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CHECK AGAINST DELIVERY

Re-examining Canada's Monetary Policy Framework:  
Recent Research and Outstanding Issues

*Introduction*

I am honoured to address members of the Canadian Association for Business Economics. My remarks today will focus on critical issues that the Bank of Canada has studied over the past four years and how this research will inform our work as we move forward post crisis.

Central banks were forced to use extraordinary policy measures to combat the macroeconomic consequences of the 2008–09 financial crisis. The experience also raised fundamental questions about existing monetary policy frameworks, causing central banks to revisit issues that were long thought to be resolved. Some critical observers even suggested that inflation targeting and the pursuit of price stability might be detrimental to financial stability and reduce economic welfare.

The Bank of Canada, of course, like many other central banks, operates under an inflation-targeting regime. We continue to believe that this regime has served us exceptionally well, in both turbulent and tranquil times. Nevertheless, we, like many of our counterparts elsewhere, are re-examining key features of our monetary policy framework in the light of recent events. However, we are doing so as part of an ambitious and long-standing research program initiated in 2006. This research will inform the renewal of the Bank's inflation-targeting agreement with the government in 2011.

A great deal of innovative analysis and research have deepened our understanding of how the macroeconomy operates and helped us gauge the potential costs and benefits of alternative monetary policy frameworks. Experience during the crisis and in the period immediately following has provided many important and cautionary lessons, and lent a greater sense of urgency and significance to the research work already under way.

I would like to review the most important elements of this research effort with you today, and indicate how it has been informed and shaped by our recent "battlefield experience." Towards the end of my presentation, I will try to give you a sense of where things stand in our search for further improvements to the monetary policy framework, as well as

some of the major outstanding issues. While much has been learned over the past four years, a great deal has yet to be resolved, and few definite conclusions will be presented. This is still very much a work in progress.

### ***Where We Were in 2006***

In 2006, when our inflation-control agreement with the government was last renewed, the Bank published a document entitled “Renewal of the Inflation-Control Target: Background Information.”<sup>1</sup> It assessed the past performance of the framework, discussed the various issues that had been examined in the run-up to the renewal, and identified a number of key questions that needed to be studied over the next five years.

The two most important questions concerned the potential benefits and costs of lowering the target rate of inflation from 2 per cent, and the potential benefits and costs of moving from an inflation target to a price-level target. The distinguishing feature of price-level targeting is that, unlike inflation targeting, by-gones are not by-gones. Any past mistakes must be corrected. If aggregate prices overshoot the targeted price-level path in one period, prices must come back to the path in future periods.

Several other issues were also identified, but were either deemed to be of lesser importance and promise, or to have been largely resolved. One of these was whether central banks should use their monetary policy instrument to lean against prospective asset bubbles and other forms of financial instability, even if this risked deviating from their inflation objective for an extended period.

The events of the past three years have seriously challenged the received wisdom that existed on this issue prior to the crisis. Some well-known economists have suggested that the pursuit of price stability is not enough, and is perhaps even dangerous to the stability of the financial system and the macroeconomy more generally.<sup>2</sup>

Consequently, the Bank’s research program on the monetary policy framework now includes three key questions: (i) whether the inflation target should be lowered; (ii) whether we should adopt a price-level target; and (iii) whether the monetary policy framework should be modified to give greater recognition to financial-stability concerns. The state of play for each of these as of 2006 is outlined briefly below, and will serve as a helpful point of departure for the discussion that follows.

### ***Is 2 per cent the optimal rate of inflation?***

Achieving and maintaining a low, stable, and predictable rate of inflation promotes economic welfare by reducing uncertainty and preventing arbitrary redistributions of wealth. However, it isn’t clear that these benefits are maximized at an inflation rate of 2 per cent.

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<sup>1</sup> The document can be found at [www.bankofcanada.ca/en/press/background\\_nov06.pdf](http://www.bankofcanada.ca/en/press/background_nov06.pdf).

<sup>2</sup> See White (2006). Also see Diamond and Rajan (2009); Cagliarini, Kent, and Stevens (2010); and White (2009).

While the benefits of targeting a lower rate of inflation were generally believed to be positive in 2006, three possible reasons were identified at the time for not pursuing such an ambitious objective: (i) measurement error; (ii) nominal wage-price rigidity; and (iii) the so-called zero bound on nominal interest rates. The first two of these were judged to be relatively unimportant, but the third was taken more seriously because, at very low rates of inflation, monetary authorities might not be able to ease policy sufficiently to counter a sudden downturn in the economy, since nominal interest rates can't technically fall below zero.<sup>3</sup> This possibility, unlike the other two concerns, was regarded as sufficiently serious to preclude consideration of a lower target without further study.

The Bank didn't realize then that the real world was about to give it a natural experiment of almost unprecedented proportions with which to test the significance of the zero bound.

### *Price-level targeting—a renewed interest*

The second key question on the research agenda was price-level targeting, and the Bank had already completed a great deal of work on this issue by 2006. Price-level targeting was seen to be potentially attractive for three main reasons. The first concerned the increased certainty that it would provide regarding the price level 10, 20, or 30 years in the future. The second concerned the enhanced stabilizing properties that price-level targeting might offer in terms of reduced inflation and output variance. Provided agents were sufficiently forward looking and the policy was sufficiently credible and well understood, the central bank might enjoy what Lars Svensson (1999) termed a “free lunch.” The third concerned the possibility that it might facilitate the pursuit of a lower inflation rate (or price-level path), if this were judged desirable.

Unfortunately, the only country to experiment ever with price-level targeting was Sweden, and for only a brief period in the 1930s.<sup>4</sup> While the experience was generally viewed as positive, there was no assurance that it could be extended to other countries or periods.<sup>5</sup>

It was clear that such a dramatic shift in regime called for some intensive research. This research would focus primarily on how expectations are formed and the challenges that a small open economy might experience when it was subject to wide swings in important relative prices, such as world commodity prices. Something that seemed to work well in a simple rational-expectations model with a single good might have severe negative consequences in practice. The research would also try to document in a more convincing way the potential benefits of price-level targeting.

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<sup>3</sup> Discussions of the implications for the zero bound on nominal interest rates for monetary policy can be found in Amano and Shukayev (2010) and Lavoie and Murchison (2007-2008).

<sup>4</sup> See Berg and Jonung (1999) for a description of the Swedish experience with price-level targeting.

<sup>5</sup> Eggertsson (2007) contends that the United States also successfully pursued price-level targeting during the 1930s, but their experience has largely gone unrecognized.

### ***Monetary stability versus financial stability***

The third issue that needs to be highlighted involves the difficult trade-offs that can at times exist between monetary stability and financial stability. Authors such as Claudio Borio and William White at the Bank for International Settlements warned as early as 1998 that the single-minded pursuit of price stability could come at the expense of system-wide financial stability.

However, the prevailing view in 2006—indeed, right up to the crisis and slightly beyond—was that financial-stability issues were best left to regulators. Central banks had one primary monetary policy tool at their disposal—adjustment of an official short-term interest rate—and experience suggested that this was best directed at achieving price stability. The extreme version of this view rested on three basic tenets: (i) asset bubbles and other forms of potentially serious financial dislocation were difficult, if not impossible, to spot in real time; (ii) adjustment of the official interest rate was a very blunt and inefficient instrument with which to counter asset bubbles, and would likely inflict considerable collateral damage on the rest of the economy; and (iii) a more realistic strategy was to focus simply on cleaning up as quickly as possible once an asset bubble had burst. This was the best a central bank could do.<sup>6</sup>

The more nuanced view of most inflation targeters, including the Bank of Canada, was that central banks should lean against any suspected financial instability to the extent that it might threaten aggregate economic activity and the achievement of the inflation target over the medium term, even if this implied appearing to deviate from the target in the short term. In other words, central banks were expected to pursue inflation targeting in a flexible, forward-looking manner, and could delay achieving their target if such an action would minimize the possibility of more ominous outcomes in the future. But the pursuit of financial stability through monetary policy measures should not go any further.<sup>7</sup>

### ***Where Are We Now?***

So how have things changed in the past four years? What have we learned from our long-term research effort? What have we and other central banks learned from the bitter experience of the crisis? Have recent events dampened or strengthened our taste for reform?

### ***The optimal rate of inflation***

Recent research on the prospective benefits of targeting a lower inflation rate have focused primarily on the gains that might accrue through improved pricing behaviour and increased incentives for holding money. This has been balanced by research that has tried to weigh these benefits against the additional costs that might be incurred through more frequent encounters with the zero bound.

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<sup>6</sup> See Greenspan (2002) and Bernanke and Gertler (1999).

<sup>7</sup> See Selody and Wilkins (2007).

In 1969, Milton Friedman published *The Optimum Quantity of Money*, in which he noted how inflation imposed an effective tax on money, causing households and businesses to economize on their transactions balances, thereby biasing the pattern of trade. His solution was to propose an optimal rate of deflation that would provide a positive rate of return on transactions balances.

Bank of Canada researchers have extended this earlier work, evaluating the welfare effects of lowering inflation in a life-cycle, heterogeneous-agent model in which households hold a portfolio of real assets (housing), nominal debt, and money. The authors find that reducing the targeted rate of inflation not only increases aggregate welfare, but also would directly benefit a significant proportion of the current population.<sup>8</sup>

The other major strand of our research on the optimal rate of inflation has concentrated on the allocative inefficiencies that are likely to arise in a world with positive inflation, owing to pricing distortions that arise due to infrequent price adjustments or “sticky prices.” If firms adjust prices infrequently, they have an incentive to set prices higher at the start of a contract than would be warranted by initial market conditions, knowing that inflation will gradually erode the real value of prices over time.

With sticky prices, higher rates of inflation cause the price spread to widen and create larger differences between prices of otherwise similar products at different points in the term of their fixed contracts. This, in turn, increases price dispersion and leads to even larger allocative inefficiencies.<sup>9</sup>

While earlier studies often found that the implied welfare costs associated with this behaviour, measured in terms of lost consumption or some other metric, were relatively small, Bank of Canada researchers have extended this work in a number of important ways and reported much larger effects. These extensions included: (i) incorporating more realistic wage dynamics into New Keynesian models; (ii) adding growth to standard steady-state analyses; and (iii) allowing for trend increases in inflation. The effect, in almost every instance, was to strengthen the case for a very low—if not slightly negative—target rate of inflation.<sup>10</sup>

It is important to note, however, that much of this work is based on historical data that pre-date the crisis and therefore assigns a very low probability of ever hitting the zero bound.<sup>11</sup> Higher probabilities would of course alter the cost-benefit equation, since the

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<sup>8</sup> See Cao et al (2009).

<sup>9</sup> See Ambler (2007–2008) for a lucid description of the costs of inflation arising from sticky prices.

<sup>10</sup> Amano, Ambler, and Rebei (2007) examine the implications of trend inflation in a stochastic, environment and Amano et al. (2009) study the effect of sticky prices and wages in the presence of exogenous growth. Amano and Shukayev (2010) investigate the implications of non-zero inflation for endogenous growth in a model with sticky prices and wages.

<sup>11</sup> Billi (2007) attempts to measure optimal inflation in a model that balances the costs of hitting the zero bound with the costs arising from the presence of nominal-price stickiness. Schmitt-Grohé and Uribe (2007) argue that the probability of the U.S. economy hitting the zero bound is very small.

expected long-term cost of choosing a target that is “too low” is a function of how often one is likely to hit the zero bound and the costs that are incurred once that occurs.

Does the fact that we have recently hit the zero bound suggest that earlier estimates were too small, and that such encounters are likely to be more frequent in the future? Will the efforts that are under way to reform the financial system make it more stable and reduce the chances of similar occurrences in the future? Answering these questions is obviously critical to reaching a decision on whether lower is better.

A second critical factor concerns the effectiveness of any alternative policy tools that authorities are likely to have at their disposal whenever the zero bound is reached. Do unconventional monetary policy instruments, such as quantitative easing, credit easing and conditional commitments, represent viable mechanisms for overcoming the zero bound? How effective are other, non-monetary, policy instruments in dealing with a crisis? While it is still early days, nothing in recent experience leads one to believe that these tools can be used with the same degree of confidence and effectiveness as conventional policy tools.<sup>12</sup> All of these factors play a critical role in determining how much insurance might be needed in terms of an inflation buffer to avoid such problems.<sup>13</sup>

Some noted economists have recommended raising the inflation target to 4 or even 6 per cent to provide an extra measure of protection.<sup>14</sup> This idea has been universally rejected by the central banking community, however, which argues that the costs incurred through lost credibility as well as higher and more uncertain inflation would far outweigh any prospective benefits.<sup>15</sup> Low, stable, and predictable inflation, it is generally agreed, is the most important contribution that central banks can make to the economic well-being of a country.

### ***Price-level targeting***

Interest in the potential advantages of price-level targeting has, if anything, increased following the crisis. The automatic stabilization properties that might result from committing to a price-level target could reduce the probability of hitting the zero bound, thereby allowing central banks to aim for a lower target path, and make monetary policy more effective once it was reached.

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<sup>12</sup> This increased uncertainty was explicitly recognized by the Bank of Canada in its press releases and *Monetary Policy Reports* once the target overnight interest rate had reached its effective lower bound, since any additional easing would necessarily require the use of unconventional policy measures. See Bank of Canada, April 2009, *Monetary Policy Report*.

<sup>13</sup> Indeed, according to some early empirical work conducted by He (2010), the Bank of Canada’s conditional commitment appears to have resulted in a persistent lowering of Canadian interest rates since April 2009, relative to what would have been expected without the conditional commitment.

<sup>14</sup> See Williams (2009) and Blanchard, Dell’Ariccia, and Mauro (2010).

<sup>15</sup> See Weber and Hildebrand (2010) and Carney (2010).

Absent any extensive real-world experience to draw on, however, central bank researchers have been forced to rely on model simulations to test the feasibility and desirability of such a bold move. These simulations assess the performance of alternative monetary policy regimes, both in the context of a representative set of shocks based on historical data and in more extreme examples.

The results, for the most part, have favoured price-level targeting over inflation targeting, although the differences are not always large or statistically significant. In addition, price-level targeting was generally found to be more robust than inflation targeting to various forms of uncertainty, owing to its self-correcting nature.<sup>16</sup> One of the main concerns identified in 2006 therefore seems to have been addressed; on balance, price-level targeting appears to be able to provide superior performance in a multi-good world characterized by large relative price shocks.<sup>17</sup>

Unfortunately, all of these encouraging results are derived from models in which agents are, for the most part, forward looking, and fully conversant with the implications of price-level targeting; they also trust that policy-makers will live up to their commitment. Simulation results reported by Bank researchers suggest that if more than approximately 40 per cent of agents base their actions on rules of thumb or on backward-looking expectations, the dominance of price-level targeting no longer holds.

Further work is clearly needed to better understand the ways in which Canadian businesses and households form their expectations, as well as the communication challenges that might arise if Canada were to move to price-level targeting. If the learning curve is too long and expectations are too slow to adjust, the present value of any shift to price-level targeting could easily turn negative.<sup>18</sup> The Bank is currently conducting some experimental work designed to shed light on both issues, and hopes to report its preliminary findings later this year.

### ***Balancing monetary and financial stability***

The tension that can sometimes exist between the dual objectives of monetary and financial stability is an issue that has been brought to the fore by recent events.<sup>19</sup> Central banks have been forced to re-examine the three tenets that I discussed earlier, and two of them have been effectively discarded. First, central banks no longer think that a strategy that relies exclusively on mopping up quickly after a bubble has burst is tenable. The costs of not taking pre-emptive action before a bubble bursts are potentially too high and,

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<sup>16</sup> See Cateau (2008).

<sup>17</sup> Murchison (2010) provides a summary of this line of research.

<sup>18</sup> See Kryvtsov, Shukayev, and Ueberfeldt (2008) and Masson and Shukayev (2008) for examples of this type of research.

<sup>19</sup> Boivin, Lane, and Meh (2010) summarize the question of whether monetary policy should and could do more to restrain a buildup of financial imbalances.

with regard to the response of the official sector, produce a destabilizing asymmetry that only encourages future misdeeds.<sup>20</sup>

In addition, central banks are no longer as dismissive about the feasibility of identifying potential sources of financial instability before their macroeconomic consequences are felt.

The one remaining complication concerns the third tenet described earlier—the fact that traditional monetary policy instruments are often a very heavy-handed means of dealing with financial sector vulnerabilities, especially if the potential source of instability is limited to a specific sector or area of activity. Such cases call for more targeted measures and a wider set of instruments that are better able to deal with financial risks. Regrettably, many of these tools are still in the development phase.<sup>21</sup>

What can one conclude from this? First, greater attention must to be paid to financial-stability concerns, particularly those of a system-wide nature. Second, inflation targeters need to be forward looking and flexible, resisting any financial-system pressures that may threaten real activity and inflation in the future, even if the horizon for such outcomes extends well beyond the normal time frame for achieving and preserving the inflation target. While most inflation-targeting agreements already allow for some flexibility in the time period over which the target is achieved, whether there is sufficient flexibility and willingness to act in situations that might require even greater forbearance is an open question that has yet to be tested.

The central issue that remains is whether monetary authorities should be expected to go further than the prescripts of flexible, forward-looking inflation targeting would suggest.<sup>22</sup> If so, what form would it take? Should the inflation-targeting agreement itself, or the central bank's reaction function, give explicit recognition to asset prices and credit growth? Would this prejudice the clarity of the current targets? Would central bank credibility and accountability be sacrificed in the interest of achieving even greater policy flexibility?

Carney (2009) has suggested that this problem might be overcome by combining flexible inflation targeting with price-level targeting. If monetary policy had to lean into the wind for financial stability purposes and deviate from target for an extended period of time, credibility and accountability perhaps could be preserved by announcing that these deviations would be offset over time, keeping the economy on a predetermined path for the price level.<sup>23</sup>

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<sup>20</sup> The so-called “Greenspan put.”

<sup>21</sup> See Bank of England (2009), Boivin, Lane, and Meh (2010), and International Monetary Fund (2009).

<sup>22</sup> See Carney (2008) and Svensson (2009).

<sup>23</sup> See Carney (2009).



Other important considerations relating to issues of monetary and financial stability include: How far should coordination between monetary authorities and regulators be taken? Would a clear and separate assignment of tools and targets be better? Will the introduction of new prudential tools essentially solve this dilemma? All of these questions, and many others, have been brought to the fore by the crisis.

### *Conclusion*

Significant progress has been made on the research front regarding key outstanding issues identified in the 2006 document on the renewal of inflation targeting. Valuable, if painful, lessons have been learned from the crisis, and old issues that were thought to be largely resolved have resurfaced, demanding renewed attention.

Shifting to a lower inflation target and/or moving to a price-level target are still possibilities, and in some respects look even more promising than they did before the crisis, although other aspects of our research results and recent experience lend an extra air of caution.

A wide range of models suggest that, all other things being equal, economic welfare is maximized at inflation rates lower than 2 per cent, but considerable uncertainty still exists regarding how large these gains might be. The cost-benefit of lowering the target hinges on weighing these uncertain benefits against the increased probability of hitting the zero bound and the costs that this might impose, absent other reliable corrective instruments.

Research on price-level targeting suggests that the gains from switching to a price-level target are probably positive and potentially larger in the presence of the zero bound. A price-level target might reduce the likelihood of hitting the zero bound and could shorten the length of time during which the economy remains there once it is reached. As a result, it might be possible to target a lower price-level path. In addition, there could be further benefits related to greater price-level certainty. Exploiting these advantages rests on a number of critical assumptions, however, including the credibility and commitment of policy-makers, as well as the expectations-formation process of agents and the ease with which price-level targeting could be communicated.

A final factor that must be considered before any decision is made is the proven track record of the present system, which has shown its worth in both turbulent and tranquil times. This represents a relatively high bar against which any future changes must be judged.

One thing is certain, no matter what is decided. The most important contribution that a central bank can make to the economic well-being of households and businesses is the achievement and maintenance of price stability. This will not be sacrificed. The only question, as always, is whether it can be delivered in an even more effective and reliable manner.

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