No. 2014–52.

[8] Cunningham, R., B. Desroches and E. Santor. 2010. “Inflation Expectations and the Conduct of Monetary Policy: A Review of Recent Evidence and Experience.” *Bank of Canada Review* (spring): 13-25.

[9] The importance of monitoring the inflation expectations of various economic agents has been recognized for a long time. What recent research has highlighted, however, is that we must also apply this approach to our models.

[10] Compared with October, the February Consensus Economics forecast for total CPI inflation for 2015 declined by 1.1 percentage points to 0.8 per cent. The forecast for total CPI inflation for 2016 is 2.1 per cent. There is also a slight downward shift in the results of the Bank’s winter *Business Outlook Survey*.

[11] Ehrmann, M., D. Pfajfar and E. Santoro. 2014. “Consumer Attitudes and the Epidemiology of Inflation Expectations.” Bank of Canada Working Paper No. 2014–28.

[12] The Fed’s survey is the product of several years of research and experiments conducted by a group of economists and psychologists. See O. Armantier, W. Bruine de Bruin, S. Potter, G. Topa, W. van der Klaauw and B. Zafar, “Measuring Inflation Expectations”, *Annual Review of Economics*, Vol. 5 (2013): 273–301.