

Credibility, Flexibility and Renewal: The Evolution of Inflation Targeting in Canada

Thomas J Carter, Rhys Mendes and Lawrence L Schembri*

1. Introduction

In February 1991, Canada became the second country, after New Zealand, to adopt an inflation target as a central pillar of its monetary policy framework, along with a flexible exchange rate.^{1,2} Its main purpose was to achieve price stability in the form of low, stable and predictable inflation. At the time, price stability was seen as the main contribution that monetary policy could make to achieving the Bank of Canada's (BoC) mandate 'to promote the economic and financial welfare of Canada', a view which experience has since only strengthened.³

The inflation-targeting regime proved much more successful than expected in achieving price stability. In contrast to the high inflation witnessed in the 1970s and 1980s, inflation has averaged just below 2 per cent since its adoption. Because of this success, inflation expectations have become very well anchored at the BoC's 2 per cent target, and this credibility has increased the effectiveness of monetary policy as a countercyclical tool. The resulting monetary policy framework has allowed Canada to chart a course for monetary policy independent of that of the United States and to adjust to various shocks more smoothly, including the sizeable commodity price movements that took place over this period. Overall economic performance has improved, with lower and less volatile interest rates and steadier employment and output growth.

The purpose of this paper is to review the Canadian experience with inflation targeting, then distil and analyse some key observations and lessons learned, especially those that are unique to Canada. Based on these findings and important trends in the global economy, the paper also examines the issues likely to shape the future of inflation targeting, monetary policy frameworks and central banking more generally.

The success of the inflation-targeting regime in Canada owes much to three important factors that have underpinned its credibility from the outset. The first is the simple, readily understood and consistently applied specification of the inflation target, which, since

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1 Formally, the inflation target is described as an 'inflation-control target' (italics added) in joint agreements between the Bank of Canada and the government, but in common usage, the word 'control' has largely disappeared.

2 Canada has operated under a flexible exchange rate since mid 1970 and had previously done so over the years 1950–62.

3 Bank of Canada Act 2017 at <<https://laws-lois.justice.gc.ca/eng/acts/B-2/>>.

adoption, has taken the form of a point target for annual consumer price index (CPI) inflation, with a surrounding symmetric control range reflecting the normal volatility of inflation. In particular, the target has been specified as the 2 per cent midpoint of a 1–3 per cent control range since 1995. The 2 per cent midpoint has thus served as an important focal point to coordinate and anchor inflation expectations throughout the economy. The specification of the target has also allowed the BoC to better communicate its goals and explain its conduct, thereby enhancing transparency and accountability.

Another factor contributing to the success of the inflation-targeting regime relates to its governance. From its inception, the regime has been based on an agreement between the BoC and the Government of Canada that grants the BoC de facto operational independence while emphasising that inflation control ultimately remains a joint duty of both parties. In other words, non-monetary policies, primarily fiscal policy, but also including financial regulation and supervision, must be coherent with the achievement and maintenance of the inflation target. This governance framework is an important theme of the paper because it has contributed to the success of the regime by enhancing the political legitimacy and credibility of the target.

The third and final key factor is that the regime is regularly subject to a formal and transparent review-and-renewal process. These renewals, which started in earnest in 2001 and have since occurred every five years, have led to continual improvement on the basis of accumulated experience and understanding, especially with respect to the operational aspects of the regime's implementation. They have also provided the BoC and government with regular opportunities to affirm the specification of the target and their joint commitment to it.

These three factors have helped to anchor inflation expectations around a credible target, and this anchoring has in turn made it easier for monetary policy to stay on target, setting a powerful virtuous cycle into motion. An additional benefit is that well-anchored inflation expectations leave monetary policy with greater flexibility to take account of its impacts on output and employment variability, as well as financial stability. In Canada, this flexibility has been operationalised as flexibility over the horizon at which monetary policy aims to return inflation to target. This proved essential in facilitating the BoC's response to the global financial crisis (GFC) and other large shocks.

While monetary policy was not the root cause of the GFC, which stemmed instead from massive regulatory and supervisory failures in core economies, the crisis nonetheless brought central banks and their monetary frameworks under increased public scrutiny. The depth and length of the ensuing Great Recession only intensified this scrutiny, and important economic developments – primarily lower equilibrium real interest rates and relatively high debt burdens in certain sectors – now present monetary policy with significant challenges.⁴ While inflation-targeting frameworks have generally fared well over the past two decades, confronting these and other challenges will not be straightforward. To remain successful, inflation-targeting central banks should, among other things, give careful thought to steps

⁴ See Schembri (2018) for more detail on the implications of these and other notable economic developments for the Canadian monetary policy framework.

that can be taken to refine and strengthen their policy frameworks, widen their toolkits and best ensure complementarity with other macrofinancial policies.

The remainder of the paper is organised as follows. Section 2 provides a chronological review of the Canadian inflation-targeting experience, focusing on key themes that we feel are unique to this experience. We also elaborate on the factors that led to the framework's establishment and the details of its governance. Section 3 highlights key lessons learned from the Canadian experience to date, which we illustrate using ToTEM III, the most recent iteration of the BoC's main structural model. Specifically, we use a series of policy simulations to illustrate the importance of credibility for the overall effectiveness of monetary policy and the practical usefulness of flexibility in the horizon at which policymakers aim to return to target, among other key themes. Section 4 then considers the future of the Canadian monetary framework, with emphasis on the policy options available to best ensure macroeconomic resilience in the face of the challenges posed by the developments emphasised above. The final section offers some brief concluding remarks.

2. Evolution of the Inflation-targeting Framework and the Renewal Process

2.1 Historical context

The history of inflation targeting in Canada can be traced back to June 1970, when Canada left the Bretton Woods system to allow the exchange rate to adjust to inflationary pressures then building abroad.⁵ This departure left the BoC in need of a target that could replace the exchange rate as a nominal anchor for monetary policy. The first such target with which the BoC experimented was the M1 money stock, beginning in 1975. Though the BoC was generally successful in achieving its money growth targets, the intended pass-through to inflation proved elusive: total CPI inflation averaged nearly 8 per cent from 1975 through to the targeting framework's abandonment in 1982 (Figure 1); and expectations of high inflation became so entrenched that the decline in inflation witnessed soon after could only be achieved at the cost of a sharp tightening of monetary policy and a consequent deep recession.

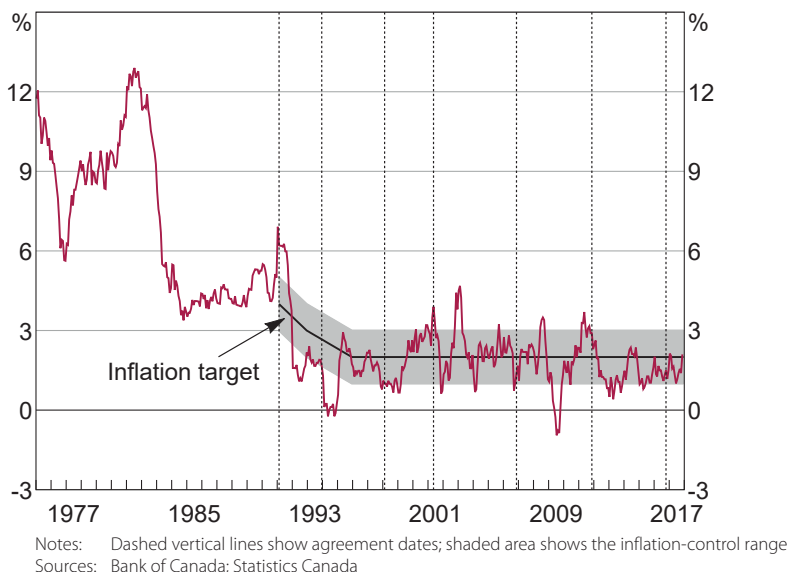
Several factors contributed to this relatively poor record, not least a series of financial sector innovations that severed a previously stable link between M1 and aggregate demand.⁶ Other contributing factors included lax fiscal policy at the federal and provincial levels, along with oil price shocks. To be clear, these factors were not unique to Canada. In fact, after the collapse of Bretton Woods in the early 1970s, many advanced economies underwent similarly disappointing experiments with money growth targeting and, thus, found themselves similarly situated in the 1980s, searching for new targets around which

5 Similar concerns motivated an earlier departure in 1950 in response to rising commodity prices and capital inflows. Canada then returned to Bretton Woods 12 years later, in 1962. See Bordo, Dib and Schembri (2010) for details.

6 As then Governor Gerald Bouey famously put it in testimony to Parliament: 'We did not abandon M1, M1 abandoned us.' (Bouey, as cited in Thiessen (2000)). See also Thiessen (1983).

their respective monetary policies could be organised. In Canada, this search touched on a wide range of potential replacement targets, including broader money aggregates and antecedents to what is now known as nominal gross domestic product (GDP) and price level targeting. Unfortunately, none of these candidates were ultimately assessed to be up to the task at hand (Longworth and Poloz 1986; Caramazza, Hostland and Poloz 1990; Duguay and Longworth 1998).

Figure 1: CPI Inflation
Year-ended



In 1988, then Governor John Crow used the occasion of his Hanson Memorial Lecture at the University of Alberta to argue for directly targeting price stability itself (Crow 1988). Crow opted not to provide a quantitative definition of ‘price stability’, nor a view on how a target of this sort might be operationalised – indeed, economic theory was far from the point where these issues could be tackled with much confidence, and the BoC could not yet look to any of its peer institutions around the world for practical examples in action. The Hanson Lecture thus served as a signal of the BoC’s intentions to rein in inflation, then running over 4 per cent, though the contours of the framework that would ultimately implement those intentions had yet to be specified.

2.2 The 1991 agreement

The situation changed in 1991 when Canada became the second country to adopt a formal inflation-targeting regime, following a precedent set by New Zealand one year earlier. The new regime was established in a short, non-legislative agreement between the BoC and the Government of Canada, the latter represented by the Department of Finance. Under

the target path, year-over-year CPI inflation, then exceeding 6 per cent, would gradually fall to 2 per cent by the end of 1995, with a control band of plus or minus 1 percentage point around each of the path's milestones.

That the inflation-targeting framework was presented as a joint agreement between the BoC and government distinguished it from the money growth-targeting regime discussed above, which the BoC had announced independently. In fact, inflation targeting was first introduced to the public as part of that year's federal budget speech. Moreover, a press release issued after the speech acknowledged that a 'range of public policies besides monetary policy can make a significant contribution [to achieving the target path]' (Bank of Canada 1991b).⁷ These signals that the target enjoyed a high degree of government endorsement likely contributed to the success with which the BoC subsequently disinflated since the task of reducing inflation is easier when firms and households understand the target path, perceive it as credible and adjust their expectations accordingly. A high degree of credibility would have been difficult to achieve absent some form of political agreement, especially in light of the large deficits that the government was running at the time.⁸

Though the agreement provided no targets for the post-1995 period, the aforementioned press release noted that 'the objective would be further reductions ... until price stability is achieved'.⁹ In addition, a background document released at the time of the announcement outlined the broad case for price stability as a long-run goal (Bank of Canada 1991a), arguing that 'inflation creates uncertainty, requires households and businesses to divert resources away from productive endeavours and is socially unjust'. In contrast, price stability would allow the economy to 'operate more fairly and more productively'.

2.3 The 1993 extension

The longer-run questions that the 1991 agreement tabled for later consideration came back to the fore in late 1993. This owed to a confluence of two events: an election saw the government that had signed the agreement replaced only months before Governor Crow's term was due to expire in January 1994.¹⁰ Crow and the new Minister of Finance disagreed on the inflation rate that should be targeted post 1995, with Crow viewing the goal as a rate 'clearly below 2 per cent', while the Minister preferred that the 2 per cent target for 1995 be extended.

7 This point was reinforced in November of the same year, when a parliamentary subcommittee began exploring issues related to the inflation-targeting framework. One of the subcommittee's main conclusions was to recognise price stability as a key objective for monetary policy while maintaining that it should remain a joint duty of the BoC and government: '[m]onetary policy should continue to be formulated and conducted by the Bank of Canada, with ultimate responsibility resting with the federal government' (Canada, House of Commons 1992, p xvii). In particular, they argued against an earlier proposal that price stability be enshrined as the BoC's sole legislative mandate, in part on the grounds that 'fiscal authorities at all levels of government would soon interpret this as a licence to shun any responsibility for inflation control' (p 22).

8 In addition, a 1967 amendment to the Bank of Canada Act gave the Minister of Finance the ability to issue the Governor a binding written directive if the two encountered irreconcilable differences concerning monetary policy. However, this power has not been exercised to date and entails large political costs to the extent that the directive must be made public in the *Canada Gazette* and would likely trigger the Governor's resignation.

9 It also noted that research to that point favoured an operational definition of price stability that was 'clearly below 2 per cent'.

10 Though the inflation-targeting framework had not itself been a major issue on the campaign trail, the leading opposition party had expressed regular criticism of the BoC for pursuing what they characterised as overly tight policies.

This impasse ultimately precluded Crow's reappointment and instead saw Gordon Thiessen appointed as the BoC's sixth Governor. In a joint statement released at the time of the appointment, the government and BoC announced a new agreement which extended the 2 per cent target through to 1998 while deferring a decision on the appropriate 'long-run monetary policy goal' (Bank of Canada 1993).

2.4 The 1998 renewal and important operational reforms

Language very similar to that in the 1993 extension appeared in the next agreement, which took place in 1998 and extended the 2 per cent target through to 2001, further postponing a determination of 'the appropriate long-run target' (Bank of Canada 1998). The decision to allow the status quo to continue owed largely to the strong track record that the framework had then accumulated: since passing the first target milestone in late 1992, CPI inflation had averaged 1.5 per cent up to the time of the 1998 agreement, spending nearly 70 per cent of that interval inside the control band. An aggressive fiscal retrenchment initiated at the federal level in 1995 also served to enhance the credibility of the target over this period.

The combination of an increasingly credible inflation target and stronger fiscal situation helped to bolster the economy's resilience during this period. On this point, an instructive example can be gleaned from a brief comparison between Canada's experiences during the 1994 Tequila crisis on one hand and the 1997 Asian financial crisis and 1998 Russian debt crisis on the other. The global flight to safety associated with the 1994 Tequila crisis proved punishing for the Canadian dollar as foreign investors seized on unflattering parallels between the Canadian and Mexican fiscal situations.¹¹ In fact, the above-noted fiscal retrenchment was largely motivated by a need to assuage external concerns about fiscal sustainability, which up till then had weighed on the credibility of monetary policy. In contrast, the downward pressure that the 1997–98 crises brought to bear on the Canadian dollar was largely judged to stem from fundamental forces, namely declines in global commodity demand and prices, rather than portfolio shifts driven by concerns about fiscal sustainability. The relatively orderly depreciation that ensued thus helped to insulate the economy from these forces, consistent with the textbook 'shock absorber' role of a flexible exchange rate. The growing credibility of monetary policy, owing in part to the fiscal consolidation, also played a role in enabling the stimulative policies that the BoC pursued in the mid 1990s, when Canadian interest rates fell well below their American analogues, a previously unthinkable occurrence. In contrast, attempts at stimulus earlier in the decade often ran a risk of being interpreted as a sign of weakness in the BoC's inflation-fighting resolve, if not the first step toward some form of subordination to fiscal priorities.¹²

11 An editorial in *The Wall Street Journal* ('Bankrupt Canada?', 12 January 1995, p A14) went so far as to declare Canada 'an honorary member of the Third World', and Moody's downgraded Canada's credit rating twice over the 1994–95 period. In some circles, the Canadian dollar was described as the 'Northern peso'.

12 See in Laidler and Robson (1993, pp 101–104) for an example from 1990. Freedman (2001, p 13) provides an insider's perspective on the constraints that this issue placed on Canadian monetary policy in the early 1990s:

On a number of occasions, especially in the first half of the 1990s, the [BoC] would have preferred easier monetary conditions (or at least wished to avoid the tighter monetary conditions that emerged), but financial market outcomes were inconsistent with the [BoC]'s desired track ... efforts to aggressively lower very short-term interest rates would have risked undermining confidence in Canadian dollar-denominated assets and causing interest rates further out the yield curve to increase—a counterproductive outcome.

In many ways, the 1998 renewal marked the end of the first phase of inflation targeting in Canada. The framework had performed better than expected despite sizeable shocks, and the economy was enjoying a period of strong growth. The accumulating years of experience also afforded an opportunity to reflect on the framework's strengths and weaknesses. One important realisation was that the target's clarity and simplicity made it easier for the BoC to communicate its decision-making to the public, which then helped to enhance the target's credibility and the general effectiveness of monetary policy. At the same time, an explicit target made it easier for the public to hold the BoC accountable for its performance and this increased accountability necessitated more transparency and effective communication from the BoC. In short, the public's demand for transparency was rising at precisely a time when the BoC found it advantageous to increase supply.

For these reasons, the years leading up to the 1998 renewal saw a series of changes in the operational aspects of the framework, many of them oriented toward better exploiting communication as a tool of monetary policy.¹³ For example, 1995 saw the BoC issue its first *Monetary Policy Report*, a publication that aims to explain the BoC's economic outlook and policy decisions.¹⁴ The transparency and simplicity of the policy-setting process also improved, starting with a phase-out of statutory reserve requirements over the 1992–94 period, followed by a 1994 decision to begin communicating monetary policy in terms of an explicit operating band for the overnight rate.¹⁵ The latter policy was then bolstered by a 1996 decision that changes in the band should always be accompanied by explanatory press releases. A further step in this general direction would later occur in 2000, when the BoC established a set of fixed announcement dates for policy rate decisions, in contrast to the more ad hoc approach pursued earlier. In addition to making policy more predictable, this had the benefit of better enabling the BoC to chart a course for Canadian monetary policy independent of that in the United States, while the previous system had sometimes produced episodes when rate decisions immediately followed those of the Federal Reserve.¹⁶

2.5 The 2001 renewal and supporting research program

Over the mid and late 1990s, the academic literature on inflation targeting matured considerably. Among its themes were two factors that potentially favoured a target higher than 2 per cent, namely downward nominal wage rigidity (DNWR) and the effective lower bound on nominal rates (ELB).¹⁷ BoC staff initiated research projects aiming to explore these

13 Indeed, Bernanke *et al* (1999) identify the strong emphasis on transparency and clear communication during this period as one of the BoC's main distinguishing features when compared against other early inflation targeters.

14 The *Report* was initially published biannually, then it switched to its current quarterly schedule in early 2000.

15 From 1980 through 1996, the so-called 'Bank rate', meaning the minimum rate at which financial institutions could borrow overnight from the BoC, was set 25 basis points above the average yield set in weekly auctions of 3-month Treasury bills. When the BoC first began emphasising the operating band for the overnight rate in mid 1994, the two approaches briefly coexisted until February 1996 saw the Bank rate directly equated with the top of the operating band, thus allowing 3-month rates to become more responsive to market conditions.

16 Indeed, Champagne and Sekkel (2017) compare the periods 1974–91 and 1992–2015 and find that Canadian monetary policy in the latter period was much less responsive to changes in the federal funds rate and USD/CAD exchange rate. The improvements in transparency described in the main text are also consistent with their observation that the latter period generally witnessed smaller monetary policy shocks.

17 See Summers (1991), Akerlof, Dickens and Perry (1996), Fischer (1996) and Krugman (1996, 1998).

topics in greater detail. Though most of these projects were still works in progress at the time of the 1998 agreement, a series of articles and working papers were released leading up to the 2001 renewal. The findings of this research pointed toward modest costs of DNWR and the ELB. When the BoC and the government ultimately agreed to extend the 2 per cent target through to 2006, the decision was partly based on these results, coupled with the BoC's view that the wider literature supported similar conclusions.

For this renewal, the BoC organised and conducted an extensive research program to systematically address key framework questions. In contrast to previous extensions, the 2001 agreement was circulated along with a series of background documents in which the BoC explained its reasoning at some length (Bank of Canada 2001a, 2001b, 2001c). The background documents also provided a substantial amount of operational information, including an announcement of a change in the BoC's preferred measure of core inflation, along with a clarification that policymakers placed emphasis on hitting the midpoint of the symmetric control range, stressing that the band was not a 'zone of indifference'.¹⁸

These are not the only important respects in which the 2001 agreement differed from previous rounds. Another distinguishing feature was its longer five-year term through to the next renewal in 2006. The 2001 agreement was also the first to avoid any specific reference to 'price stability', re-interpreting the objective as 'low, stable and predictable inflation' (Department of Finance Canada 2001). Gone as well was the suggestion that the longer-run form of the targeting framework was a question that would be decisively settled at some point, rather than one that could be revisited on an ongoing basis. In general, the 2001 agreement stands out as a departure from the relatively ad hoc renewals of the 1990s in favour of the more transparent, deliberate and research-oriented approach that has since been pursued.

2.6 The 2006 renewal and emerging emphasis on horizon flexibility

Following on the precedents set by the 2001 renewal, the remainder of the early 2000s saw the BoC identify three issues that warranted research in advance of the next agreement: (i) the horizon at which policymakers should aim to return inflation to target; (ii) the extent to which monetary policy should respond to asset price movements; and (iii) the usefulness of core inflation as a guide for monetary policy. The level of the target was, thus, not a major theme of the 2006 renewal, which ultimately extended the 2 per cent target through to 2011. Nonetheless, the conclusions reached regarding all three of these issues had strong bearing on the shape of the targeting framework.

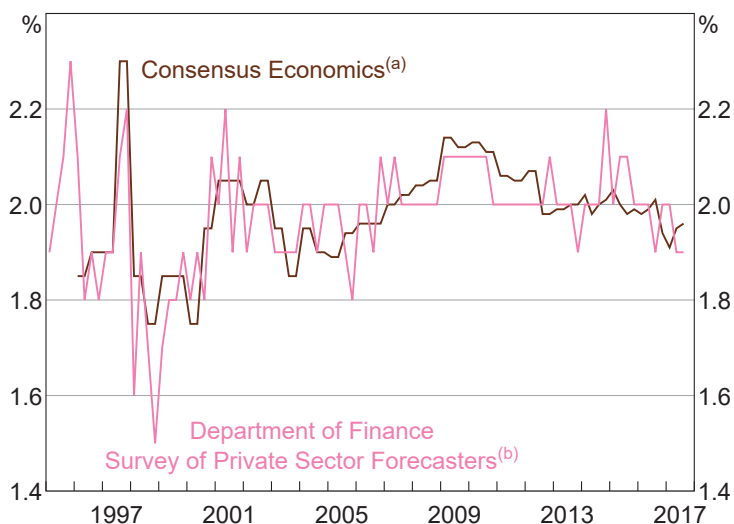
For example, the first and second of these issues proved to be linked in important ways. While a background document (Bank of Canada 2006) reaffirmed a view expressed in earlier rounds that the lags associated with monetary transmission generally favoured a six- to eight-quarter

¹⁸ The new measure of core inflation was called CPIX and excluded the eight most volatile components of the CPI, namely fruits, vegetables, gasoline, fuel oil, natural gas, mortgage interest, intercity transportation and tobacco products. It also excluded the effect of indirect taxes on all other components.

target horizon, it now added a caveat that some shocks, crucially including large asset price movements, may ‘have more long-lived effects ... and might, therefore, require a longer time horizon.’¹⁹ Indeed, the renewal’s broader take on asset prices was that they generally warranted attention only to the extent that they provided information about future output and inflation, though large asset price shocks might require ‘sacrificing something in terms of inflation performance over the usual horizon’ in return for ‘greater financial, economic, and inflation stability over a somewhat longer horizon’.

This willingness to introduce more flexibility into the policy framework, operationalised as adjustments in the target horizon, owed in no small part to the fact that the early and mid 2000s witnessed a firm anchoring of inflation expectations despite a variety of shocks (Figure 2). These shocks included 9/11 and the US dot.com recession, along with a steady and significant rise in commodity prices beginning around the time of China’s 2002 entry into the World Trade Organization (Figure 3). Much as during the 1997–98 crises described earlier, the firm anchoring of inflation expectations around an increasingly credible target made it possible for the flexible exchange rate to adjust smoothly to higher commodity prices, effectively facilitating the necessary economic adjustments.

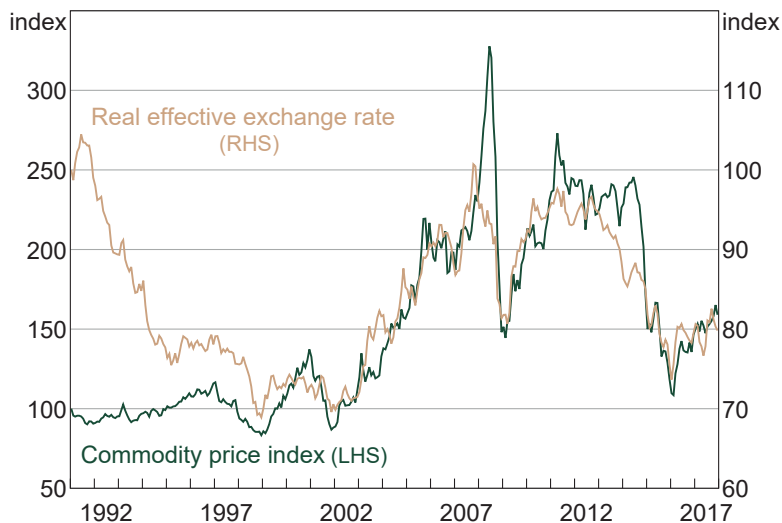
Figure 2: Inflation Expectations
Year-ended



Notes: (a) Average of the annual inflation forecasts for two and three years out in each quarter
(b) Average of the surveyed private sector forecasts for two years out in each quarter
Sources: Consensus Economics; Department of Finance Canada

¹⁹ For this reason, inflation targeting as practised in Canada bears many similarities to inflation *forecast* targeting à la Svensson (1997).

Figure 3: Commodity Prices and Real Exchange Rate
January 1991 = 100



Sources: Authors' calculations; Bank of Canada; IMF

2.7 The global financial crisis and 2011 renewal

The next renewal was heavily influenced by the GFC and its aftermath. While Canadian financial institutions weathered the crisis relatively unscathed, thanks in part to the strength of the regulatory and supervisory framework, the wider fallout quickly triggered a collapse in global trade and commodity prices. This ultimately led to Canada's first recession in nearly 20 years, one whose depth necessitated an extraordinary response from policymakers.

On the monetary side, this response involved maximal conventional stimulus and a year-long experiment with conditional forward guidance. The BoC enacted more than 4 percentage points' worth of conventional easing between December 2007 and April 2009, when the overnight rate reached the ELB, then assessed at 25 basis points. At that point, the BoC issued a commitment to maintain the overnight rate at this level through to the end of June 2010, conditional on the outlook for inflation.²⁰ Medium- and long-term inflation expectations crucially remained anchored throughout the episode, and fiscal policy also provided strong stimulus at the federal and provincial levels. By the time of the 2011 renewal, Canada was the only G7 country to have recovered all the output and jobs that it lost during the global downturn, and policymakers began to implement a series of G20 financial sector reforms that further enhanced the resilience of the Canadian financial system. This reduced the likelihood

²⁰ A *Monetary Policy Report* (Bank of Canada 2009) issued soon thereafter outlined other unconventional policies with which the BoC would consider supplementing the conditional commitment, though these ultimately did not prove necessary. See Bank of Canada (2015) for an update on the BoC's framework for conducting monetary policy at low interest rates.

and impact of future crises, along with the frequency of ELB episodes to the extent that these episodes are often triggered by financial crises.²¹

While the 2006 renewal had already specified issues to be explored leading up to 2011, the experiences described above naturally prompted changes in the research agenda. The relationship between monetary policy and financial stability was added as a new research theme. Meanwhile, the two issues identified in 2006, namely the merits of a lower target or a switch to price level targeting (PLT), both took on new colour as policymakers revisited their assessments of the frequency and cost of ELB episodes.

BoC research indicated that a lower inflation target would likely lead to superior economic outcomes during periods when the ELB was not binding, but at the same time it would increase the likelihood of hitting the ELB. Consequently, the net benefit of a lower target was uncertain. Considerable uncertainty also surrounded the potential benefits of PLT. Its theoretical stabilising effects proved dependent on strong assumptions regarding the rationality of private sector expectations and credibility of the new framework – credibility which could, in practice, prove more difficult to secure than had been the case for the inflation-targeting framework. Moreover, the bar for change on both fronts was high, given the established regime's own credibility and success in anchoring inflation expectations. The BoC and the government thus opted to extend the 2 per cent inflation target through to 2016. However, a background document (Bank of Canada 2011) acknowledged that the benefits and costs surrounding these issues might change in the future as policymakers accumulated more experience with non-conventional monetary policies and the above-noted financial sector reforms.

As for the relationship between monetary policy and financial stability, the background document began by recognising that the crisis emerged from financial imbalances that had accumulated during the relatively quiescent years of the early and mid 2000s. This experience suggested that 'macroeconomic stability ... does not guarantee financial stability'. Moreover, the asset price movements that were a focus of the 2006 renewal did not represent the only form that financial vulnerabilities might take. On the contrary, 'experience has underlined the importance of focusing on indebtedness [i.e. leverage] ... as a defining feature of dangerous financial imbalances'. While micro and macroprudential tools are best suited to mitigating these vulnerabilities, the BoC acknowledged that the vulnerabilities might occasionally necessitate monetary responses above and beyond those dictated by their direct implications for output and inflation over the usual target horizon, especially in cases 'where imbalances pose an economy-wide threat and/or where the imbalances themselves are being encouraged by a low interest rate environment'. In addition, if an exceptional response was warranted, then the horizon flexibility emphasised in the 2006 renewal would play a key role in enabling it.

21 For details, see Schembri (2013).

2.8 The 2016 renewal

The 2016 renewal tackled three questions: (i) whether the inflation target should be raised to a level somewhat higher than 2 per cent; (ii) to what extent monetary policy should be used to address financial stability concerns; and (iii) how best to measure core inflation for the purpose of monetary policy.

The first question was largely motivated by mounting evidence that neutral policy rates had fallen substantially in many advanced economies, implying a higher likelihood of hitting the ELB, all else being equal. Additional motivation for the adoption of a higher target arose from concerns about the use of unconventional monetary policies in the post-GFC period, typically when policy rates were at or close to the ELB. While empirical evidence suggested that unconventional policies had indeed proven reasonably effective in easing monetary conditions, especially as central banks became more experienced with their use, they nonetheless attracted criticism for distorting financial markets and asset prices, unduly expanding the central banks' balance sheets and blurring the distinction between monetary and fiscal policy.

Estimates of the ELB were also revised down over this period as several central banks began experimenting with negative policy rates as a source of additional stimulus. Overall, the experience with unconventional policy at or near the ELB was judged sufficiently positive to conclude that the additional benefits that a higher inflation target had to offer would likely not outweigh the associated costs. A higher target would likely entail a greater distortion of relative price signals, along with possible adverse distributional effects and the risk that a higher target might prove less credible.²²

At the same time, renewed interest in the question of whether monetary policy should address financial vulnerabilities stemmed from post-crisis experience that financial vulnerabilities had increased in an environment characterised by 'low for long' interest rates. While borrowing, risk-taking and higher asset prices were intended consequences of monetary stimulus, concerns arose regarding whether these vulnerabilities had become excessive.

On this front, some analysis indicated that the role that monetary policy had to play in ensuring financial stability had likely diminished since the time of the 2011 renewal. This was due to a comprehensive set of G20- and Financial Stability Board-sponsored reforms that had increased the overall resilience of the global financial system, coupled with a series of macroprudential measures with which the Canadian government had aimed to lower household debt and mitigate various housing market vulnerabilities. Moreover, research at the BoC and elsewhere suggested that the inherently blunt nature of monetary policy implied that it could likely only deliver a marginal impact on financial vulnerabilities at the cost of extreme variability in output and inflation (e.g. Svensson 2016). While the balance of the evidence thus militated against active use of monetary policy to address financial

²² With regard to distributional effects, we note that higher inflation could prove socially unjust to the extent that households with lower or fixed incomes may have trouble adequately hedging their finances against inflation or securing the higher nominal wages needed to maintain real purchasing power. For example, Fung, Huynh and Stuber (2015) show that lower-income households in Canada tend to rely more heavily on cash for their transactions. Distributional effects would also likely arise during the transition between targets, given that nominal assets and liabilities are not evenly distributed in the economy (Amano, Carter and Terajima 2017).

stability considerations, the renewal nonetheless noted that central banks should be mindful of the impact of monetary policy on financial vulnerabilities, especially in an environment of persistently weak demand where interest rates are likely to be low for prolonged periods. More specifically, central banks should be flexible about the horizon over which they aim to return inflation to target to avoid unduly increasing vulnerabilities or triggering instability through a sudden hike in interest rates.

As for the final question regarding the measurement of core inflation, the BoC did extensive research on several candidate measures and ultimately found that three dominated in terms of performance against key criteria, namely CPI-common, CPI-trim and CPI-median. The BoC thus decided to adopt all three measures to better reflect the uncertainty associated with measuring underlying inflation. If anything, any spread between these measures would provide a useful gauge of this uncertainty.

3. Lessons Learned

It is no exaggeration to say that the inflation-targeting framework has performed much better than initially expected, despite large external shocks and pronounced cycles in commodity prices. Total CPI inflation has averaged 1.9 per cent since the framework was first adopted, and both inflation and inflation expectations have generally held close to target since the late 1990s, apart from discrete episodes associated with the GFC and its aftermath, along with the 2014–15 collapse in commodity prices.²³

In this section, we highlight three aspects of the targeting framework that have played key roles in enabling this record:

1. A clear and simple 2 per cent target that was readily understood by the public and served as a Schelling (1960)-style focal point to coordinate economic decision-making while improving the reliability of price signals.^{24,25}
2. A joint agreement with the government that:
 - i. endowed the target with political legitimacy, thus enhancing its credibility;
 - ii. provided the BoC with operational independence to direct its tools toward achieving the target; and
 - iii. served as a mechanism for promoting coherence between monetary policy, including exchange rate policy, and the other parts of the overall policy mix.²⁶
3. A regular review-and-renewal process that led to continual improvement in our understanding of the framework and its specification and operation.

²³ While other advanced economies also experienced moderations in the level and volatility of inflation over the period in question, Beaudry and Ruge-Murcia (2017) provide evidence that the Canadian experience compares favourably with that of Australia, New Zealand and Sweden, along with the United States and United Kingdom.

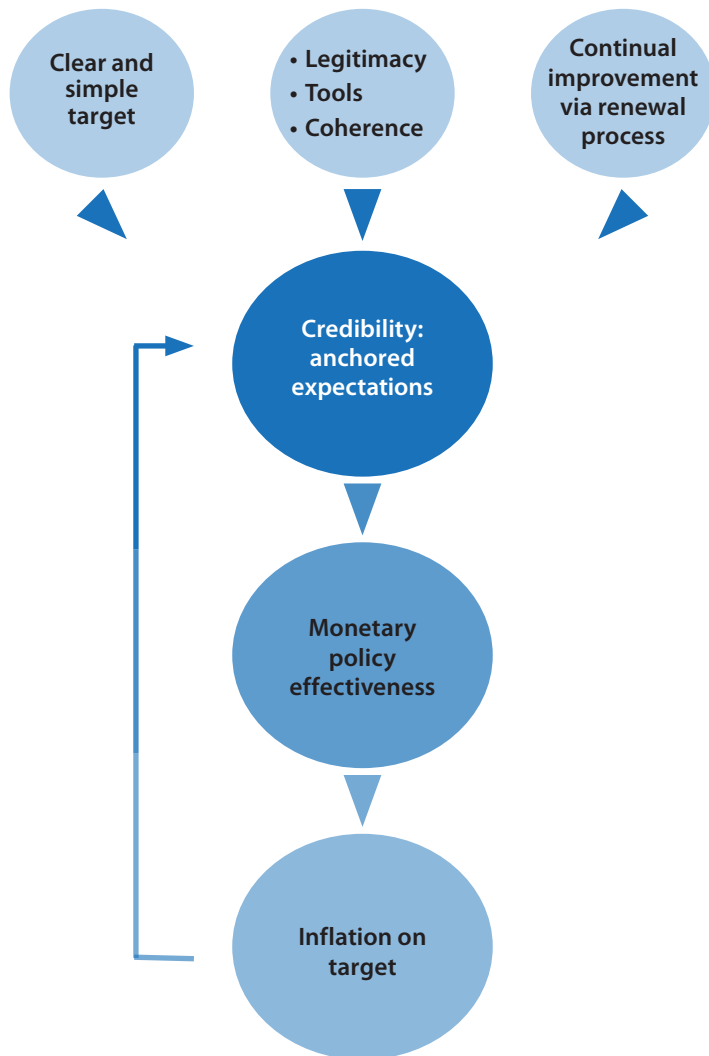
²⁴ Indeed, an overwhelming majority of participants in the 'Canadian Survey of Consumer Expectations' report that they understand the concept of inflation. See Gosselin and Khan (2015) for details.

²⁵ Prices are more likely to convey information about real fundamentals when the target is consistently achieved and understood by the public, ultimately leading to a more productive allocation of resources. Similar mechanisms operate in, for example, Hellwig (2005), Mendes (2008, ch 3) and Lorenzoni (2010).

²⁶ See Poloz (2016) for details on the need for coherence between monetary and fiscal policy in particular, along with a view that the inflation-targeting agreement served as an implicit mechanism for fostering this coherence.

Together, these ingredients have helped to anchor inflation expectations around an increasingly credible target. To the extent that this anchoring then made it easier for the BoC to stay on target going forward, they also set in motion a virtuous cycle of the sort depicted in Figure 4.

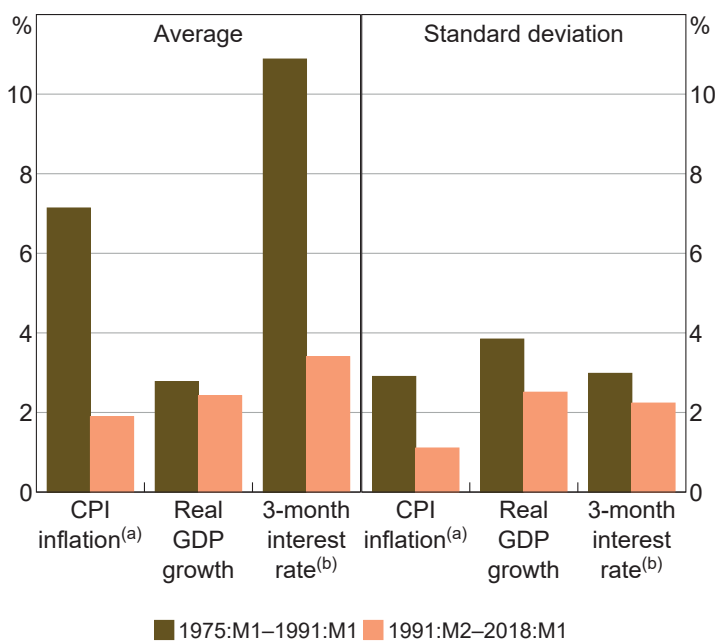
Figure 4: Anchored Expectations and the Success of Inflation Targeting



We stress that these ingredients have not delivered low, stable inflation at the cost of a deterioration in real economic outcomes. On the contrary, Figure 5 compares the economy’s experience under inflation targeting against that of the preceding two decades and indicates that output growth and short-term interest rates have both become less volatile, while BoC estimates associate most of the relatively modest decline in average output growth

with changes in potential. One factor contributing to the framework’s relatively strong performance on the real side is that well-anchored inflation expectations leave monetary policy with more scope and flexibility to stimulate the real economy when necessary. For example, the BoC could likely not have supplied the unprecedented amount of stimulus that it marshalled in response to the GFC had Canadians entered that juncture with less confidence in policymakers’ commitment to the 2 per cent target. In addition, this and other rounds of stimulus were likely more effective to the extent that well-anchored inflation expectations enabled a given reduction in nominal rates to translate more directly into lower real rates.

Figure 5: Macroeconomic Outcomes before and after 1991



Notes: (a) Year-ended
 (b) Refers to the 3-month prime corporate rate
 Sources: Bank of Canada; Statistics Canada

3.1 Illustrative simulations using ToTEM III

We use the remainder of this section to illustrate some of these points in the context of ToTEM III, the current version of the BoC’s main structural model. ToTEM III is an open economy New Keynesian model whose main distinguishing feature relative to previous iterations is that it includes elaborated housing and collateralised household debt markets, allowing it to capture a range of interactions between household balance sheets and macroeconomic

outcomes.²⁷ We focus on the model's solution when the central bank sets the policy rate under full commitment, subject to one of three ad hoc loss functions. The first two take the form

$$\alpha_{\pi}(\pi_t - \bar{\pi})^2 + \alpha_y(y_t - \bar{y}_t)^2 + \alpha_{\Delta i}(i_t - i_{t-1})^2 \quad (1)$$

where π_t and $\bar{\pi}$ respectively denote inflation and its target value; y_t and \bar{y}_t respectively denote (the logarithms of) actual and potential output; and i_t denotes the policy rate. We specifically consider weights $(\alpha_{\pi}, \alpha_y, \alpha_{\Delta i}) = (1.5, 0.5, 0.5)$ and $(\alpha_{\pi}, \alpha_y, \alpha_{\Delta i}) = (1.0, 1.0, 0.5)$. In addition, we consider a loss function that departs from the latter, more balanced weights by attaching some small value to stabilising household debt:

$$(1.0 - 0.5\varepsilon)(\pi_t - \bar{\pi})^2 + (1.0 - 0.5\varepsilon)(y_t - \bar{y}_t)^2 + 0.5(i_t - i_{t-1})^2 + \varepsilon(d_t - \bar{d})^2 \quad (2)$$

where ε is a small number, while d_t denotes (the logarithm of) household debt, with steady-state value \bar{d} . Table 1 reports key moments under these loss functions and various versions of the model. We also report mean and median target horizons, computed using the method in Coletti, Selody and Wilkins (2006), which involves making repeated draws from the joint distribution of shocks, then calculating the number of quarters needed to return to within 10 basis points of target, assuming that no further shocks arrive. The interquartile range of the resulting distribution of target horizons has been included as well.

Panel A in the table focuses on a baseline version of the model. It crucially assumes that agents always perceive the inflation target as credible, leaving long-run inflation expectations well anchored. In contrast, Panel B considers an illustrative counterfactual under which negative (positive) supply shocks lead a certain portion of price and wage setters to temporarily perceive a target somewhat higher (lower) than that actually pursued by policymakers.²⁸ The counterfactual thus aims to capture one – though certainly not all – of the channels via which low credibility and weakly anchored expectations might hamper monetary policy. As shown in the table, this channel leads to a sizeable increase in macroeconomic volatility, along with a widening of the target horizon.

27 For details, see the appendix in Bank of Canada (2017).

28 Formally, we allow rule-of-thumb price setters, who normally behave in a manner similar to that in Galí and Gertler (1999), to perceive a target $\bar{\pi}_t^p$ that sometimes differs from the actual target $\bar{\pi}$, with the gap $\bar{\pi}_t^p - \bar{\pi}$ assumed to follow an AR(1) process with innovations proportional to a convex combination of the underlying innovations in the model's supply shocks. The model also features rule-of-thumb wage setters, whom we treat analogously.

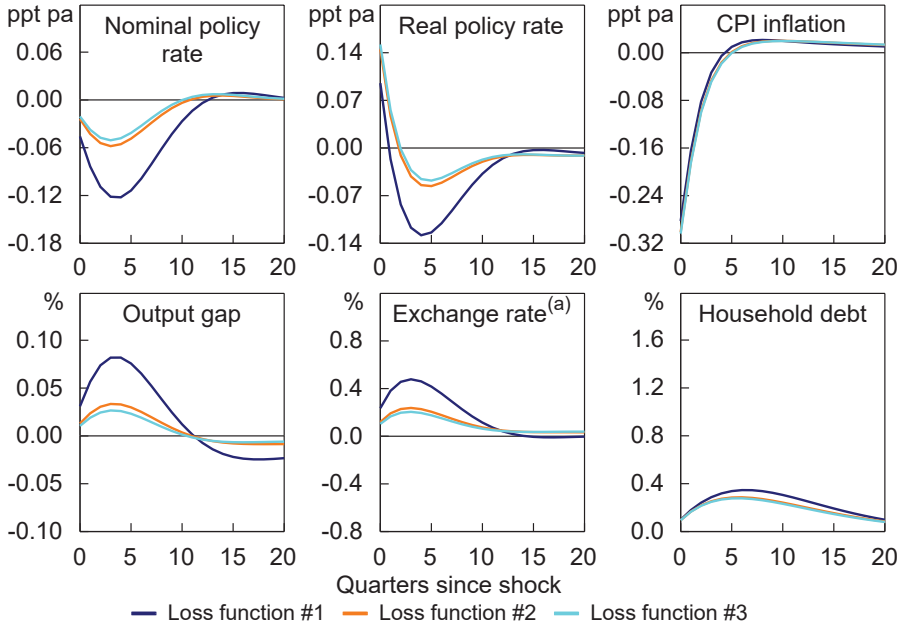
Table 1: Moments and Target Horizons under Various Loss Functions

	Loss function #1 $(\alpha_\pi, \alpha_y, \alpha_{\Delta i}) =$ $(1.5, 0.5, 0.5)$ in Equation (1)	Loss function #2 $(\alpha_\pi, \alpha_y, \alpha_{\Delta i}) =$ $(1.0, 1.0, 0.5)$ in Equation (1)	Loss function #3 $\varepsilon = 0.015$ in Equation (2)
Panel A: Baseline scenario			
std dev (π_t) – ppt pa	0.77	0.83	0.92
std dev $(y_t - \bar{y}_t)$ – ppt	1.00	0.81	0.83
std dev $(i_t - i_{t-1})$ – ppt pa	0.80	0.92	0.92
std dev (d_t) – % of steady state	20.8	20.8	20.1
Mean horizon – quarters	5.6	7.1	7.8
Median horizon – quarters	6	6	7
Interquartile range – quarters	3–7	4–9	4–9
Panel B: Low credibility scenario			
std dev (π_t) – ppt pa	0.83	0.97	1.04
std dev $(y_t - \bar{y}_t)$ – ppt	1.17	0.88	0.90
std dev $(i_t - i_{t-1})$ – ppt pa	0.80	0.92	0.93
std dev (d_t) – % of steady state	20.9	20.8	20.1
Mean horizon – quarters	7.5	11.8	12.7
Median horizon – quarters	7	9	9
Interquartile range – quarters	4–10	5–17	5–18
Panel C: High debt scenario			
std dev (π_t) – ppt pa	0.78	0.85	0.97
std dev $(y_t - \bar{y}_t)$ – ppt	1.13	0.95	1.00
std dev $(i_t - i_{t-1})$ – ppt pa	0.83	0.96	0.99
std dev (d_t) – % of steady state	25.6	25.5	24.6
Mean horizon – quarters	5.7	7.3	10.4
Median horizon – quarters	6	7	7
Interquartile range – quarters	3–8	4–9	4–12

As we emphasised earlier, one of the advantages of having expectations anchored on a credible target is that monetary policy then enjoys greater flexibility to stimulate real activity when necessary or to take financial stability considerations into account. Indeed, the mean and median target horizons reported in Table 1 consistently suggest that policymakers should be prepared to tolerate longer deviations from target when they place more weight on stabilising the output gap or household debt. Perhaps more importantly, the breadth of the reported interquartile ranges implies a need to do this in a relatively shock-specific way. For example, consistent with the theory emerging from simpler New Keynesian models, we find that target horizons in the upper part of the distribution are often associated with large supply shocks. Large shocks to the exchange rate have a similar property, as do shocks with a differential effect on household balance sheets in the case where debt enters the loss function directly. See Figures 6 to 8 for some illustrative impulse responses.

Figure 6: Negative Mark-up Shock

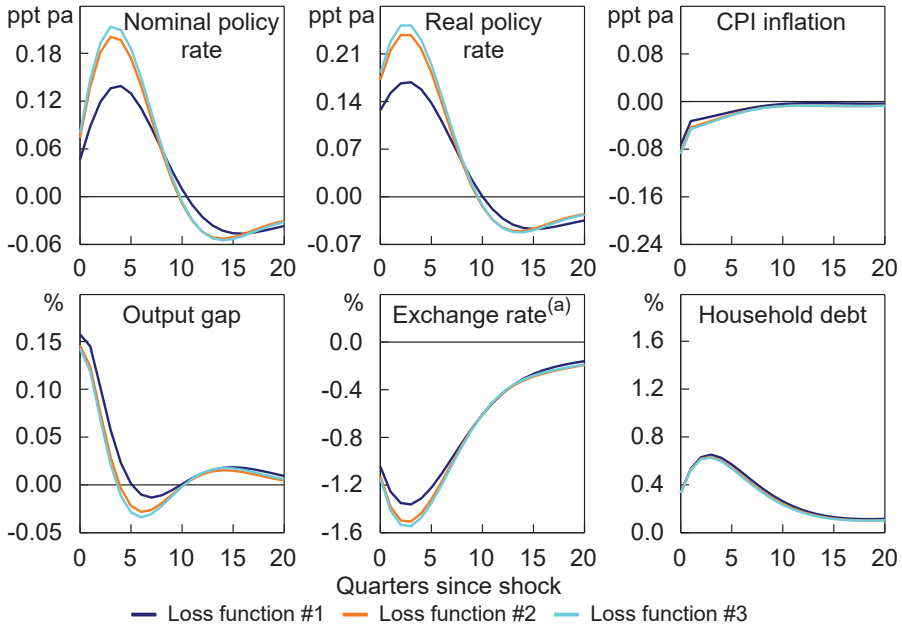
Deviations from steady state



Note: (a) C\$ per unit foreign currency

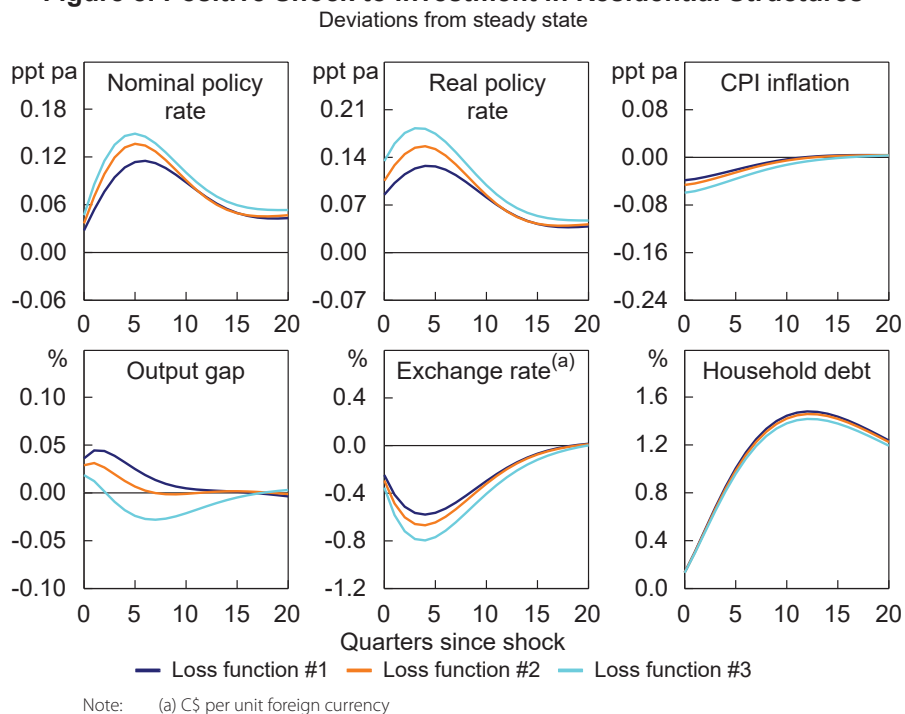
Figure 7: Positive Commodity Price Shock

Deviations from steady state



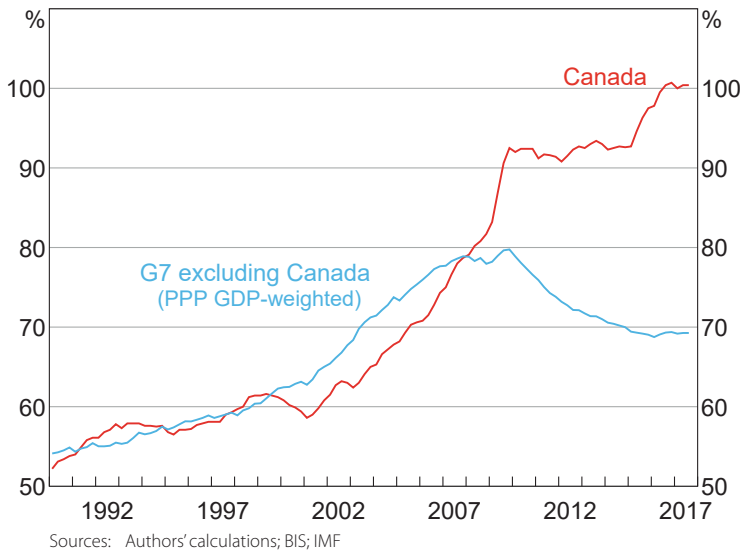
Note: (a) C\$ per unit foreign currency

Figure 8: Positive Shock to Investment in Residential Structures



While the foregoing analysis illustrates the importance of flexibility, credibility and strong anchoring of inflation expectations, Panel C of Table 1 can be interpreted as speaking to the need for coherence between monetary policy and other parts of the broader macrofinancial policy framework. In contrast to the baseline parameterisation in Panel A, which aims to capture historical levels of household debt, the parameterisation in Panel C aims to capture the higher current levels of household debt (Figure 9). We see that this rise in indebtedness leads to an increase in volatility, especially for the output gap, along with longer-lived deviations of inflation from target. This reflects the fact that household expenditure, including consumption and residential investment, is more dependent on debt financing, which then tends to amplify the feedback loop between household borrowing and house prices. These findings therefore serve as an example of complementarity between monetary and macroprudential policies to the extent that the latter can help to rein in household leverage before it becomes excessive. More generally speaking, they raise important questions about the overall policy mix that would best ensure the economy’s resilience. We elaborate further on this issue in the next section, which shifts attention to the future of the Canadian monetary policy framework.

Figure 9: Aggregate Household Debt
Per cent of GDP



4. Looking Ahead

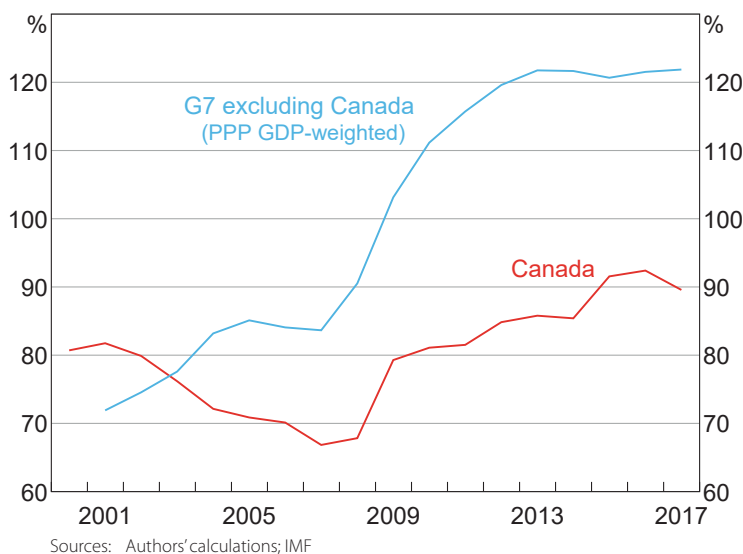
The BoC's next renewal will take place in 2021. Though formal research topics have not yet been selected, many of the candidates are motivated by the low neutral rates currently being estimated for Canada and many other advanced economies. For example, while BoC estimates placed the Canadian real neutral rate around 3 per cent in the mid 2000s, current estimates centre around a midpoint of 1 per cent (Dorich, Reza and Sarker 2017). This downward shift is likely to persist for an extended period, given the largely secular nature of its underlying drivers, including slower growth in potential output, higher global savings, lower capital intensity of production, greater demand for safe assets and demographic trends.

As mentioned earlier, the main policy challenge associated with a lower neutral rate is that it increases the likelihood and expected duration of ELB episodes, all else being equal. For example, if one assumes an ELB of 25 basis points, as the BoC did in the aftermath of the GFC, then Dorich *et al* (2018) estimate that the unconditional probability of a binding ELB has risen from 3 per cent in the mid 2000s to nearly 14 per cent at present. Even after accounting for policymakers' growing openness to modestly negative interest rates, which has shifted the BoC's assessed ELB to -50 basis points (Witmer and Yang 2016), the latter figure still stands near 8 per cent, more than double the mid 2000s estimate.

Apart from a low neutral rate and elevated ELB risk, large debts in the household and public sectors also stand out as important features of the medium- to long-term economic environment (Figures 9 and 10). As explained in Poloz (2016), these are largely a consequence of the extraordinarily stimulative monetary and fiscal policies needed to support aggregate

demand during and after the GFC. They also raise a host of policy challenges, not least including the limits that they likely place on the role that further borrowing can play in supporting aggregate demand, along with a heightened risk to financial stability. In addition, the monetary transmission process is likely to differ across high- and low-debt environments, necessitating a careful recalibration of (even the conventional parts of) the central bank toolkit.

Figure 10: General Government Debt
Per cent of GDP



In an environment characterised by a low neutral rate and high debts, the non-monetary parts of the overall policy mix likely have a larger role to play in stabilising the economy and ensuring its resilience against shocks, all else being equal. For example, while discussions of fiscal–monetary coherence in the early years of the targeting framework focused mainly on the importance of fiscal consolidation and sustainability as preconditions for price stability, attention has now shifted more to how countercyclical fiscal policy can best complement monetary stimulus during periods when the policy rate is close to or at the ELB. This is especially important since much evidence suggests that fiscal stimulus may be more powerful under these circumstances. At the same time, the financial imbalances that may build up in low interest rate environments create an obvious role for macroprudential tools, especially in light of the large debts already in place, along with evidence that monetary policy is likely too blunt an instrument to mitigate financial vulnerabilities. For example, Duprey and Ueberfeldt (2018) use an empirical risk management model to show that monetary policy is likely to have relatively little effect on financial stability risk when operating in a context of effective support from macroprudential authorities, thus freeing the central bank to focus more on the containment of macroeconomic risks, an area in which it enjoys a natural comparative advantage. Broadly speaking, these considerations imply a strong need to ensure complementarity between the

monetary, fiscal and macroprudential policy frameworks while respecting and preserving the operational independence on which central bank credibility depends. In the Canadian case, we stress that special aspects of the institutional framework already help to encourage complementarity of this sort, not least including the highly centralised nature of federal fiscal policy, a long tradition of cooperation among macrofinancial authorities, and the above-noted fact that inflation control is a joint duty of the BoC and government.

Heightened ELB risk also enhances the role of unconventional monetary policies. These include forward guidance, a tool with which the BoC already has direct experience, along with several tools, like large-scale asset purchases, funding for credit and negative interest rates, with which other central banks experimented during and after the GFC and European debt crisis. Despite the body of experience thus accumulated, many open questions remain regarding the use of these tools, especially concerning their optimal coordination and relative strengths and weaknesses. Another important question is the extent to which unconventional monetary policies can substitute for the non-monetary measures discussed above. While this issue was less important in Canada due to the fact that Canadian rates had already escaped the ELB at the time that the government began withdrawing the fiscal stimulus marshalled in the aftermath of the GFC, it proved highly relevant in other jurisdictions, where central banks' interest in unconventional monetary policy derived partly from a perceived need to provide stimulus independent of fiscal authorities, especially as fiscal policy in many advanced economies began tightening around the time of the G20's 2010 Toronto Declaration.

While the unconventional policies just discussed can be incorporated into an inflation targeter's toolkit without necessitating some change in the overall inflation-targeting framework, the literature has also identified alternative frameworks that may deliver superior outcomes when nominal rates are at or near the ELB. These include the average inflation-targeting (AIT) framework proposed by Nessén and Vestin (2005), which aims to stabilise average inflation over a multi-year window and, thus, represents an intermediate case between pure inflation targeting and PLT. Another possibility would be the regime-switching frameworks analysed by Mendes and Murchison (2014) and Bernanke (2017), which involve switching to PLT at the onset of ELB episodes, then committing to not raise rates until prices have reached the target path.

The essential feature of these alternative frameworks is that they introduce history dependence into monetary policy, in contrast to the fully forward-looking nature of inflation targeting, which makes no attempt to correct for past deviations from target. Going back to seminal work by Krugman (1998) and Eggertsson and Woodford (2003), it is well known that optimal monetary policy generally entails some degree of history dependence during and after ELB episodes – in particular, policymakers should be prepared to respond to ELB episodes by committing to keep rates lower for longer than a purely forward-looking analysis would imply, since expectations of an extended period of high inflation and low nominal rates would then help to stimulate demand through their effect on long-term real rates. A commitment of this sort can be approximated under AIT and temporary PLT frameworks, both of which have the property that low levels of inflation in the early phases of an ELB episode mechanically extend the period over which agents can expect lax monetary conditions.

Of course, a permanent shift to PLT was contemplated as part of the 2011 renewal and was ultimately rejected due to concerns about its credibility and heavy reliance on expectational mechanisms, among other issues. However, these concerns are somewhat mitigated in the case of AIT and temporary PLT. For example, an oft-cited challenge to the credibility of full PLT in small open economies is that extended periods of tight monetary policy would sometimes be needed to unwind the price impact of large terms of trade shocks, and episodes of this sort could prove prohibitively unpopular. Fortunately, this issue would be less of a concern under AIT (since the offending shocks would eventually pass out of the averaging window) and would remain entirely moot under temporary PLT due to that framework's asymmetric nature. The asymmetries inherent in temporary PLT also have other advantages. For example, if credibility or expectational issues prevented temporary PLT from exerting its intended effects on long-term real rates, then the costs associated with the periods of overly expansionary policy that the framework would then entail would nonetheless be mitigated to the extent that the efficient level of output is likely to exceed potential in practice.²⁹

That said, a more radical set of recent policy proposals aims to respond to heightened ELB risk by circumventing the ELB entirely. Though all such proposals remain highly speculative, we briefly highlight two leading examples, namely the frameworks advocated by Agrawal and Kimball (2015) and Goodfriend (2016), which involve introducing a time-varying exchange rate between paper currency and some form of e-money (e.g. deposits at the central bank). More specifically, Agrawal and Kimball (2015) argue for a time-varying fee on deposits at the central bank's cash window, while Goodfriend (2016) proposes fixing the quantity of paper currency and then allowing an endogenous determination of the exchange rate.

In principle, approaches like these could deliver negative interest rates on e-money so long as the public expects an offsetting depreciation of paper currency. However, they would also entail a host of challenges. For example, commercial banks may be hesitant to pass negative rates on to their retail depositors. Negative interest rates would also leave firms and households with incentives to delay the deposit of e-money cheques or prepay e-money liabilities, potentially including taxes. In addition, the magnitudes of the required depreciations might trigger disruptions in the e-money-to-paper market not unlike those sometimes witnessed in real-world foreign exchange markets. Large depreciations would also raise distributional issues to the extent that e-money and paper currency are not evenly distributed in the economy.

To be clear, most of the policy measures discussed in this section are not mutually exclusive. If anything, many would likely prove complementary. For example, if AIT or temporary PLT were ultimately adopted, then the need for strong macroprudential policy would likely be enhanced to the extent that these frameworks enable monetary policy to set rates lower for longer than would otherwise be the case.

In summary, the foregoing discussion has identified at least four topics that warrant further study, either in the context of the 2021 renewal or as part of the BoC's broader research agenda, namely: (i) complementarities in the monetary, fiscal, and macroprudential policy

²⁹ Distortions such as taxes and market power likely cause the level of potential output to be inefficiently low. Hence, a temporary period of excess demand may be less costly than commonly assumed in analyses of monetary policy frameworks.

frameworks; (ii) the costs, benefits, and optimal use of forward guidance, large-scale asset purchases, credit for funding, and negative interest rates as additions to the central bank toolkit; (iii) the merits of AIT, temporary PLT, and other potential strategies for introducing greater history dependence into the conduct of monetary policy; and (iv) the long-term prospects for circumventing the ELB.

5. Concluding Remarks

Looking back over Canada's more than quarter-century experience with an inflation-targeting-based monetary policy framework, the framework has proven much more successful than initially expected. In hindsight, we underestimated how quickly credibility could be achieved and how effectively well-anchored inflation expectations would help to keep inflation close to target.

The consistent application of a clear and simple 2 per cent inflation target within a symmetric control range has proven to be a tremendous strength of the framework. The 2 per cent target, which is now firmly ingrained in the Canadian mindset, has served as a Schelling (1960)-style focal point for the coordination of economic decisions while improving the reliability of price signals. In turn, the anchoring of inflation expectations has enhanced the flexibility and general effectiveness of monetary policy, thus making the target easier to achieve and improving overall macrofinancial outcomes.

The governance of the inflation target has played an important role in ensuring its credibility. In particular, the underlying joint agreement committed the federal government to the target while granting the BoC the operational independence needed to achieve it. In addition, the agreement has served as an implicit mechanism for promoting coherence between the monetary and non-monetary parts of the overall policy mix, including fiscal policy and financial regulation and supervision.

At the same time, a regular and highly deliberate renewal process has provided multiple opportunities to review the framework, conduct in-depth research on its structure and implementation, and examine our growing experience and related theoretical work. While the structure of the framework has largely remained intact, its operation has continually improved as our understanding has deepened, especially regarding the importance of clear and effective communication.

Looking ahead to the next renewal in 2021, a few ongoing economic developments pose important challenges to inflation-targeting-based monetary policy frameworks, most notably low neutral rates, heightened ELB risk, and high debt burdens in the household and public sectors. The goal of the 2021 renewal will be to strengthen the Canadian framework in the face of these developments to maintain the economy's resilience to adverse shocks.

The academic and policy literatures have put forward several proposals for dealing with the above-noted developments, including alternative monetary frameworks (e.g. PLT, AIT, nominal GDP targeting) and various additions to the central bank toolkit (e.g. conditional forward guidance, large-scale asset purchases, negative interest rates). The need to ensure a

complementary mix of monetary, fiscal, and macroprudential policy has also received growing attention. Clearly, there is some degree of substitutability among these three policy choice sets: framework, toolkit, and policy mix. Moreover, a sufficiently coherent and resilience-enhancing policy mix would imply less need to consider more radical changes to the framework or toolkit. At the same time, some of these options, including large purchases of government debt or substantial changes in the policy mix, raise important concerns about central bank independence. Such concerns will also need to be examined as these options are considered going forward.

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