



C.D. Howe Institute
Institut C.D. Howe

C.D. Howe Institute

COMMENTARY

MONETARY POLICY

Unstable Foundations:

Asset Markets, Inflation Targets, and Canada's
2011 Policy Choices

David Laidler
Robin Banerjee



In this issue...

As a 2011 deadline approaches for reform or renewal of the Bank of Canada's inflation-targeting program, questions arise about how the Bank's responsibilities for ensuring the financial system's stability are exercised under such a regime. The current financial crisis underlines the urgency of these issues.

THE STUDY IN BRIEF

THE AUTHORS OF THIS ISSUE

DAVID LAIDLER is
Fellow-in-Residence at the
C.D. Howe Institute.

ROBIN BANERJEE is a Policy
Analyst at the C.D. Howe
Institute.

*Rigorous external review of every
major policy study, undertaken by
academics and outside experts,
helps ensure the quality, integrity
and objectivity of the Institute's
research.*

\$12.00; ISBN 0-88806-776-3
ISSN 0824-8001 (print);
ISSN 1703-0765 (online)

The current financial crisis is creating a plethora of visible and immediate policy problems, but it also raises longer-run questions about the adequacy of inflation targeting as a basis for Canada's monetary regime, which this *Commentary* addresses.

Asset price bubbles and the excessive swings in real economic activity that typically accompany them seem less likely to develop when a broad inflation measure like Canada's CPI is targeted, and when long upswings in inflation, even at low overall levels, are not permitted to gain momentum. But beyond these considerations, because bubbles are usually sector specific, conventional monetary policy is unsuitable for their pre-emption, a task better delegated to regulators.

There is no certain way of avoiding asset market instability, however, so a central bank that targets inflation must also be the financial system's lender of last resort. These tasks are complementary. Inflation falls in the wake of financial crises, so monetary expansion is called for on both counts, while the exchange rate flexibility needed to support inflation targeting permits interest rates to be lowered as part of the policy package, as they could not be under a fixed exchange rate regime.

The 2011 monetary policy agreement between the Bank of Canada and the Minister of Finance should explicitly recognize the Bank of Canada's lender-of-last-resort role. It might also pay attention to minimizing the scope for prolonged inflation upswings to develop, a consideration that argues against a shift to price level targeting and also points to the desirability of strengthening the upper boundary of inflation's target range.

ABOUT THE INSTITUTE

The *C.D. Howe Institute* is a leading independent, economic and social policy research institution. The Institute promotes sound policies in these fields for all Canadians through its research and communications. Its nationwide activities include regular policy roundtables and presentations by policy staff in major regional centres, as well as before parliamentary committees. The Institute's individual and corporate members are drawn from business, universities and the professions across the country.

INDEPENDENT • REASONED • RELEVANT

Asset market instability has been at the centre of the monetary policy scene in Canada and just about everywhere else for more than a year now – this at the very time when the review of Canada’s inflation targeting program announced in November 2006 (Bank of Canada 2006) as a prelude to its possible reform in 2011 has been getting under way.

Monetary policymakers around the world had already begun to pay systematic and serious attention to financial stability issues long before the current crisis began in mid-2007.¹ Its unfolding, however, has lent a very practical tone to recent local discussions (see for example, Engert, Selody, and Wilkins 2008) about the role central banks should play as they cooperate with the various regulatory agencies with whom they share responsibilities in this area. The 2011 deadline for the renewal and potential reform of Canada’s inflation-targeting monetary policy regime, moreover, gives particular immediacy to questions about how – and even whether – the Bank of Canada can effectively strengthen and support the economy’s apparently unstable financial foundations if low- to medium-term inflation continues to be its sole explicit policy goal.

Some observers have suggested that a benign macro-economic environment, such as many countries have enjoyed since the mid-1990s, helps weaken financial systems by lulling participants into careless decisions that have taken insufficient account of risk, and that a narrowly focused monetary policy regime like Canada’s is therefore inadequate. This *Commentary* extends the carefully nuanced skepticism of Freedman and Goodlet (2007) about this view by stressing complementarities between the pursuit of low inflation and the maintenance of financial stability. We argue both that success on the inflation front enhances the chances of maintaining stability without quite guaranteeing it, and that, when instability does arise, prompt and vigorous

attention to it by the relevant authorities, including the central bank, can help to keep inflation on track. Even so, we also argue that the precise characteristics of the inflation-targeting regime can influence these interactions, and therefore we end with a brief discussion of the characteristics most likely to support financial system stability.

A Brief Overview

We begin by discussing competing views about how low and stable inflation affects the vulnerability of asset markets to instability, arguing that it helps in this regard, albeit without offering any cast-iron guarantees. We specifically suggest, as a corollary, that a little more attention in recent years to the behaviour of overall inflation on the part of the US Federal Reserve might have led it to tighten its policies earlier and helped avoid the worst excesses of the housing market bubble, whose bursting precipitated the current crisis; we make a similar case about the Bank of England.

We then outline our views on how asset market bubbles develop, paying particular attention to how they can occur even against a background of low overall inflation. Here, we stress the limits imposed on the use of orthodox monetary policy to forestall bubbles by the fact that its effects are economy wide, while bubbles are usually phenomena of particular sectors. Turning to the deployment of lender-of-last-resort activities by the central bank as a means of coping with the financial crises that typically follow the bursting of bubbles, we argue that, appropriately coordinated with conventional interest rate policies, the deployment of such activities is consistent with the ongoing pursuit of medium-term inflation targets.

Finally, we outline some implications of our analysis for the 2011 monetary policy agreement between the Bank of Canada and the minister of finance. We suggest that the Bank of Canada’s responsibilities for supporting financial sector stability in its lender-of-last-resort capacity should be recognized explicitly, and that it should continue to set policy targets for an inclusive consumer price index (CPI) rather than a narrower core index that abstracts from important categories of expenditure.

The authors are grateful to Steve Ambler, Colin Busby, Chuck Freedman, John Murray, Finn Poschmann, Anji Redish, Bill Robson, and Nick Rowe for many useful comments on an earlier draft of this *Commentary*, but remain responsible for remaining errors and omissions.

¹ This development is analyzed and assessed in some detail by Freedman and Goodlet (2007).

There is also something to be said for configuring the new regime so as to make it difficult for prolonged upswings in inflation, even at a low average rate, to get under way. To that end, we suggest that the upper boundary of any target range for inflation might be made a firmer constraint on policy than it currently is, and that inflation targeting looks more attractive than price-level targeting. An important caveat that accompanies these conclusions, however, is that they arise from analysis that gives pride of place to consideration of financial stability and that other factors might not always point in the same direction.

Low Inflation and Asset Market Instability

Recent asset market instability seems to have taken many by surprise, but it was foreseen by some important commentators. In particular, as long ago as the late 1990s, while the so-called dot-com bubble was developing, the Bank for International Settlements (BIS) began to warn that the seemingly benign inflationary environment of that period was masking growing fragility in financial markets.²

Although the BIS has a rather low profile among the public at large, it provides the venue where central bankers from around the world meet regularly to discuss policy concerns of mutual interest, and it has also long been closely associated with the international coordination of regulatory policies toward the financial sector. The label “central bankers’ central bank” that is sometimes attached to the BIS exaggerates both its powers and influence, but it is safe to say that all monetary policymakers who mattered were aware of its warnings even if they did not act on them. Although bygones are now bygones, it is still worth asking whether these warnings yield any lessons for future policy.

The BIS View

Briefly, the BIS argued that the stable low-inflation environment of the 1990s had led participants in

asset markets to underestimate the risks they were taking, making those markets ever more vulnerable to speculative excesses, and hence to sudden collapses. And after the dot-com bubble burst in 2000, the BIS argued that the monetary ease that came in its wake threatened to create even more trouble in the future. Two policy implications seemed to follow. The first was that monetary authorities, as well as pursuing low inflation, ought to keep an eye open for emerging asset market bubbles and be prepared to act to prevent them from gathering momentum, even if that meant taking measures not also required in pursuit of their immediate goals for the inflation rate. The second implication was that, should they fail to the point of having to cope with an asset market collapse, monetary authorities ought to be wary about the amount of support they then provided to the financial system in its wake, lest this encourage even more foolhardiness in future.

Recent events in the United States and elsewhere seem at first sight to bear much of this out. Although inflation did move up a little in the late 1990s as the dot-com bubble got under way, it evidently remained low enough to trigger no alarms. The Federal Reserve did little to discourage this bubble’s development, and vigorous efforts by both the fiscal and monetary authorities to keep the economy expanding after it burst were in due course followed by a housing boom, whose own collapse is now having worldwide repercussions. Once again, just as in 2001, the Fed and other central banks are working hard to prevent financial market problems driving real economies into deep and prolonged recession. In light of past experience, it is hard to avoid asking whether, in doing so, they are simply setting the scene for yet more asset market problems in future.

Canada’s monetary policy regime is centred on a specific numerical target – 2 percent inflation with a margin of error between 1 and 3 percent around it – for the CPI. Although this regime has been a remarkable success over the past decade-and-a-half when judged on its own terms, it has encountered some difficulty as the recent crisis has evolved. Has

2 The list of BIS publications on this matter is long. A representative sample of contributions, where references to other papers can also be found, includes Crockett (1999); Borio and Lowe (2002); and Borio and White (2003). The BIS approach has strong echoes of some of the interwar literature on financial stability, surveyed by one of the present authors (not by co-incidence) in another BIS publication (see Laidler 2003). Many of these themes were also sounded from the 1960s onwards by the at-the-time lonely voice of Hyman Minsky (see Minsky 1982 for a representative collection of his work). On the historical continuity of these ideas and their relationship to the economic history which helped to generate them, see Bordo and Wheelock (2004).

its very simplicity left it vulnerable to asset market instability and, in 2011, should it be modified to deal with this potential flaw?

Inflation Targeting as a Source of Economic Stability

The almost uninterrupted post-1991 expansion of market economies, in which Canada was a full participant, made it all too easy to forget that the so-called business cycle – a repeated pattern of expansion and contraction, often quite sharp in the latter phase – has been a fact of life ever since market economies began to emerge in the eighteenth century. The earliest name given to this phenomenon was the *credit cycle*, a reliable testament to the prominent role that financial markets have always played in it, and it is not surprising that the task of coping with the cycle has been widely regarded as one for central banks from their very beginnings. Ideas about just what such coping might entail have, of course, changed radically over time, but today's focus on stabilizing the inflation rate is usefully thought of as being simply the latest stage in this evolution.³

By and large, the hopes vested in monetary policies focused on inflation control – that cyclical swings in inflation and real output would indeed be stabilized – have been fulfilled since the mid-1990s, to the point that the succeeding period has been labelled the great moderation.⁴ This improvement began even sooner in some places, including Canada, that were early off the mark in putting explicit inflation targets in place. But it also occurred elsewhere, not least in the United States, where it began even earlier as stable inflation began to be pursued in the 1980s, albeit less single-mindedly than would have been the case under a formal targeting regime. Even so, another hope – namely, that the asset market instability that also traditionally accompanied the cycle might also be mitigated – has been sadly and obviously disappointed.

This should not have come as a total surprise. Two periods of smooth real expansion accompanied by low and stable inflation that ended in ruinous asset market crises were well known even before the great moderation got under way: the later 1920s in the United States, where the collapse of the stock market in October 1929 heralded the Great Depression; and the later 1980s in Japan, where the subsequent demise of the “bubble economy” ushered in the “lost decade” of the 1990s. Figures 1 and 2 display consumer price inflation rates during these episodes, alongside a major equity price index, and show just how benign the inflationary environment seemed before asset market trouble struck, particularly in the United States in the 1920s. When hindsight is applied to Japan, the matter is a little less clear-cut: although inflation remained sufficiently low in the late 1980s and early 1990s that it caused no contemporary concern, it nevertheless rose steadily from 1987 onwards; in this respect, the Japanese experience seemed to foreshadow recent experience in North America.

Inflation and Recent Episodes of Asset Market Instability

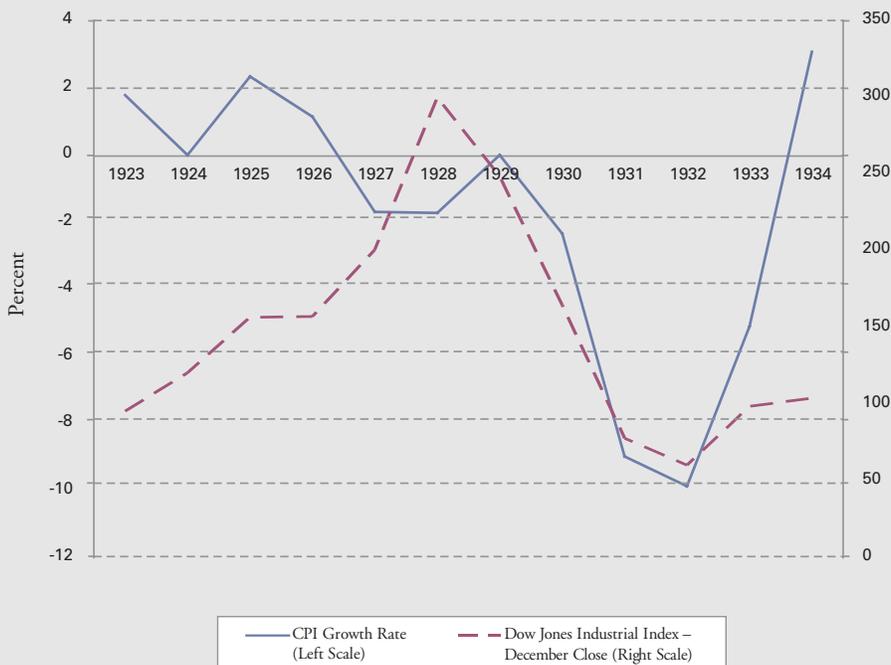
Figures 3 and 4 present data for the United States and Canada since the mid-1990s that are comparable to those displayed in Figures 1 and 2. Here, it is particularly instructive to compare the behaviour of consumer price inflation in the United States and Canada in the two intervals bounded by the collapse of Long-Term Capital Management (LTCM) in September 1998, the stock market collapse that began in March 2000, and the collapse of the market for asset-backed commercial paper in September 2007.

During the first interval, there was something of a run up in the inflation rate in both countries, but better defined, starting earlier, and reaching a higher peak that was sustained longer in the United States. These differences are surely a result of those countries'

3 A particularly readable account of these hopes, which pays particular attention to the reasons for expecting stable inflation to contribute to asset market stability, is that of Bernanke and Gertler (1999).

4 This now widely used phrase seems to have been coined by Stock and Watson (2002). Some commentators, with benefit of hindsight and perhaps concentrating on US experience, fix the beginning of the moderation in the mid- to late 1980s. However, given the instability encountered in both Europe and Canada at the beginning of the 1990s, we find this hard to defend. Before the event, some commentators seem to have expected greater stability in inflation to be accompanied by less rather than more stability in real variables. See Walsh (2008) for a discussion of this expectation and the way in which subsequent experience disappointed it.

Figure 1: USA 1920s – Inflation versus Stock Market Performance



Sources: Bureau of Labour Statistics and Dow Jones & Company.

Figure 2: Japan – Inflation versus Stock Market Performance, 1985-1996



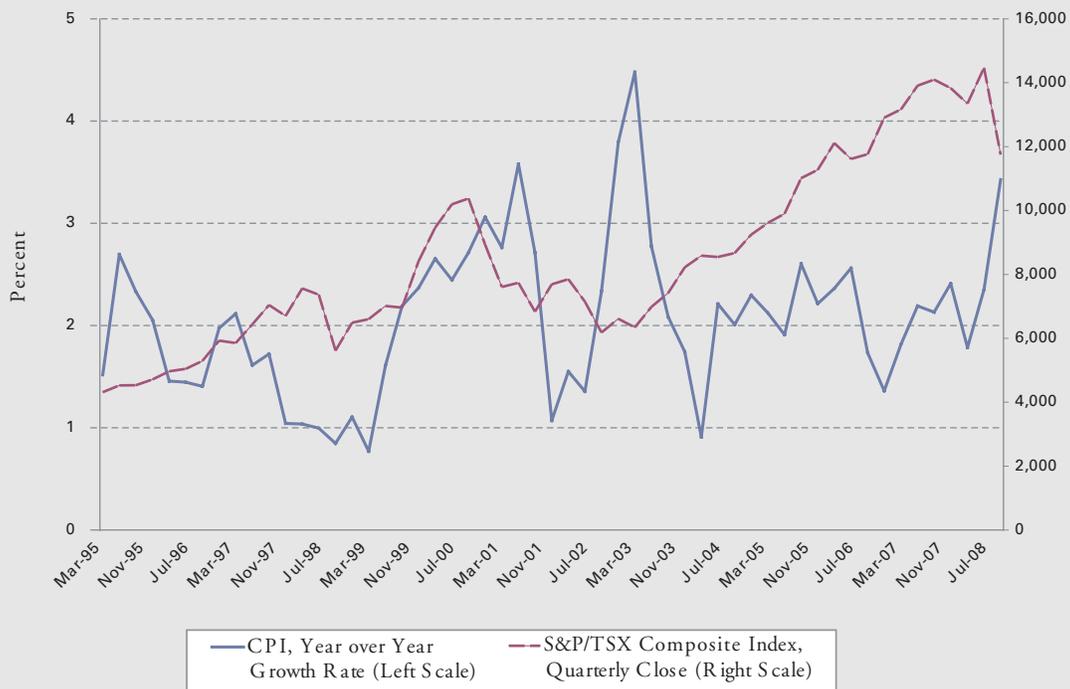
Sources: OECD and Yahoo Finance.

Figure 3: USA – Inflation versus Stock Market Performance, 1995-2008



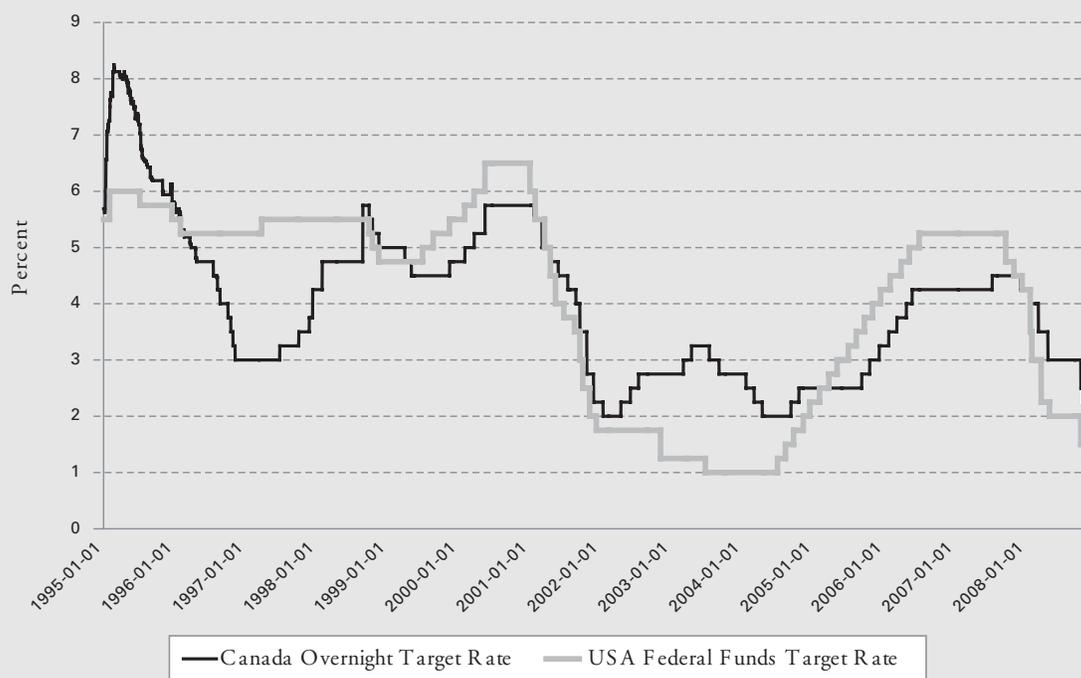
Sources: Bureau of Labour Statistics and Dow Jones & Company.

Figure 4: Canada – Inflation versus Stock Market Performance, 1995-2008



Source: Statistics Canada.

Figure 5: Canada Overnight Target Rate and USA Federal Funds Target Rate



Sources: Bank of Canada and Federal Reserve Board.

monetary authorities responding differently to the Russian and subsequent LTCM crises, but inflation in neither Canada nor the United States reached levels that attracted policymakers' attention even under the former's formal 1-to-3 percent targeting regime. The corresponding differences between the two countries after 2001, however, are more marked. US inflation moved up sharply once the Fed's response to the collapse of the dot-com bubble took hold, and continued to rise erratically towards 4 percent, where, after a brief respite, it remains at the time of writing. Canada mimicked US behaviour only until early 2003, when inflation actually spiked above the US rate for a month or so, but thereafter fell back below 3 percent and remained there until the late summer of 2008.

A comparison of the two countries' targets for their policy interest rates – in Canada, the overnight rate, and in the United States, the federal funds rate

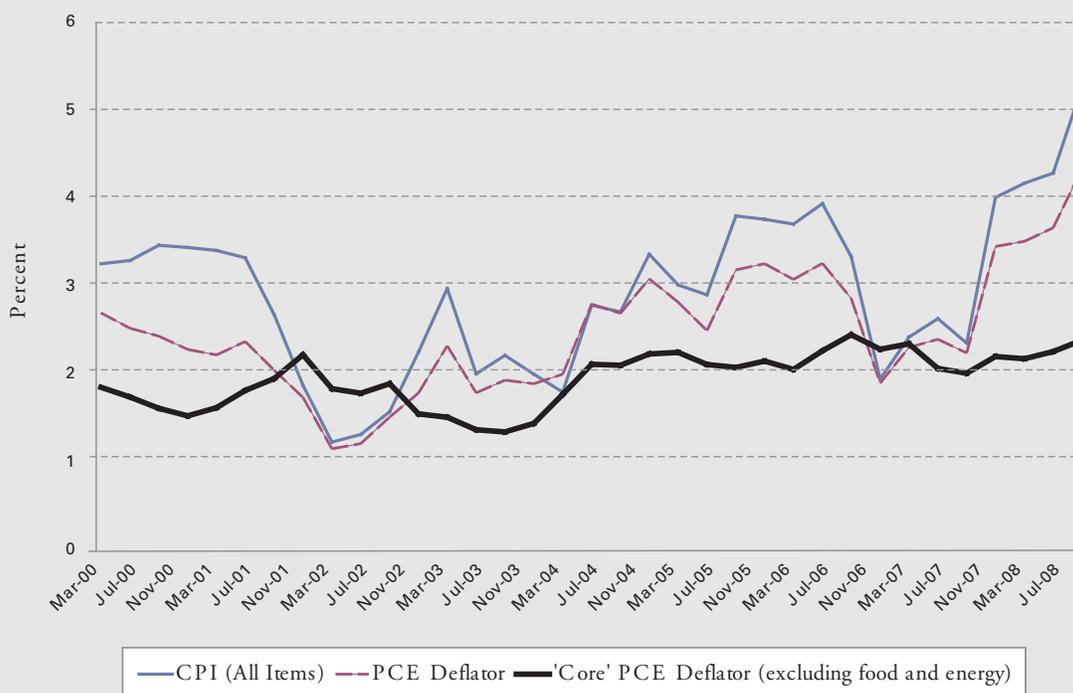
(see Figure 5) – strongly suggests that this difference in outcomes was related to the fact that monetary policy was self-consciously tightened earlier in Canada, a fact surely related in turn to the Bank of Canada's pursuit of a formal 2 percent inflation target for the CPI and to the lack of a similar commitment on the part of the Fed.

The Importance of Targeting the Right Price Index

Even so, the Fed was not inattentive to inflation during the period. Though lacking a formal target and, indeed, operating under a "dual mandate" that requires it to pay attention to the performance of the real economy, the Fed was well known to be working with an inflation "comfort zone" of around 1.5 to 2 percent.⁵ Crucially, however, this informal target was not for the local counterpart of Canada's

5 The significance of this dual mandate is much discussed in US debates, and some contributors, notably former Fed governor Frederic Mishkin (2008), argue that though it requires the Fed to aim at the best real performance that the economy is capable of sustaining, this does not conflict with the pursuit of a stable inflation target. Mishkin also argues, however, for the suitability of a core inflation measure for targeting, partly on the grounds that it would lead to smaller policy-induced output fluctuations than does a broader "headline" index. We wonder, in the light of our argument below in favour of the virtues of targeting headline inflation, whether the Fed's dual mandate is quite as innocuous as it might seem.

Figure 6: USA – CPI, PCE and Core PCE, Year-over-Year Growth Rates, Quarterly



Sources: Bureau of Labour Statistics and Bureau of Economic Analysis.

CPI but for the core personal consumption expenditure (PCE) deflator, which is unsuitable as an anchor for a formal inflation-targeting regime.

Compared to the appropriately labelled headline CPI, the PCE deflator is badly understood by the public, available only with a significant time lag, and subject to post-publication revisions. On the other hand, as a chain-weighted index that continuously updates the consumption bundle whose price it monitors, the PCE deflator is less prone to upward bias in measuring inflation than is the fixed-weight CPI, which takes account of the proclivity of consumers to substitute away from those goods whose prices are rising most rapidly only when its weights are intermittently updated. Thus, to this extent, the usually lower measures of inflation that the PCE tends to yield (see Figure 6) are more accurate, a characteristic that perhaps enhances its suitability as a gauge of central bank “comfort.” However, the even lower estimates of inflation yielded by stripping the PCE deflator of its food

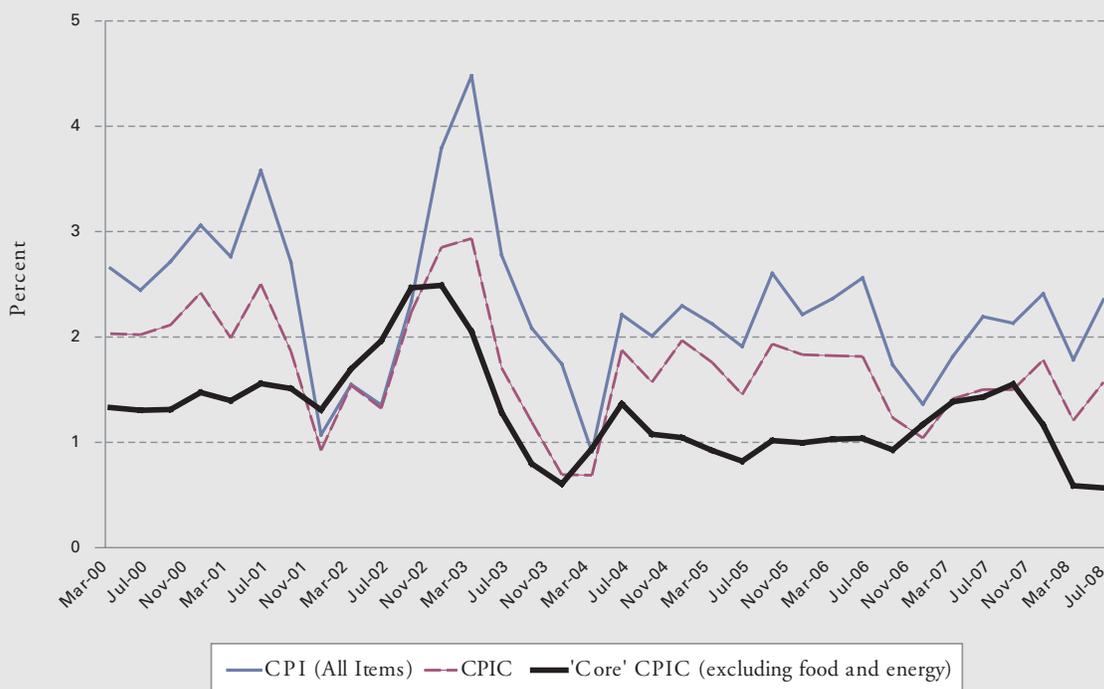
and energy components to arrive at a measure of “core” inflation seem to have lulled the Fed into a false sense of security after 2001.

The pros and cons of core inflation measures are by now widely understood, so suffice it here to assert that, although they provide a useful way of “seeing through” short-term volatility in measured inflation when food and energy prices are fluctuating around average levels that remain constant over time relative to those of other goods, they become misleading when relative prices are themselves changing.⁶ Specifically, when the relative prices of food and/or energy are rising over the long term, as they have been in recent years, a price index that ignores them systematically underestimates the overall inflation rate.

It is this effect that mainly accounts for the failure of the Fed’s favoured measure of inflation to catch the rise of inflation in recent years. Figure 7 shows that this index’s Canadian counterpart – the core version of the chained price index for consumption

⁶ For discussions of these issues in a specifically Canadian context, see, for example, the exchange between Laidler and Aba (2000) and Macklem (2001). See also Mishkin (2008) and the references, mainly to US literature, therein.

Figure 7: Canada – CPI, CPIC, and 'Core' CPIC, Year-over-Year Growth Rates, Quarterly



Sources: Bank of Canada and Statistics Canada.

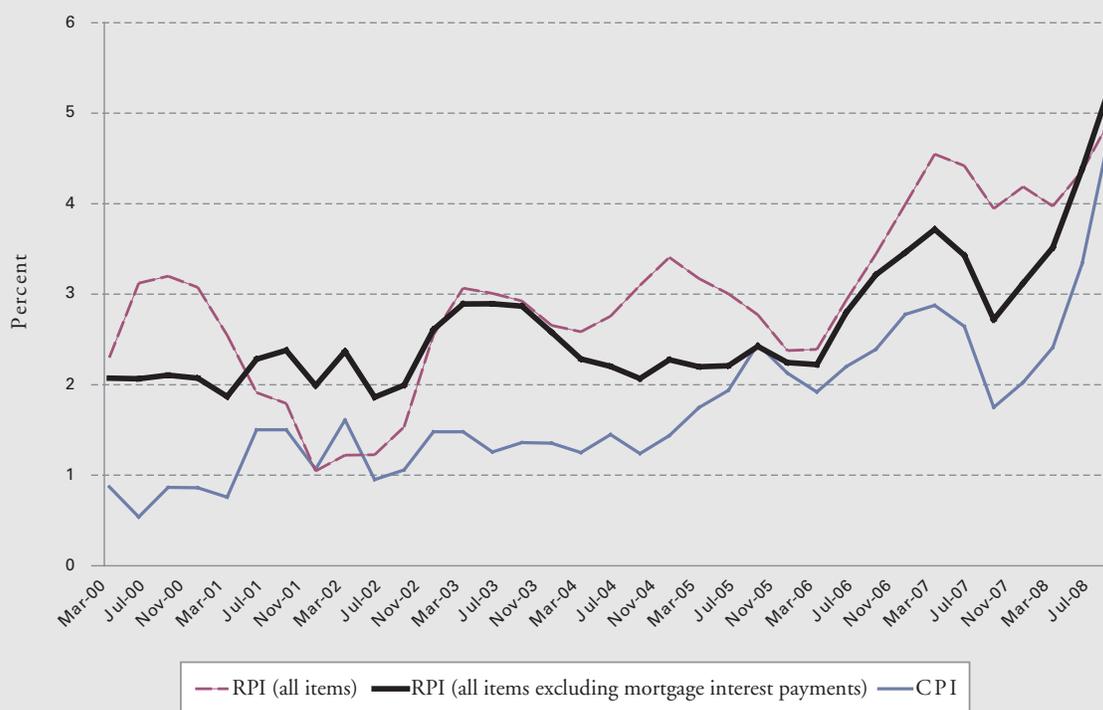
(CPIC) – would have similarly misled policymakers had they been paying much attention to it, but because Canada is an inflation targeter focused on the CPI, no one was. One could argue that, over the same period, the Bank of Canada paid too much attention to the core CPI (not plotted in Figure 7 in order to maintain its clarity and comparability with Figure 6), but such policy errors as this caused were not large enough to do real damage. Headline CPI inflation was above its 2 percent target too often for comfort, but at least it stayed below 3 percent between mid-2003 and mid-2008, exceeding this upper bound only in the late summer of 2008.

Recent UK experience also illustrates the potentially harmful effects of monetary policymakers' focusing on an inappropriate price index. As did the United States a little earlier, the United Kingdom is now seeing its housing bubble collapse, but, unlike the Fed, the Bank of England is a formal CPI inflation targeter: at 2 percent since December 2003, with particular attention given to keeping the rate below 3 percent, a goal it largely achieved even as house prices boomed. However, although it bears the same label as Canada's broadly based CPI, the

UK's index is not equivalent and covers a narrower range of goods. It is, in fact, the European harmonized index of consumer prices as applied to local data, and although it is not a core index, inasmuch as it does include food and energy, it takes no account at all of the costs associated with the owner occupancy of housing. This extraordinary omission makes it a dubious tool for measuring inflation in an economy such as that of the United Kingdom, with an owner-occupancy rate of about 70 percent, and in which house prices – and, therefore, that component of the cost of living associated with the provision of shelter – have until recently been rising at double-digit rates in many areas.

Not surprisingly, the UK retail price index (RPI), which does account for owner-occupancy costs and is roughly equivalent to the Canadian CPI, has risen significantly faster in recent years (see Figure 8). Had the Bank of England been targeting this index – or even the variant that it targeted before 2003, which ignores mortgage interest while accounting for other owner-occupancy costs – it is hard to believe that UK monetary policy would not have

Figure 8: UK – CPI and RPI, Year-over-Year Growth Rates, Quarterly



Source: UK Office for National Statistics.

tightened sooner, with salutary effects not just on inflation but on the local housing market, too.⁷

Monetary Policy and Asset Markets

Even if asset market upheavals in the United States and the United Kingdom did not arise entirely unheralded by prior upswings in inflation – and even if a CPI-inflation-targeting Fed or an RPI-targeting Bank of England had begun to tighten earlier so that the housing booms in those countries might have ended earlier and with less drama – none of this quite establishes the sufficiency of a successfully achieved low-inflation target such as Canada's for asset market stability. Experience shows that serious asset market crises sometimes can happen with only a rather mild increase in inflation preceding them, and occasionally with none at all.

The 1929 US stock market crash did occur. More recently, the dot-com bubble developed in the United States and, to a lesser extent, in Canada and elsewhere without inflation rising to a level that alarmed even a formal inflation targeter. And hindsight about the potential significance of its rise notwithstanding, Japanese inflation was still below 3 percent in 1990. These facts require an explanation.

Some Common Characteristics of Asset Market Bubbles

Markets for real assets – usually sector specific rather than for investment goods in general – are, like the financial sector, almost always heavily involved in crises (see Reinhart and Rogoff 2008). In recent experience, only the October 1987 stock market

⁷ A discussion of the details of the United Kingdom's shift of target price index in 2003 is beyond the scope of this *Commentary*. Suffice it to note that the decision was taken not by the Bank of England, but by the chancellor of the exchequer for political reasons having to do with preparing the country for the possible adoption of the euro as its currency. Not all of the UK CPI's systematic tendency to produce lower inflation estimates than the RPI stems from its omission of owner-occupancy costs. Some of it is due to its use of geometric rather than arithmetic weights. In recent years, however, the treatment of housing has been a significant factor. Details of these UK indices are to be found on the web site of the UK Statistics Authority: <http://www.statistics.gov.uk>.

crash was confined to financial markets. The dot-com bubble saw a run up not only in the stock prices of high-tech firms, but also in the volume of output they produced. In addition to creating serious problems in stock markets and on the balance sheets of firms that had granted generous credit to enable their customers to purchase newly produced equipment, the bursting bubble also left behind it a great deal of newly produced, unwanted equipment. In the housing bubble, it was not only the prices of existing homes that increased dramatically; the volume of new construction also soared. Although banks, bond insurers, and other financial institutions have been highly conspicuous and much discussed victims of the subsequent crisis, US builders have also been left with large unsold inventories of houses and condominiums, while countless households have seen equity in their homes shrink or even vanish altogether, with further real effects on the economy, not all of which have yet materialized.

Another recurrent feature of asset market bubbles is a mismatch between expectations of the returns to be realized in one or more particular lines of economic activity and the costs of borrowing in order to pursue them.⁸ Sometimes these mismatches are well grounded in the facts of the case, arising from technical innovations that make particular types of capital equipment more productive than the economy-wide average and their creation and deployment abnormally profitable. In such circumstances, high profit expectations and an accompanying boom are well justified, of course, but a justified boom can turn into an unsustainable bubble when expectations become exaggerated and begin to feed upon themselves, a development much easier to recognize after the event than while it is occurring. Even so, this is surely what happened in the late 1990s in the high-tech sector.

On the other hand, the profit-enhancing innovation that sets things in motion can occur on the lending side of capital markets, making it

cheaper to service a particular sector. Enhanced profit expectations often are initially justified in the wake of such an innovation, but once again, an ensuing boom can turn into a bubble by becoming exaggerated. The origin of the US sub-prime mortgage fiasco and the UK housing bubble in financial innovations, both in the mortgage market itself and in securitization techniques that seemed to make mortgage lending safer and cheaper than it had previously been, is all too well documented. And one can explain the anomaly that the 1987 crisis was confined to financial markets along these lines, too, for it originated in the emergence of new ways of financing mergers and acquisitions that made the reorganization of the ownership and management of many corporations, but not the expansion of their output, unusually profitable.

The Roles of Credit and Money

Wherever mismatches between expected returns and the cost of borrowing originate, the longer they persist and the more widely they reach across sectors, the more likely they are to generate over-optimistic profit expectations. The more pervasive these mismatches are in any instance, the greater the risk of their creating a bubble and the more serious the consequences of its ultimate collapse. And to this, one should add that the more widely spread is such a mismatch, the more likely it is to give rise to an increase in the economy's overall inflation rate as well. This is because the credit creation that fuels any bubble also involves, as a by-product, the creation of new deposit money, which, having been spent by its initial borrowers, then has the potential to remain in circulation and drive up prices in general across the economy or to be turned into close substitutes for such money, with expansionary consequences for its velocity of circulation.⁹ An asset market boom thus begins by setting prices rising in the markets directly

8 The next few paragraphs draw heavily on the interwar literature discussed in Laidler (2003), where references to a representative selection of this work are to be found. As the reader will see, the arguments presented below sometimes hinge on explicit consideration of the effects of policy on particular sectors of the economy, issues which much of the macroeconomics literature that has dominated policy debates since the 1940s has obscured because of its concentration on the behaviour of such variables as the price level and aggregate demand and supply, and its consequent neglect of the variations in relative prices and the structure of demand and supply that so often underlie them. The importance of Leijonhufvud's work (for example, 1968, 1982) in drawing attention to these matters should be acknowledged.

9 The velocity of circulation is the number of times a unit of money changes hands in a given period. It is customary, not to say easier, to measure this not as a raw turnover statistic – transactions velocity, as the jargon has it – but relative to the volume of income that the economy generates over the same period: income velocity.

affected by new lending, but prices elsewhere in the economy have a tendency to play catch-up before long as second- and subsequent-round effects, fed by the money that this lending creates, are felt.

Though an economy-wide boom fed by overexpansionary monetary policy and accompanied by generally rising prices is the limiting – perhaps even the typical – outcome of such processes if they are allowed to continue for very long, economy-wide price inflation is not quite one of their inevitable and immediate consequences. A growing economy's demand for money and its close substitutes normally expands over time and is also subject to a nontrivial degree of random variation, thus creating a certain amount of room for credit creation to boost, and eventually destabilize, particular markets without at the same time imparting an overall inflationary impulse to the money supply and/or the stock of liquid assets more generally and thence to the economy at large. The fact that financial market problems are often heralded by a rise in the overall inflation rate – sometimes large enough to trigger offsetting policies quickly enough to prevent them developing into a full-blown crisis – suggests that such an eventuality is not the norm, but the logic of the creation of credit, money, and near-money and their effects on the structure of relative prices and the price level dictate that it clearly can happen.

The foregoing argument tells us that, in addition to a not quite reliable tendency for prices in general to rise, financial crises should also be preceded by a step up in the expansion of credit and money aggregates.¹⁰ The literature on these matters is still developing and the evidence is indecisive about whether the asset (credit) or liability (money) side of the banking system's balance sheet is the more relevant, but it apparently favours broader over narrower aggregates as leading indicators of financial instability. Figures 9 and 10 follow these hints by displaying the growth rates since the mid-1990s of

the ratio of a rather broad monetary aggregate to real gross domestic product (GDP): M2+ gross for Canada, and M2 adjusted for “sweep accounts” (see Cynamon, Dutkowsky, and Jones 2006, 2008) for the United States. These conform to the basic story already told earlier, even though the recent financial crisis was preceded by substantial innovations in the creation of new short-term securities that, though close money substitutes, do not figure in these conventionally measured aggregates. Thus, there is no Canadian equivalent to the above-trend growth of broad money experienced in the United States during the dot-com boom – at least on these measures. Moreover, although both countries saw a prompt and rapid increase in the money stock after the dot-com collapse, in the United States the expansion persisted for longer and brought about a significantly larger cumulative change in this particular liquidity measure's ratio to GDP than it did in Canada. The latest Canadian data show a burst of liquidity creation as a response to financial market stress similar to that which followed the bursting of the dot-com bubble; it is to be hoped that, as with the earlier episode, the Bank of Canada will ensure that it turns out to be temporary, once financial markets stabilize.¹¹

Inflation Targeting and the Financial System

The logical links between the foregoing analysis of how asset market instability can be generated and the mechanics of inflation targeting as it is currently practiced are worth clarifying at this stage. Doing so facilitates discussion of the interrelationships between the policy responses this instability calls for and the measures needed to keep inflation on track.¹²

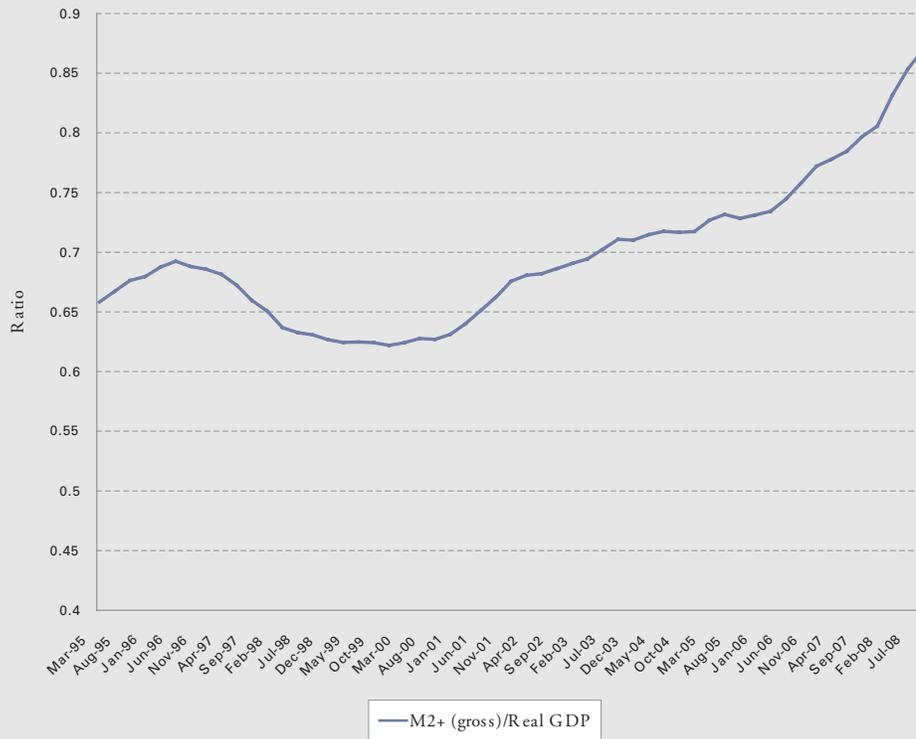
The standard framework within which inflation targeting is usually discussed links the time path of actual inflation relative to the general public's expect-

10 This tendency has been noted in work associated with the BIS and in recent contributions by, for example, Congdon (2005) and Adalid and Detken (2007). Bordo and Wheelock (2003) show that the association between rising growth rates of money and credit and asset market booms is a longstanding one, being clearly visible even in nineteenth-century US data.

11 Unfortunately, at the time of writing, US data that would enable a comparison to be made with this Canadian response are not available due to the lag in the availability of sweep-adjusted monetary aggregates.

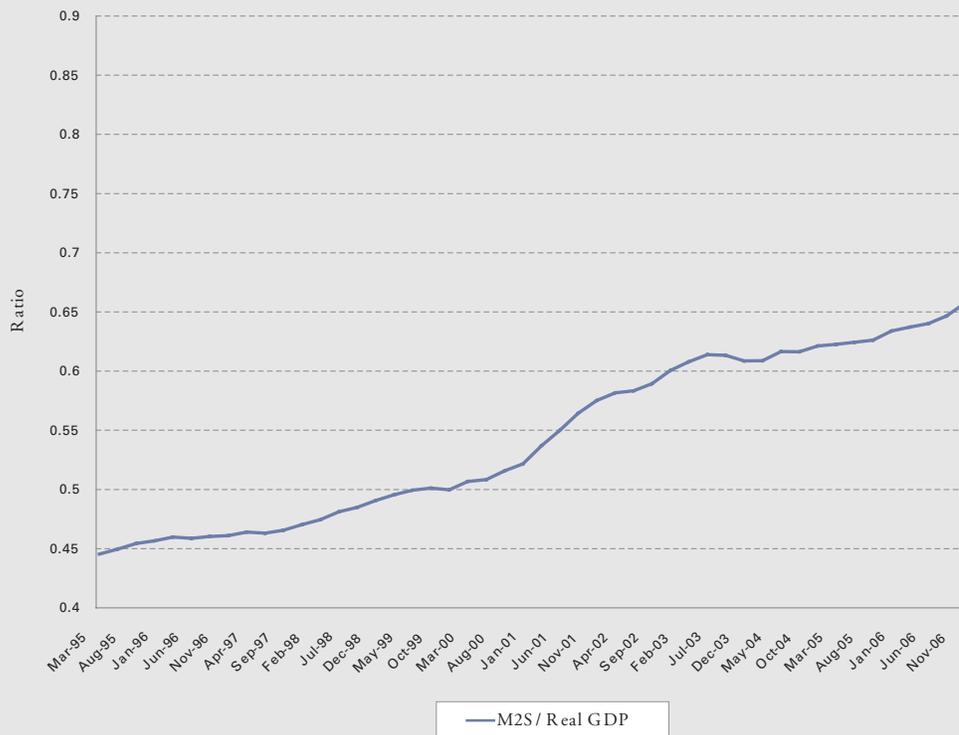
12 Woodford (2002) provides an account of this framework that is sufficiently extensive, thorough, and technically sophisticated to warrant the label canonical. It has important intellectual roots in the work of the Swedish economist Knut Wicksell (1898) from whom Woodford borrows the title of his own book. A detailed and up-to-date account of how policy is actually implemented on a day-by-day basis in Canada is given by Engert, Gravelle, and Howard (2008)

Figure 9: Canada – Ratio of a Broad Monetary Aggregate to GDP



Sources: Bank of Canada and Statistics Canada.

Figure 10: USA – Ratio of a Broad Monetary Aggregate to GDP



Sources: Bureau of Economic Analysis, Federal Reserve Board and Cynamon et al. (2008).

tations about it to the economy's "output gap," and pictures the latter as systematically responsive to the very short-term interest rates that the central bank controls. It then derives rules for changing the latter in reaction to variations in actual and expected inflation and to the above-mentioned gap, which, in turn, emanate from underlying shocks to the level of aggregate demand in the economy and its sustainable level of aggregate supply. Important in the design of such rules are views about the appropriate pace for bringing inflation back to target after any deviation, which, in turn, hinge upon the need to ensure that the policy regime does not end up generating longer-term instability as a consequence of inappropriate short-term responses. Crucially, furthermore, though variations in expected inflation are understood to be potentially subject to policy influence, this framework treats the other shocks to which policy ought to respond as arising independently of its conduct.

This standard framework usually abstracts from two matters that have already figured in our earlier discussion and are particularly important for understanding the interdependence of inflation control policies and asset market issues. First, and quite evidently, the interest rates that proximately matter for the demand for goods and services in any sector of the economy, and hence for the overall output gap, are not those that the central bank sets, but those, explicit and implicit, that firms and households actually pay for the funds they spend on goods and services. Second, it is not the absolute values of borrowing rates that matter, but their level relative to the returns, both implicit and explicit, expected on the uses to which borrowed funds are to be put, and which, in turn, might not always be independent of the stance of monetary policy or expectations about its future course.

These considerations obviously are significant in times of financial instability, when risk premiums on various types of securities are likely to be volatile. But they can be at work even in a tranquil macroeconomic environment, because here it seems

plausible that interest rate spreads within the financial system might narrow over time as perceptions of risk diminish, that ultimate borrowers' assessments of the profitability of investment might simultaneously increase, and, hence, that any given level of policy interest rates will come to imply not so much a steady-over-time policy stance, but one that is becoming progressively easier. If this is so, then the economy's vulnerability not just to an asset market boom, but also to rising inflation, will indeed increase precisely as a consequence of the persistence of macroeconomic tranquility.¹³

If there are other factors that can shift the relationship between the overnight rate and the economy's output gap than policy-induced changes in the rate, variations in inflation expectations and exogenous shocks to aggregate demand and supply in the real economy, then monetary policy needs to take account of them. The standard approach to inflation targeting gives no help in understanding how this should be done, and the matter is surely not straightforward. About all that one can say about it in general is that, when policy interest rates are set, careful attention should be paid to variability in the linkages between these rates and those that impinge more immediately upon the demand for goods and services – not to say to the influence of expectations about future monetary policy on investors' expectations. The stability here that standard analysis takes for granted is, at best, a feature of the system only in tranquil economic times, which might themselves tend to erode it. Even so, none of this implies that policy interest rate settings should be aimed at influencing asset market behaviour per se, in the sense that they should be diverted from their medium-term inflation control task to the immediate one of pricking incipient bubbles. It implies only that policymakers need to bear in mind that rigid rules for setting interest rates can become misleading over time, even where the task of policy seems to be the maintenance of already well-established inflation stability.

13 This is, of course, a way of restating the basis of what we earlier termed the BIS view of these matters, which makes it clear that the latter also involves an empirical judgment that these forces tend to affect the financial system's fragility before they begin to produce overall inflationary tendencies. Borio and Haibin (forthcoming) have recently suggested that we should think about the effects of monetary policy on perceptions and the pricing of risk as integral parts of its transmission mechanism that are neglected by standard analysis.

Sectoral Issues and the Limits of Monetary Policy

Variations in expectations about the profitability of doing business in particular sectors of the economy, when they remain well grounded in the fundamentals of agents' tastes and the technology and resource endowments available to them, lie at the very heart of the market economy's ability efficiently to exploit technical advances and financial innovations. The relative price movements associated with such variations provide signals that resources can be used more productively in the sectors in question than elsewhere. Asset markets exist precisely to transmit such signals and to enable borrowers and lenders to respond to them.

Inherent in these mechanisms, however, is the risk of bubbles: when agents overestimate the returns to be realized in a sector, assets associated with it become overvalued, attracting more activity to the sector, which further bids up prices, and so on, in an upward spiral. Real resources will be devoted to the sector's expansion so long as the spiral persists. With the passage of time, when errors are revealed and asset prices fall, those real resources are left stranded. This aftermath was all too visible in the large numbers of empty office buildings in many cities in the early 1990s, in the large stocks of fibre-optic and other high-tech equipment in North America at the beginning of the millennium, and, more recently, in the large inventories of unsold housing stock in the United States and elsewhere.

In the light of all this, it would certainly be desirable to have in place a policy framework that encouraged just those degrees of expansion and contraction in various sectors of the economy that were justified by ever-changing economic fundamentals, while simultaneously forestalling mistakes. The question remains, however, just what tools, if any, are well adapted to these purposes. It is a commonplace that region-specific monetary policy is impossible. The Bank of Canada sets just one overnight interest rate for all regions of the country, even when there are large disparities in economic

performance among them. But the Bank also sets just one overnight interest rate for its transactions with the financial institutions that lend to all sectors of the economy. Ensuring that asset market behaviour at the sector- and firm-specific levels remains grounded in economic fundamentals, therefore, is not a task for monetary policy. Such behaviour is better tackled with regulatory and supervisory measures – with respect to accounting standards and risk-management practices, for example – or even by moral suasion.¹⁴

In short, although there is more to the maintenance of a stable monetary and financial environment than the control of inflation, the policy tools that are devoted to the latter end should not be diverted into attempts to forestall asset market bubbles, a task to which supervisory and regulatory powers are better adapted. Those powers need not even be vested in the central bank to be deployed effectively. In Canada, they belong to other institutions, the most important of which are federal: the Office of the Supervisor of Financial Institutions and the Canadian Deposit Insurance Corporation. Whatever the formal division of labour between the central bank and other institutions, close and continuous cooperation among them is essential, as Freedman and Goodlet (2007) stress. Any policy framework to maintain monetary and financial stability must allow for the possibility that it will sometimes fail to prevent asset market bubbles. As recent events have demonstrated all too clearly, the financial turbulence that follows the bursting of a bubble requires not just the intervention of regulators in specific parts of the financial sector, but also the creation of liquidity for particular institutions and for markets in general. Obviously, these responses are more likely to be effective if they are coordinated, and the last of them is quintessentially a task for the central bank. It is also one whose execution potentially impinges upon the bank's ability to keep its medium-term policies towards inflation on track.

14 This is not to say that any regulatory and supervisory framework will do. On the contrary, its design and operation raise a host of difficult and, in the current state of knowledge, even unresolved issues. Freedman and Goodlet (2007, 9-18) and Milne (2008) discuss these issues extensively; their studies should be regarded as complementary to this one.

Monetary Policy in the Wake of Financial Crises

In the days before the First World War, when commodity convertibility anchored the price level, the theory and practice of central banking paid attention to the institution's responsibility not just for maintaining that convertibility, but also for ensuring the financial system's continuing viability and integrity. Then as now, it was understood that a market economy cannot function smoothly if its financial system is under stress, and that instability there can have adverse consequences not just for those whose mistakes have caused it, but also for innocent agents both within that system and beyond its bounds.

The Lender of Last Resort

The idea of intervening in markets even after the event, let alone before it, to protect participants from the consequences of their own actions (beyond the enforcement of laws against outright fraud) was essentially unheard of a century ago, but it was widely accepted that the mitigation of damage to innocent third parties was an appropriate task for the central bank. Specifically, the injunctions that came to define the bank's role as lender of last resort in the face of financial crises were that it should be ready to lend freely to particular institutions that found themselves illiquid but solvent, while allowing the insolvent to fail, and that it should provide by whatever means were needed sufficient liquidity (in the form of its own cash and deposit liabilities) to financial markets more generally so that their participants could continue with their ordinary business in the face of the increased uncertainty and low confidence that characterize

such times.¹⁵ These injunctions are just as relevant under today's monetary policy regimes, where price-level behaviour is anchored by inflation goals, as when commodity convertibility was the norm. Though, as we shall now see, different monetary policy arrangements dictate certain differences in their implementation, a difficulty common to lender-of-last-resort activities under any regime is that the line between solvency and liquidity on which so much seems to hinge, and which seems so clear in principle, is anything but in practice.

Solvency and Liquidity

This problem arises because, during a financial crisis, and regardless of its origin, the location of the line between solvency and mere illiquidity for any individual financial institution is not independent of the behaviour of the central bank.¹⁶ An institution that lacks the cash needed to meet its current commitments and cannot raise it through loans must sell assets. At this point, it is certainly illiquid, but its solvency depends upon the prices at which sales can be consummated, and during a crisis these will depend upon the amount of support that the central bank offers to the system overall. If there are many would-be sellers but the volume of central bank support is large enough to match the pressures they create, all will be well. If the scale of that support is relatively small, however, asset prices will be driven down and initially sound balance sheets will be undermined. So, as an asset market crisis develops, how many financial institutions become insolvent (and hence, according to the standard injunction, unworthy of lender-of-last-resort support) and how many remain solvent but illiquid (and hence, again according to that

¹⁵ It is usual to associate the analysis of the central bank as lender of last resort with Walter Bagehot (1873), but it in no way detracts from this book's classic status, not least as an influence on the creation of the US Federal Reserve system in 1913, that its author had neither the first nor even the final and correct word on all aspects of its subject matter. Before Bagehot (and among many others), there were Francis Baring (1797), who actually coined the phrase "dernier r sort" to refer to the Bank of England's role in the financial system of that time, Henry Thornton (1802), and Ralph Hawtrey (1932). On all this and its significance for current issues, see Laidler (2004).

¹⁶ One essential feature of a bank is that it borrows at a shorter term than it lends. There is, therefore, as Diamond and Dybvig (1983) showed in a now classic article, a risk that a crisis, taking the form of a run on its liabilities, can develop essentially spontaneously for even a sound and well-run bank. It will occur if each of its depositors for some reason comes to expect that all the others are about to withdraw their funds. Given this expectation, it becomes rational for each depositor, and therefore for all of them, to try to withdraw before the bank's liquid reserves are exhausted – that is, immediately – hence precipitating the bank's failure. Diamond and Dybvig highlight deposit insurance, which guarantees every depositor against losses in the event of a bank's failure, as a way of eliminating such behaviour, but the presence of a lender of last resort in the system works in the same direction.

injunction, worthy of such help) depends on the scale and promptness of the support.

Furthermore, because the behaviour of asset holders is forward looking, firmly established expectations that lender-of-last-resort help will be promptly available should a financial crisis ever develop can themselves affect its seriousness – and even the likelihood of its occurring in the first place.¹⁷ The potentially stabilizing effects of lender-of-last-resort activities are relevant beyond the boundaries of the financial system. The latter exists to provide the credit agents in the rest of the economy require to carry on their everyday business and the money they use in their market transactions. The more extensive are liquidity and solvency problems within the system and the more widespread are concerns of their worsening, the less able is the system to carry out these basic tasks and the more will the real economy begin to suffer. This, in turn, further exacerbates the financial system's own difficulties, both directly as previously sound firms and households begin to default on their debts, and indirectly as growing sluggishness in the economy leads to downward pressure on equity prices. Thus, any financial crisis, even an incipient one, carries with it the threat of a downward spiral that involves the financial system and then the rest of the economy. The quicker and more vigorous is the central bank's first response to trouble, not to mention the more confidently expected it is, the less likely is the spiral to get started.

Moral Hazard

Criticism of central bank support for banks and related institutions on the grounds that it favours the financial sector over other agents, therefore, is misconceived, but such support has its perils nevertheless. To the extent that central bank intervention

aimed at rescuing innocent third parties and stabilizing the economy also supports financial institutions that really did make bad loans – not to mention their overoptimistic customers – and to the extent that intervention creates expectations of rescue in future times of trouble, so moral hazard encourages even more carelessness next time round. The dilemma implicit here is real, but no clear resolution to it is to be found in the distinction between insolvency and illiquidity because, to repeat, the location of the line between them depends upon the central bank's actions. Faced with a financial crisis, where speed of response is of the essence, a lender of last resort must act in the almost certain knowledge that it is going to err in one direction or the other. In which direction, and by how much, are questions to which answers will be available only after the event.

Pre-1914 commodity-based monetary systems had some built-in protection against creating moral hazard through overgenerous provision of lender-of-last-resort facilities. These regimes required central banks to ensure the continued convertibility of their currencies, and in order to attract the necessary short-term capital inflows during crises, they were impelled to increase their policy interest rates to levels that also tended to deter any but the genuinely needy – but in the longer run sound (in their own estimation) – domestic last-resort borrowers.

No such mechanism is built into today's regimes, whether formally based on inflation targets or not. But during crises, a central bank must still reconcile the pursuit of short-term stability with the longer-term goal of keeping moral hazard in check (Engert, Selody, and Wilkins 2008, 75-76). Particularly if it is a formal inflation targeter, the central bank's other obligation is to maintain not exchange-rate stability (today's equivalent of commodity convertibility), but inflation stability. Given our usual habit of

17 This interdependence between liquidity and solvency lies at the heart of current controversies about the appropriateness of applying “mark to market” accounting rules to financial institutions in times of crisis. It is true that marking to market when the market is not functioning is likely to result in some institutions being classified as insolvent and, on a strict interpretation of lender-of-last-resort principles, denied support when, over a longer period, the market is likely to recover and so are they, and that less stringent accounting principles would prevent this occurring. Our own inclination, however, is to address this problem by combining strict measurement standards with operating procedures that leave room for the self-conscious exercise of forbearance on the part of the lender, rather than by trying to build opportunities for such forbearance into accounting conventions.

thinking that a central bank's key activity in pursuit of this latter obligation is the manipulation of a very short-term interest rate, it is not immediately clear whether or how this overriding longer-term obligation impinges on the choices the bank must also make about lender-of-last-resort actions.

Inflation Targeting during Financial Turbulence

The trouble with this usual way of thinking is that it leads us to ignore the fact that in any circumstances, tranquil or otherwise, the linkages between policy interest rates and aggregate demand are indirect and work through the financial system. This intellectual shortcut is never quite safe, but it becomes positively dangerous in times of financial turbulence. As recent experience has shown all too clearly, policy rates then become unreliable indicators of what private sector borrowers must actually pay, while loans at any price become harder or even impossible to get for some. At such times, policy needs to respond to developments within the financial system, not necessarily in order to change the monetary conditions impinging on expenditure decisions in the real economy (though such a change might be called for) but perhaps merely to preserve their pre-existing stance. Under inflation targeting, generous provision of liquidity and lower policy interest rates are complementary measures during crises, as they were not under commodity convertibility.

For an inflation-targeting central bank, then, there is no inherent contradiction between its obligations to preserve financial stability and its longer-term goals. Were it blindly to follow rules of thumb derived from past experience about the level of the overnight rate appropriate to keep inflation on target when asset markets become turbulent, and were it to hesitate about providing lender-of-last-resort support to the system, the central bank would quickly end up presiding over a monetary contraction and a real economic downturn that would cause the inflation target to be undershot. This would be true, furthermore, whether the problems had originated at home, as with the Fed during the past year, or abroad, as with the Bank of Canada, or even whether they were the consequence of one of those rare asset market bubbles that are not prefigured by an increase in inflation.

Even so, we must add two qualifications here. First, and obviously, too much (or too little) stimulus for the economy's medium-term good can be imparted by lender-of-last-resort activities and associated cuts in policy interest rates. The automatic checks on the creation of moral hazard that were built into regimes based on commodity convertibility are not present under inflation targeting, where more is left to the judgment of policymakers. When judgment is in play, misjudgment can occur all too easily, as the overexpansionary nature of US policy after 2001 suggests.

Second, and closely related, the chances that an overexpansionary policy miscalculation will do real damage depend on, among other things, the level of inflation expectations and the firmness with which they are held when stimulus is needed to cope with financial instability. Recent experience is once again instructive. When the Bank of Canada began to cope with the recent bout of market turbulence, domestic inflation expectations were firmly anchored by an explicit and credible target, and the inflation rate itself was well within the target's margin of error. In the United States, on the other hand, the Fed had no firm targets to begin with, and faced actual inflation that had been running at an uncomfortably high rate for some time. It is hard to believe, therefore, that the Fed recently has had as much room for expansionary error as has the Bank of Canada.

Implications for Canada's 2011 Decisions

In this *Commentary*, we have argued that well-defined and credible inflation targets help to avoid asset market instability. Moreover, when such instability does arise, there is no policy disconnect implicit in coping with it through lender-of-last-resort operations while continuing to pursue stable inflation for the longer run. We have further suggested that expectations that lender-of-last-resort facilities will be deployed promptly in the event of instability also might help to reduce its severity, and even the likelihood of its occurring at all.

Nevertheless, even a regime that combines successful inflation targeting with confidently held expectations about the availability of lender-of-last-resort facilities cannot offer complete protection against locally generated asset market problems, let alone those originating abroad. The flexible

exchange rate that is inflation targeting's necessary accompaniment is an excellent device for facilitating the real economy's smooth adjustment to relative price shocks originating in world markets for goods and services, but it does not shield Canadian financial institutions from upheavals in the international financial markets into which they are so deeply integrated.

A Broader Mandate for Monetary Policy

When it comes to the Bank of Canada's 2011 agreement with the minister of finance, our conclusions imply, first, that, desirable though it might be to continue to put price-level behaviour at the centre of monetary policy, consideration should also be given to recognizing explicitly the Bank's lender-of-last-resort responsibilities. Such an acknowledgement would ratify the status quo, rather than add anything to the Bank's tasks, but, appropriately drafted, it could help to avoid any repetition of the public confusion about the Bank's policy priorities that the events of last year generated, and make it easier for the Bank to mitigate future financial market problems. The acknowledgment should state that, although a well-behaved price level helps to promote asset market stability, it does not ensure it. It should also make clear that, to the extent coping with instability requires the creation of liquidity, this is the Bank's responsibility, which it should exercise without jeopardizing longer-term price-level goals. Such a statement surely would enhance the transparency of monetary policy in and of itself, and provide a useful reference point for ongoing discussions of the Bank's activities.

It has also been argued above, with reference to Japan in the late 1980s, and the US and UK more recently, that the behaviour of the price level, even within parameters that might define an apparently successful inflation-targeting regime, can indicate if

policy is increasing the likelihood of asset market bubbles, and that this has implications for how those parameters are set that need to be considered before 2011. This is not to say that financial stability questions are the only ones at issue here, or that others might not weigh against taking steps aimed solely at dealing with them. But they are relevant and need to be considered when choices are made concerning the price index to be targeted, its rate of increase, the margins of errors that the regime permits, and whether targets should be set for the time path of the index or simply, as now, its rate of change.

Targeting an Appropriate Price Index

Canada's current monetary policy regime targets the inflation rate of the CPI – so-called headline inflation – and recent episodes of financial instability here and elsewhere seem to confirm the wisdom of this choice. It has long been argued that the use of a broadly based and easily understood index lends transparency and credibility to an inflation-targeting regime, and reduces the chances that the authorities will miss an upturn in inflation when relative prices are changing. Recent US and UK experience has added weight to this argument, which, in the past, has usually been directed against overreliance on core indices that omit various food and energy prices.¹⁸

The UK case also shows the relevance of an index that does not omit owner-occupancy costs. Moreover, the fact that owner-occupied housing is an asset recently subject to a bubble reminds us that some commentators (see, for example, Goodhart and Hoffman 2000) have long advocated a version of the BIS doctrines discussed earlier, arguing for a monetary policy aimed at a price index that pays attention to the prices of a broad range of assets, including financial assets.¹⁹ However, our case for paying attention to housing costs is not easily

18 It should nevertheless be said explicitly that none of this argues against the use of core inflation measures as indicators of future headline inflation when policy decisions are made, so long as careful attention is given to the underlying factors that are producing differences between the two rates before policy decisions are taken. What we are arguing is that the target of policy should be headline inflation, not that each and every monthly shift in this variable should elicit a pre-programmed policy response that ignores information about how long it is likely to persist. Core inflation sometimes contains such information, and other information, too, is often available that can help policymakers distinguish between these two circumstances.

19 There are also longstanding theoretical arguments in favour of using indices that include asset prices (see Alchian and Klein 1973), which, however, do not address the important practical questions surrounding policy transparency stressed above.

extended to other assets. It is based on the observation that expenditure on shelter is a component of the current cost of living and, for owner occupiers, is visibly linked to house prices. This, we suggest, is why such expenditure is accounted for in Canada's CPI, why it is quite appropriate for the Bank of Canada to target the CPI, and why the Bank of England moved into dangerous territory when its target was switched to an index that ignored these costs. Crucially, variations in the prices of most other assets, whether financial or real, do not impinge directly on the current cost of living as consumers understand it, and to broaden the Bank of Canada's targeted index to include them would significantly reduce monetary policy's transparency to the general public. If it is believed that asset prices contain information not available elsewhere about the economy's future behaviour, however, there is nothing to prevent the Bank from using this information in making its policy decisions in exactly the same way as it currently uses core inflation measures – namely, as a sometimes useful indicator of the future behaviour of the price index whose time path it is required to stabilize.

Paying Attention to Upswings in Inflation

Also implicit in our analysis are views about the desirable level of Canada's post-2011 inflation rate and whether targets should be set for inflation itself or the time path of the price level. We suggest that, though rising inflation is not quite a necessary forerunner of asset market troubles – the United States in 1929 is the clearest counterexample to overgeneralization here – even a mild but sustained upswing can foreshadow trouble. The reason seems to be that rising inflation itself can be a symptom of the excessive credit and money creation that starts an asset bubble; in turn, this early warning property of rising inflation implies that there is something to be said for a policy framework that forces attention to be paid to such a phenomenon sooner rather than later.²⁰

On this count, then, it is worth considering a regime that is intolerant of upswings that take inflation significantly above its central target rate or, at the very least, forces the authorities to take explicit notice of them. This could be accomplished by treating the upper boundary of inflation's target range not just as an indicator of a reasonable margin of error, as it is now, but as a limit that requires a policy response – or perhaps by merely requiring a public explanation of why the bound has been reached, along the lines of the Bank of England governor's letter to the chancellor of the exchequer.²¹

Inflation versus Price Level Targets

As for the relative merits of price-level targeting and inflation targeting, it has been suggested above that asset market bubbles are associated with overestimates of the profitability of investing in particular sectors of the economy, and that the potential for such errors – which are essentially about the likely future behaviour of relative prices – increases with the duration of any bout of generally inflationary credit and money creation. If this suggestion is considered in isolation from all other considerations (which, of course, it should not be), then price-level targeting emerges as the riskier option. To see why, consider what the response of monetary policy would have to be if, starting from an “on target” position, inflation and, therefore, the price level fell below their desired paths. With an inflation target, monetary policy would have to become more expansionary than the norm for long enough to bring inflation back on track. With a price-level target, however, policy would have to be more expansionary for longer, creating more space for errors about the future course of relative prices in particular markets, whose future unwinding might then have the capacity to destabilize the financial sector.

One counterargument here is that price-level targeting should bring more stability than inflation targeting not only to long-term inflation, and expectations about it, but to the real economy as well (Ambler 2007). These conclusions, however, are derived from macroeconomic models that do not

²⁰ We are grateful to Angela Redish and Nicholas Rowe for comments that helped us considerably in clarifying this point.

²¹ It should be conceded, however, that the considerations favouring such a change might be outweighed by others – for example, by the potentially adverse effects on the policy regime's credibility of setting an overambitious upper boundary and then drawing attention to violations of it, or by the disinflationary policy bias that an asymmetrically firmer upper boundary might create.

permit investigation of the possibility of mistakes about relative prices developing against the background of apparently benign aggregate behaviour. Further work is required on these matters, because it is not clear that the greater stability of long-term price-level behaviour, whose benefits Ambler stresses, does anything to offset the tendency of a price-level-targeting regime to create more scope for short-term errors about relative prices in specific markets to occur and then get out of hand. In the meantime, it would be unwise to ignore the chance that longer upswings in inflation made possible by price-level targeting might permit a return of the type of credit cycle driven by relative price errors that characterized economic life under the gold standard. Commodity convertibility was, after all, a species of price-level targeting, as Masson and Shukayev (2008) point out.²²

Summing Up

Although it is possible that the macroeconomic stability which successful inflation targeting brings can itself increase financial markets' vulnerability to instability, markets are nevertheless right (up to a point at least) to worry less about risk under such a regime. Moreover, there should be no concern about this fact provided the central bank remains conscious of it and adapts to its effects on the transmission mechanisms through which it controls inflation. Even so, not all inflation-targeting regimes are equal when it comes to combining low and

stable inflation with well-behaved asset markets. From this point of view, particularly desirable is a regime that not only targets a broadly based price index, but also narrows the scope for long-duration, though slow, upswings of inflation to get under way unnoticed. Other factors also need to be taken into account, however, before one can reach any firm conclusions about the decisiveness of these considerations for Canada's post-2011 monetary policy regime.

Whatever decisions are made about its precise configuration, however, that regime must leave the authorities room to deal with asset market instability. Even if the chances of such problems arising for domestic reasons can be reduced by careful regulation and supervision, they cannot be eliminated, and they can all too easily be imported as well. There is more involved here than monetary policy per se: regulators and supervisors also have roles to play during crises. But the Bank of Canada's ability and willingness to act as a lender of last resort to the financial system at such times are crucial; as we have seen over the past year, the Bank understands this. It would nevertheless enhance monetary policy's transparency if the 2011 agreement were explicitly to recognize the Bank's responsibility in this regard. Since the exercise of that responsibility is quite compatible with the pursuit of longer-run goals for the behaviour of inflation, such a recognition would seem to require nothing more than a little careful drafting.

22 A number of their observations deserve serious attention, among them that the constraints of the gold standard were sufficiently strong that implicit in it was an escape clause allowing convertibility to be suspended in emergencies, with the parity thereafter perhaps being rebased; that this arrangement, widely invoked in 1914, caused severe trouble after the First World War; and that price-level targeting might take on a similar characteristic, with adverse effects on such a regime's long-term credibility.

References

- Adalid, R., and C. Detken. 2007. "Liquidity Shocks and Asset Price Boom-Bust Cycles." Working Paper 732. Frankfurt am Main: European Central Bank.
- Alchian, A., and B. Klein. 1973. "On a Correct Measure of Inflation." *Journal of Money, Credit and Banking* 5 (February): 173-191.
- Ambler, S. 2007. "Price Level Targeting and Inflation Policy: A Review." Discussion Paper 2007-11. Ottawa: Bank of Canada.
- Bagehot, W. 1873. *Lombard Street: A Description of the Money Market*. London: P.S. King & Sons.
- Bank of Canada. 2006. "Renewal of the Inflation-Control Target: Background Information." Ottawa. November.
- Baring F. 1797. *Observations of the Establishment of the Bank of England and on the Paper Circulation of the Country*. New York: Augustus M. Kelley, 1967.
- Bernanke, B., and M. Gertler. 1999. "Monetary Policy and Asset Price Volatility." Proceedings of the 1999 Jackson Hole Conference. Kansas City, MO: Federal Reserve Board of Kansas City.
- Bordo, M.D., and D.C. Wheelock. 2004. "Monetary Policy and Asset Prices: A Look Back at Past U.S. Stock Market Booms." *Federal Reserve Board of St. Louis Review* 86 (Nov./Dec.): 19-44.
- Borio, C., and Z. Haibin (forthcoming) "Capital Regulation, Risk Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?" (keynote presentation at an ECB conference on "The implications of changes in banking and finance on the monetary policy transmission mechanism," 29-30 November 2007, revised and forthcoming as a BIS Working Paper. Basel: Bank for International Settlements.
- Borio, C., and P. Lowe. 2002. "Asset Prices, Financial and Monetary Stability: Exploring the Nexus." BIS Working Paper 127. Basle: Bank for International Settlements.
- Borio, C., and W. White. 2003. "Whither Monetary and Financial Stability: The Implications of Evolving Policy Regimes." Proceedings of the 2003 Jackson Hole Conference. Kansas City, MO: Federal Reserve Board of Kansas City.
- Congdon, T. 2005. "Money and Asset Prices in Boom and Bust." IEA Hobart Paper 153. London: Institute of Economic Affairs.
- Crockett, A. 1999. "Overview: Symposium on New Challenges in Monetary Policy." Proceedings of the 1999 Jackson Hole Conference. Kansas City, MO: Federal Reserve Board of Kansas City.
- Cynamon, B.Z., D.H. Dutkowsky, and B.E. Jones. 2006. "Redefining the Monetary Aggregates: A Clean Sweep." *Eastern Economic Journal* 32 (4): 661-673.
- 2008. "Sweep-Adjusted Monetary Aggregates for the United States." Available at <http://www.sweepmeasures.com>.
- Diamond, D.W., and P.H. Dybvig. 1983. "Bank Runs, Deposit Insurance and Liquidity." *Journal of Political Economy* 91 (3): 412-419.
- Engert, W., T. Gravelle, and D. Howard. 2008. "The Implementation of Monetary Policy in Canada." Discussion Paper 2008-9. Ottawa: Bank of Canada.
- Engert, W., J. Selody, and C. Wilkins. 2008. "Financial Market Turmoil and Central Bank Intervention." *Financial System Review* (Bank of Canada) (June): 71-78.
- Freedman, C., and C. Goodlet. 2007. "Financial Stability: What It Is and Why It Matters." C.D. Howe Institute Commentary 256. Toronto: C.D. Howe Institute.
- Goodhart, C.A.E., and B. Hoffman. 2000. "Do Asset Prices Help Predict Consumer Price Inflation?" *Manchester School* 68 (supplement): 122-149.
- Hawtrey, R. 1932. *The Art of Central Banking*. London: Longman Group.
- Laidler, D. 2003. "The Price Level, Relative Prices and Economic Instability: Aspects of the Inter-war Debate." BIS Working Paper 136. Basel: Bank for International Settlements.
- 2004. "Central Banks as Lenders of Last Resort – Trendy or Passé?" EPRI Working Paper 2004-08. London, ON: University of Western Ontario, Economic Policy Research Institute.
- Laidler, D., and S. Aba. 2000. "It's Time to Ignore Core Inflation." C.D. Howe Institute Backgrounder 45. Toronto: C.D. Howe Institute.
- Leijonhufvud, A. 1968. *On Keynesian Economics and the Economics of Keynes*. Oxford: Oxford University Press
- 1982. *Information and Co-ordination*. Oxford: Oxford University Press.
- Macklem, T. 2001. "A New Measure of Core Inflation." *Bank of Canada Review* (Autumn): 3-12.
- Masson, P., and M.D. Shukayev. 2008. "Are Bygones not Bygones? Modeling Price Level Targeting with an Escape Clause and Lessons from the Gold Standard." Toronto: University of Toronto, Rotman School of Management. Mimeo.
- Milne, Frank. 2008. "Anatomy of the Credit Crisis: The Role of Faulty Risk Management Systems." C.D. Howe Institute Commentary 269. Toronto: C.D. Howe Institute.
- Minsky, H. P. 1982. *Can "It" Happen Again? Essays on Instability and Finance*. Armonk, NY: M.E. Sharpe.
- Mishkin, F. 2008. "Does Stabilizing Inflation Contribute to Stabilizing Economic Activity?" NBER Working Paper 13970. Cambridge, MA: National Bureau of Economic Research.

- Reinhart, C., and K. Rogoff. 2008. "Is the U.S. Sub-Prime Financial Crisis So Different? An International Historical Comparison." Working paper. Cambridge, MA: Harvard University.
- Stock, J., and M. Watson. 2002. "Has the Business Cycle Changed and Why?" NBER Working Paper 9127. Cambridge, MA: National Bureau of Economic Research.
- Thornton, H. 1802. *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain*. London: J. Hatchard and Mssrs. F & C. Rivington.
- Walsh, C. E. 2008. "Inflation Targeting: What Have We Learned." Bank of Canada 2008 John Kuzsck Memorial Lecture. University of California at Santa Cruz. Mimeo.
- Wicksell, K. 1898. *Interest and Prices*. (Translated by R. F. Kahn for the Royal Economic Society, London: Macmillan. 1936.)
- Woodford M. 2002. *Interest and Prices*. Princeton, NJ: Princeton University Press.

C.D. Howe Institute Commentary© is a periodic analysis of, and commentary on, current public policy issues. Barry Norris and James Fleming edited the manuscript; Heather Vilstus prepared it for publication. As with all Institute publications, the views expressed here are those of the author and do not necessarily reflect the opinions of the Institute's members or Board of Directors. Quotation with appropriate credit is permissible.

To order this publication please contact: Renouf Publishing Company Limited, 5369 Canotek Road, Ottawa, Ontario K1J 9J3; or the C.D. Howe Institute, 67 Yonge St., Suite 300, Toronto, Ontario M5E 1J8. The full text of this publication is also available on the Institute's website at www.cdhowe.org.

- December 2008 Dachis, Ben, Gilles Duranton, and Matthew A. Turner. *Sand in the Gears: Evaluating the Effects of Toronto's Land Transfer Tax*. C.D. Howe Institute Commentary 277.
- December 2008 Richards, John, Jennifer Hove, and Kemi Afolabi. *Understanding the Aboriginal/Non-Aboriginal Gap in Student Performance: Lessons From British Columbia*. C.D. Howe Institute Commentary 276.
- November 2008 Charlebois, Sylvain, and Richard Pedde. "A Bushel Half Full: Reforming the Canadian Wheat Board." C.D. Howe Institute e-brief.
- November 2008 Dodge, David A. "Central Banking at a Time of Crisis and Beyond: A Practitioner's Perspective." C.D. Howe Institute Benefactors Lecture.
- November 2008 Laurin, Alexandre, Finn Poschmann, and Robin Banerjee. "International Policy Responses to the Financial Crisis: A Canadian Perspective." C.D. Howe Institute e-brief.
- November 2008 Pierlot, James. *A Pension in Every Pot: Better Pensions for More Canadians*. C.D. Howe Institute Commentary 275.
- October 2008 Busby, Colin. "Fixing a Persistent Problem: Canada's Regional Pockets of Unemployment." C.D. Howe Institute e-brief.
- October 2008 Richards, John. "Closing the Aboriginal/non-Aboriginal Education Gaps." C.D. Howe Institute Backgrounder 116.
- October 2008 Adler, Matthew. "Stumbling Forward on Trade: The Doha Round, Free Trade Agreements, and Canada." C.D. Howe Institute e-brief.
- October 2008 Card, David, Martin Dooley, and A. Abigail Payne. "School Choice and the Benefits of Competition: Evidence from Ontario." C.D. Howe Institute Backgrounder 115.
- September 2008 Stapleton, John, and Richard Shillington. "No Strings Attached: How The Tax-Free Savings Account Can Help Lower-Income Canadians Get Ahead." C.D. Howe Institute e-brief.
- September 2008 Alexandroff, Alan S., Gary Clyde Hufbauer, and Krista Lucenti. *Still Amigos: A Fresh Canada-US Approach to Reviving NAFTA*. C.D. Howe Institute Commentary 273.
- September 2008 Chen, Duanjie, and Jack Mintz. "Still a Wallflower: The 2008 Report on Canada's International Tax Competitiveness." C.D. Howe Institute e-brief.
- September 2008 Dungan, Peter, Jack Mintz, Finn Poschmann, and Thomas Wilson. *Growth-Oriented Sales Tax Reform for Ontario: Replacing the Retail Sales Tax with a 7.5 Percent Value-Added Tax*. C.D. Howe Institute Commentary 273.
- September 2008 Dachis, Benjamin. "No Free Ride: The Cost of Essential Services Designation." C.D. Howe Institute e-brief.
- September 2008 Cockfield, Arthur, J. *Finding Silver Linings in the Storm: An Evaluation of Recent Canada-US Crossborder Tax Developments*. C.D. Howe Institute Commentary 272.
- August 2008 Johnson, David. "Heads of the Class: A Comparison of Ontario School Boards by Student Achievement." C.D. Howe Institute e-brief.
- August 2008 Hogg, Peter W. "A Question of Parliamentary Power: Criminal Law and the Control of Greenhouse Gas Emissions." C.D. Howe Institute Backgrounder 114.
- August 2008 Kamstra, Mark, and Robert J. Shiller. *The Case for Trills: Giving Canadians and their Pension Funds a Stake in the Wealth of the Nation*. C.D. Howe Institute Commentary 271.

SUPPORT THE INSTITUTE

For more information on supporting the C.D. Howe Institute's vital policy work, through charitable giving or membership, please go to www.cdhowe.org or call 416-865-1904. Learn more about the Institute's activities and how to make a donation at the same time. You will receive a tax receipt for your gift.

A REPUTATION FOR INDEPENDENT, NONPARTISAN RESEARCH

The C.D. Howe Institute's reputation for independent, reasoned and relevant public policy research of the highest quality is its chief asset, and underpins the credibility and effectiveness of its work. Independence and nonpartisanship are core Institute values that inform its approach to research, guide the actions of its professional staff and limit the types of financial contributions that the Institute will accept.

For our full Independence and Nonpartisanship Policy go to www.cdhowe.org.

C.D. Howe Institute
67 Yonge Street
Toronto, Ontario
M5E 1J8

Canadian Publication Mail Sales
Product Agreement #40008848