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The Bank of Canada and Financial Stability: A New Mandate?

Calls for adding an explicit financial stability objective to the Bank's mandate are motivated by a desire to avoid financial crises. Policymakers need to be aware that such views are sometimes based on erroneous assumptions.

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THE STUDY IN BRIEF

In 2016, the Bank of Canada (BoC) and the government agreed to renew the 2 percent inflation target for five more years. The Bank's own research concluded that it might be beneficial to show flexibility in responding to the build-up of financial imbalances. Recent history has shown that such conditions can produce asset-price booms that, once the inevitable bust occurs, may trigger a financial crisis. If financial imbalances are equated with greater risks to financial stability it is natural to ask whether this could conflict with the Bank's mandate of targeting headline inflation with a plus or minus 1 percent tolerance range. We conclude that the Bank of Canada's focus on price stability should not change. However, the Bank ought to be provided with greater latitude to become more forward-looking in highlighting potential threats, both domestic and foreign, to financial stability.

We marshal historical and empirical evidence to make our case. A major impediment to burdening the BoC with additional responsibilities to maintain financial stability is that there is disagreement not only about when financial instability erupts, not to mention the form this instability can take, but also about its overall economic impact. Although calls to increase the burdens placed on central banks have become more widespread in recent years at the international level, policymakers also need to be made aware that such views are sometimes based on erroneous assumptions. These include:

- (i) *All financial crises are the same.* They are not.
- (ii) *We know the size, timing and spillovers from financial crises.* There is no one-size-fits-all response to financial crises.
- (iii) *Financial stability policy is capable of being forward-looking.* Unlike monetary policy, which has been forward-looking for more than two decades, there is little evidence yet that the same is currently feasible to maintain future financial stability.

Any renewal of the Bank of Canada's inflation target, while explicitly acknowledging the Bank's role as one of several agencies responsible for the maintenance of financial stability, should not confuse the public by adding the burden of meeting a goal it cannot reasonably achieve on its own. Unlike inflation, which inflation-targeting central banks have managed to control within tolerance ranges for more than two decades, financial stability requires a much wider set of tools. If the central bank were to become responsible for these tools, this would bring the institution dangerously close to making political-style decisions.

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“If history repeats itself, and the unexpected always happens, how incapable must Man be of learning from experience!” – George Bernard Shaw (1948)

Discussions about the role of financial stability in the monetary authority’s mandate are as old as central banking.

In October 2016, when the Bank of Canada (BoC) and the government agreed to renew the 2 percent inflation target for five more years, the Bank’s own research concluded that it might be beneficial to show some flexibility in responding to the build-up of financial imbalances.¹ After all, recent history has shown that such conditions can produce asset-price booms that, once the inevitable bust occurs, may trigger a financial crisis.² If financial imbalances are equated with greater risks to financial stability,

however, it is natural to ask whether this could conflict with the Bank’s mandate of targeting around 2 percent in headline inflation as measured by the Consumer Price Index (CPI), with a plus or minus 1 percent tolerance range.

There was no explicit statement at the time of the inflation target renewal in Canada about whether, or for how long, this core principle of monetary policy could be set aside to counter any threat to financial stability.³ Equally important,

We are grateful to Jeremy Kronick and the reviewers of this *Commentary*. They include Phil Howell, David Laidler, David Longworth, Angelo Melino, John Murray, Mark Zelmer and anonymous reviewers. They provided penetrating and, at times, highly critical comments. Clearly, the issue of any changes to the Bank of Canada’s mandate elicits a wide variety of opinions. Indeed, ours do not necessarily reflect those of the C.D. Howe Institute or the NBER. We retain responsibility for any errors and the views expressed.

- 1 The Bank of Canada’s statutory mandate is defined in law (<https://laws-lois.justice.gc.ca/PDF/B-2.pdf>) as: “WHEREAS it is desirable to establish a central bank in Canada to regulate credit and currency in the best interests of the economic life of the nation, to control and protect the external value of the national monetary unit and to mitigate by its influence fluctuations in the general level of production, trade, prices and employment, so far as may be possible within the scope of monetary action, and generally to promote the economic and financial welfare of Canada....” In practical terms, this has been operationalized in terms of an inflation–target agreement renewed periodically.
- 2 A financial imbalance is the finance counterpart of an imbalance in the trade of goods and services (a trade surplus or deficit), though the former is more unambiguously pejorative than the latter. When asset prices appear to deviate too far away or for too long from fundamentals (i.e., observable factors that ought to drive the value of an asset), policymakers will refer to the situation as an imbalance. These developments have also generated the so-called “lean versus clean” debate, which asks whether monetary policy ought to strike pre-emptively to head off asset-price booms (lean) as opposed to cushioning the economic costs stemming from asset-price busts (clean). The debate is not new and predates the last financial crisis. See, for example, Bernanke and Gertler (2001) who take the view that it is preferable to pick up the pieces, as it were, when a financial bubble bursts, while Cecchetti, Genberg, Lipsky, and Wadhvani (2000) prefer a more activist approach when dealing with asset-price inflation.
- 3 The renewal document (Bank of Canada 2016, p. 25, https://www.bankofcanada.ca/wp-content/uploads/2016/10/background_nov11.pdf) states that “some flexibility” is needed, without being explicit about the degree of flexibility required. Interestingly, the 2006 inflation target renewal published before the international financial crisis of 2008–09 (Bank of Canada 2006, p. 9; https://www.bankofcanada.ca/wp-content/uploads/2010/06/background_nov06.pdf) contained, almost verbatim, the same language found in later renewal agreements.

there was no explicit definition of “financial stability.” Looking abroad, Siklos (2017), for example, described how different central banks interpret that concept. Some central banks focus on the dangers associated with systemic risks, while others worry about the role of financial innovation or the spread of risks from shadow banks to the more traditional financial intermediaries. Nevertheless, concerns about how to maintain financial stability are now front and centre, including in Canada, especially since some central banks have seen their role expand beyond traditional monetary policy (Lombardi and Siklos 2016).⁴

A major impediment to addressing the issue, however, is that there is disagreement not only about when financial instability erupts, not to mention the form this instability can take, but also about its overall economic impact. We are left with, “We know it when we see it,” as one former Federal Reserve district president remarked a few years ago (Hoenig 2016).

Adding an explicit financial stability objective to the Bank of Canada’s existing mandate is motivated by a desire to avoid financial crises. Although calls to do so have become more widespread in recent years at the international level (Siklos 2017), policymakers also need to be made aware that such views are sometimes based on erroneous assumptions. These include:

- (i) *All financial crises are the same.* In reality, they are varied (banking, currency and debt) and stem from a variety of sources (asset price booms

and busts, contagion) that need not always lead to a financial crisis. Even if empirical evidence suggests that excessive credit growth is a predictor of financial crises (Jordà, Schularick, and Taylor 2011, Schularick and Taylor 2012), policies to restrain credit exist, and it is up to the politicians to use available instruments to control its growth. History may not be kind to politicians who fail to heed this piece of advice, but it is far from clear why an autonomous institution responsible for monetary policy ought to be charged with implementing policies that have distributional effects.⁵

- (ii) *We know the size, timing and spillovers from financial crises.* In reality, the effects are heterogeneous over time and across countries. To be sure, there is agreement over the consequences of a few major historical financial crises. However, this does not explain what happens in most financial crises. More importantly, there is no one-size-fits-all response to these crises.
- (iii) *Financial stability policy is not yet capable of being forward-looking.* Unlike monetary policy, which has been forward-looking for more than two decades, there is, as we shall see, little evidence yet that the same is currently feasible when it comes to maintaining future financial stability.

The BoC’s own research argues that “...financial stability objectives should be primarily met with a strong financial regulatory and supervisory framework that has the necessary microprudential and macroprudential policies and tools (Bank of Canada 2016, p. 4).” This reminds us that responsibility for ensuring financial stability does not lie solely with the BoC, but that such a mandate

4 It is too early to assess successes and failures resulting from this development. However, the changing role of central banks is reflected in the rise of macroprudential policies, the umbrella term used to describe the set of instruments available to central banks and other agencies to prevent financial instability. In 2018, the International Monetary Fund (IMF) inaugurated an annual survey of international practices. See <https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/04/30/pp043018-imf-annual-macroprudential-policy-survey>.

5 A good example of the potential distributional consequences is the build-up and bursting of the US housing bubble. See, for example, Albanesi, De Giorgi, and Nosal (2017). The policy implications of their findings would force any central bank into making uncomfortable distributional decisions.

is the joint responsibility of several institutions.⁶ Although financial stability is equated with resilience in the face of financial shocks, the latest renewal document, written after the so-called global financial crisis of 2008-09, does not provide an explicit definition of the concept (Bank of Canada 2016). This is not surprising as economists continue to grapple with this question (Mayes 2019).

The role of the monetary authority in maintaining financial stability has evolved from the lender-of-last-resort function, defined as heading off a banking panic⁷ and viewed historically as a *raison d'être* of central banking (Bordo 1990), to one where systemic financial risks of all kinds, including from non-bank financial intermediaries (i.e., shadow banks), are now considered fair game for the central bank to tame. This turn of events highlights concerns over the potential overburdening of the monetary authority.

The discomfort with adding financial stability to a central bank's existing monetary policy goal(s) also stems from the pre-financial crisis view that monetary policy can deliver price stability and that this objective, combined with vigilance and prompt action in the face of a financial crisis, is the best way to clearly define the mission of a central bank. The global financial crisis has threatened this consensus but, so far, there is no agreement about rules and policies that should be adopted to deal with financial imbalances (Bordo 2018).

Any renewal of the Bank of Canada's inflation target, while explicitly acknowledging the Bank's role as one of several agencies responsible for the maintenance of financial stability, should not confuse the public by adding the burden of meeting a goal it cannot reasonably achieve on its

own. Unlike inflation, which, as discussed below, inflation-targeting central banks have managed to control within tolerance ranges for more than two decades, financial stability requires a much wider set of tools. If the central bank were to become responsible for these tools, this would bring the institution dangerously close to making political-style decisions. For example, restrictions on the type and size of mortgage loans, or the make-up of risky versus riskless assets in portfolios, represent decisions not historically associated with monetary policy and central banking, at least in advanced economies. The adage that the Bank of Canada ought to "stick with its knitting" (Laidler 2004) remains the correct advice.

The rest of this *Commentary* paper is organized as follows. Since the potential financial-stability mandate of central banks is a global issue, as well as one that has been debated for decades, our strategy is to marshal international evidence over a long historical period with a Canadian flavour. We first explore varied notions of the financial stability concept, the heterogeneous nature of past financial crises, and why their aftermath can place central banks in a precarious position.

We then move on to provide some empirical evidence of the connection between financial crises and economic performance, highlighting the need not to confuse financial crises of the kind experienced in 2008-09 with those that preceded it. We conclude by proposing that while the Bank of Canada's focus on price stability should not change, the Bank ought to be provided with greater latitude to become more forward-looking in highlighting potential threats, both domestic and foreign, to financial stability.

6 The Bank of Canada provides a list of provincial, federal and even international agencies it collaborates with to both monitor and respond to shocks that can threaten financial stability. See <https://www.bankofcanada.ca/core-functions/financial-system/financial-system-committees>.

7 That is, an attempt by members of the public to convert their bank liabilities into cash.

DID THE PENDULUM SWING TOO FAR? RESPONSE AND RECOVERY FROM FINANCIAL CRISES

Some Preliminaries

The most recent financial crisis led to an outpouring of books and articles.⁸ At least two factors explain the difference between earlier financial crises and the one triggered by events in global financial markets beginning in 2007. First, the output fallout from the crisis was truly global in nature. Second, it originated in advanced economies. Figure 1 makes those points. Annual rates of change in real GDP are shown for the world in total along with those of the advanced economies (AE), the G7, and emerging and developing economies (EME). The period shown is roughly from the start of the so-called Great Moderation in the mid-1980s (Bernanke 2004) to 2018.

While global growth shrank in 2009, only the G7 and AE experienced negative growth rates in 2008 and 2009. Nevertheless, it is striking that growth in all types of economies dropped sharply and at the same time. Notice also that, as growth rates between EME and AE began to diverge beginning around 2000, differences in growth rates after the crisis, while still better for the EME, remained essentially constant thereafter. In addition, countries with fewer macroeconomic and financial vulnerabilities pre-crisis fared much better than

others with similar levels of development (IMF 2010, and Bordo and Siklos 2019).

The foregoing arguments are relevant for the Canadian case since the mandate of a central bank, and its capacity to fulfill promises, is influenced by the overall economic and institutional environment in which it operates. Therefore, in what follows, we focus on the historical experience of a small set of advanced economies.

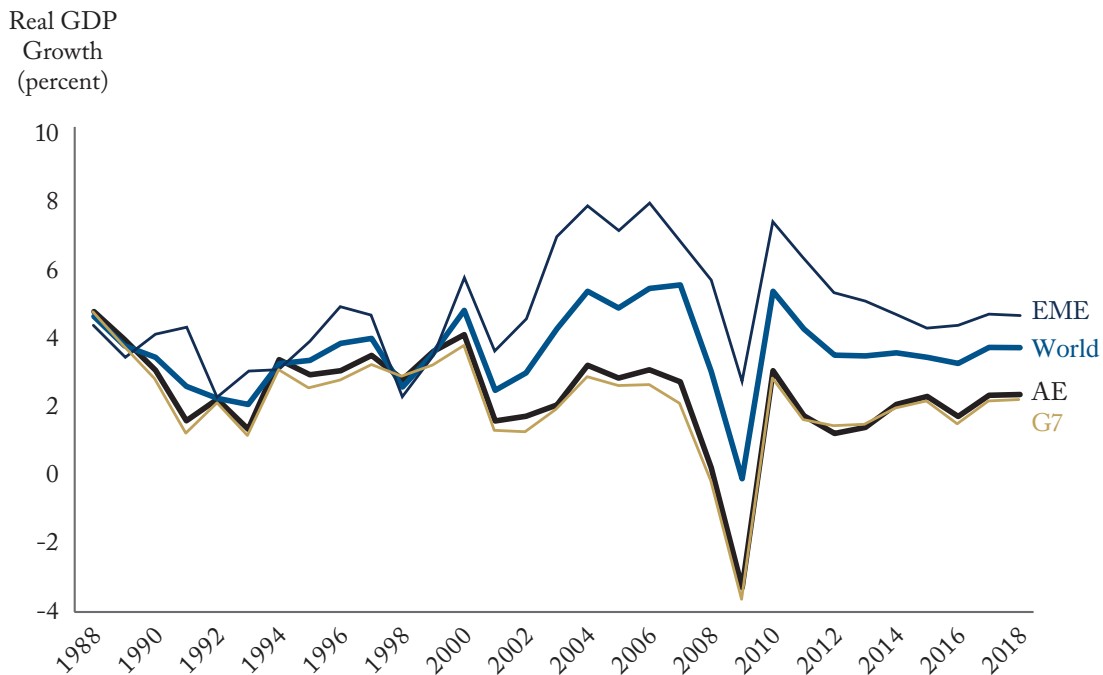
Financial Crises and Central Banks: Definitions, Challenges

Because the historical incidence of financial crises in any one advanced economy is small, we consider the macroeconomic and financial experience in 10 AE, going back to the late 19th century. This approach also permits us to examine a cross-section of central banks that were created for a variety of reasons, including political motives. For example, the US Federal Reserve came into existence with a financial stability motive (Reinhart and Rogoff 2013). Typically, the central banks considered in this study were created not to manage inflation or mitigate the amplitude of business cycles but in response to the economic havoc in the wake of financial crises, as well as to introduce a lender of last resort, again in response to a desire to reduce the likelihood of financial instability.⁹ The countries examined are: Canada (CAN 1934), Switzerland (CHE 1907), Germany (DEU 1876), France (FRA

8 A selective short list would include Reinhart and Rogoff (2009), Blinder (2013), Bernanke (2015), King (2016), Mody (2018) and Tooze (2018). Accompanying such book-length manuscripts are numerous articles that have shown historical links with earlier crises, lessons to be learned from the latest crisis and overviews of the consequences of the events that unfolded, especially between 2007 and 2010. Again, a selective list would include Romer and Romer (2017), Bordo (2008, 2018) and Lombardi, Siklos and St. Amand (2018).

9 In a few other cases (e.g., Sweden, the UK, Spain), the need to finance expenditures that had to be financed by the state also figures prominently as a motivating factor in establishing a monetary authority. There was likely some political element as well, since economic downturns raise pressure on the political authorities.

Figure 1: Real GDP Growth Rates in Different Regions of the World



Notes: AE are advanced economies; G7 are the Group of 7 advanced economies; EME are emerging and developing economies. Definitions follow the IMF’s World Economic Outlook database from <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>.

Source: Annual data from the International Financial Statistics, Washington, D.C.: International Monetary Fund, retrieved January 2019 for the 1988-2018 period.

1800), Great Britain (GBR 1694), Italy (ITA 1893), Japan (JPN 1882), Norway (NOR 1816), Sweden (SWE 1668) and the US (USA 1913). (The ISO country code and year the central bank was established are in parenthesis.)

Financial crises come in various forms. A list would include, in rough order of importance, banking, currency, sovereign debt and inflation variability. Leading causes include: asset-price-

boom busts (commodity prices, property prices and equity markets), contagion from other countries, and liberalization (innovation) in financial systems.¹⁰

Inflation, defined as a sustained rise in the average of consumer prices, is not a financial phenomenon, per se, although variability in inflation can still be associated with financial instability (Bordo and Wheelock 1998). Indeed,

10 We highlight these crises because of their potential for directly impacting monetary policy. To conserve space, we ignore fiscal crises even though these may well have monetary implications, as is clear, for example, from a retrospective of the Eurozone crisis (Mody 2018, Bordo and Meissner 2016).

a broad consensus exists that excessive inflation represents an economic threat.¹¹ Inflation, of course, can come in various forms. Thus, a sharp drop in equity prices can also be associated with an episode of financial instability (Mishkin and White 2008).¹² Similarly, booms and busts in housing prices are also associated with financial crises (Burnside, Eichenbaum, and Rebelo 2016).

Banking crises are, arguably, the most frequent cause of financial crises, as these originate when one or more financial institutions fail or merge, and the consequences have systemic implications leading to direct government intervention.¹³ Hence, in what follows we focus on this type of financial crisis.

Bordo and Landon-Lane (2012) present evidence that there were only two truly global financial crises over the past century or so; namely the Great Depression of 1929-1933 and the international financial crisis of 2008-2009. Both are notable because they originated in the advanced world and were propelled by problems in the banking sector. Even the Eurozone sovereign debt crisis that dovetailed with the great financial crisis stems from weaknesses in the banking sector that spilled over into sovereign debt markets due to the so-called doom loop that ties banks to the sovereigns (Brunnermeier, James and Landau 2016, James 2012, Mody 2018).

The other forms of financial crises (currency, sovereign debt) require a trigger point or threshold beyond which it is said that an economy is in crisis. For example, a sovereign debt crisis always involves a potential debt default and is often triggered by a sudden halt to foreign capital inflows.¹⁴

Complicating the identification of these types of crises is the fact that history includes cases where one kind of financial crisis is followed by, or simultaneously triggers, another kind of crisis. For example, twin crises often consist of a banking one followed by a currency crisis, although the reverse is also possible (Eichengreen and Portes 1987).¹⁵ Moreover, in recent years triple crises involving banking, currency and sovereign debt have become an issue (Bordo and Meissner 2016).

The global nature of the last financial crisis is germane when considering any future changes to the mandate of the Bank of Canada. Specifically, policymakers in the economies where the crisis originated may have over-reacted by responding to a once-in-a-century financial crisis, as opposed to asking whether any new regime could deal with a future crisis. Unless the next financial crisis is very similar to the last one, it is not clear how current policy instruments or regulations in place today will prevent a recurrence. This is not to suggest, of course, that efforts to forestall such events should be

11 Although there have been suggestions that very low or negative inflation rates and declines in the price level (deflation) are also associated with crisis conditions, these are viewed as accompanying a financial crisis, not necessarily as the trigger for a future one (Burdekin and Siklos 2004). For example, deflation during the Great Depression was a key cause of the banking panics that occurred in many countries (Bernanke and James 1991).

12 These events arise with the following frequency since 1870 to 2015 in the 10 countries examined. USA: 16; GBR: 11; NOR: 11; SWE: 18; DEU: 27; CHE: 18; CAN: 12; ITA: 16; FRA: 16; JPN: 16.

13 Although there are subtle differences in how different authors define the onset of a banking crisis, they all involve some form of “distress” in the banking system that leads to mergers, acquisitions by stronger banks of weaker ones and direct government intervention. See Bordo and Meissner (2016, Table 1).

14 However, sudden stops generally do not affect advanced economies, especially ones able to borrow internationally in their own currency.

15 Bordo and Meissner (2016) define a banking crisis as one that is not followed in a year’s time by a currency and/or debt crisis.

abandoned but that the most appropriate strategy need not consist of an expansion of the Bank of Canada's current mandate.

The bottom line is that financial crises emerge from a wide variety of sources, often lead policymakers to overreact, hoping that such events will never be repeated, and usually place the central bank in the middle of efforts to, as it were, pick up the pieces. This raises the possibility that the monetary authority's mandate will promise more than it can reasonably deliver, thus setting it up to face excessive political pressure.

FINANCIAL CRISES AND CENTRAL BANK PERFORMANCE: SOME EVIDENCE

The Historical Record in Advanced Economies

The various definitions applied to financial crises make the historical record of their incidence sensitive to the chronologies used (Bordo and Meissner 2016, Figure 1), the period covered and the number of countries sampled. Figure 2 compares the historical record of the 10 developed economies in our sample, based on our preferred chronology. Panel A of the figure stacks the incidence of a financial crisis across the 10 economies. The higher the bars, the more countries simultaneously experience banking and currency crises.

Figure 2 makes three points. First, AE are not immune to financial crises, especially of the banking variety. Second, although crises and real GDP growth can be negatively correlated, the results depend on whether war years are included and the

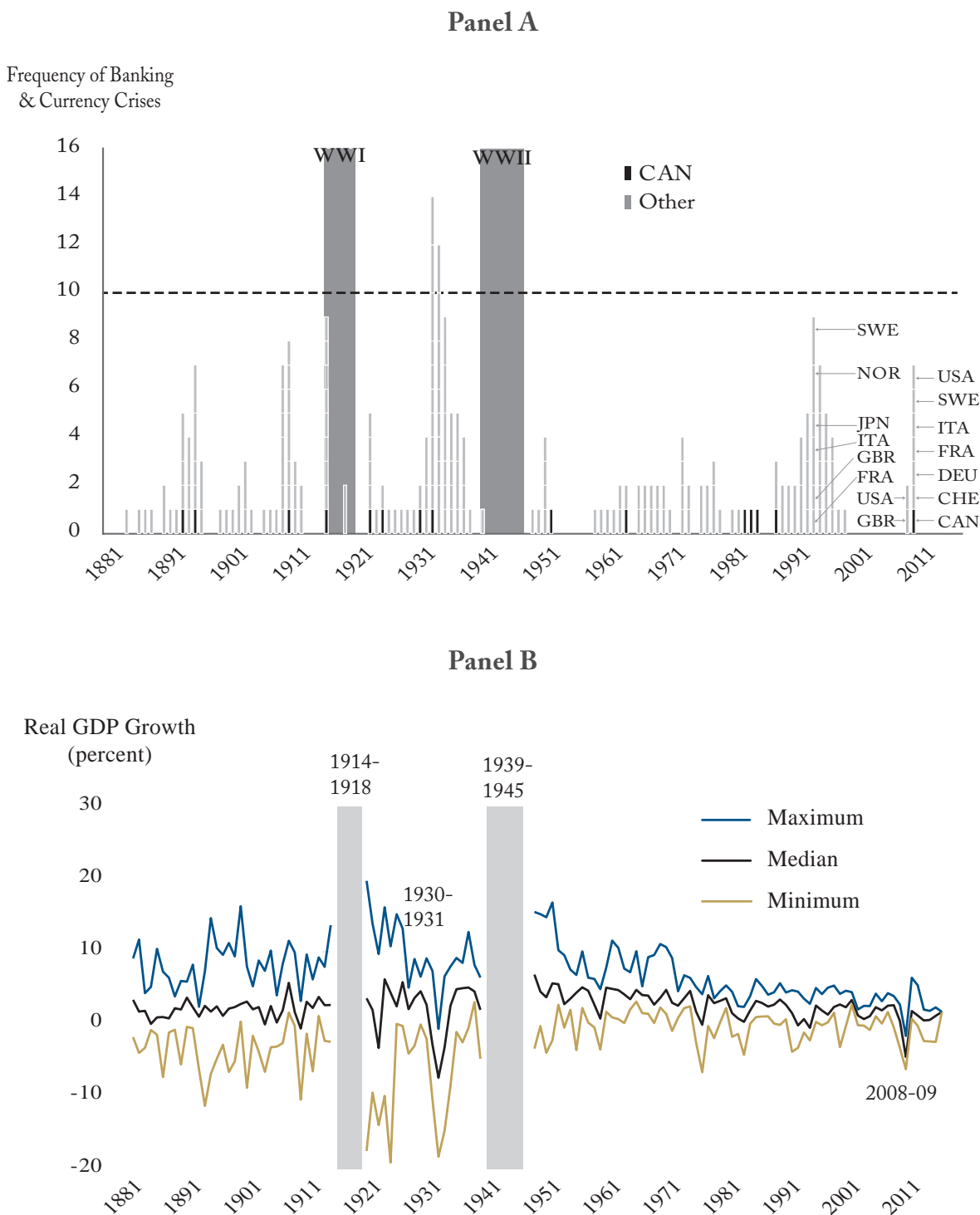
correlation is usually weak. This is illustrated by Panel B of Figure 2, which plots median, maximum and minimum real GDP growth rates for all 10 economies. Indeed, while the Scandinavian economies in our sample (i.e., Norway and Sweden) were in the throes of a banking crisis in the early 1990s, which largely explains the spike in crises around that time, economic growth was not especially hard hit across all 10 AE. However, during the 2008-09 period, which stands out as another era when financial crises reappeared and economic growth collapsed, the larger economies in the sample (i.e., US and UK) drove the sharp fall in real GDP growth, producing the global financial crisis label.

Thirdly, despite the adoption of various monetary policy regimes, ranging from the gold standard of the 19th and early 20th centuries through the Bretton-Woods-pegged regime of the post-Second World War period to the adoption of inflation control policies in the 1990s by four of our sample countries, financial crises still recurred.¹⁶ The bottom line is that there is considerable heterogeneity in the timing, form and international scope of financial crises.

Next, we turn to the inflation record. The combination of more activist and interventionist fiscal and monetary policies, together with the search for an anchor for monetary policy after the Second World War, eventually shifted central bank policies in the direction of inflation control. Inflation rates became low and stable once the Bretton Woods era was fully in place at the end of the 1950s but, by the mid-1960s, inflation began to ratchet up as central banks both accommodated

16 The gold standard is generally dated as being in place between the early 1800s until shortly before the Second World War (Bordo and Schwartz 1984, Bordo and Kydland 1990). Meanwhile, the Bretton Woods period is generally dated as beginning in the early 1950s until the US suspended the gold-dollar link in 1972. Similarly, the four economies that adopted formal inflation targets – Canada (1991), the U.K. (1992), Norway (2001) and Sweden (1993) introduced them between the early 1990s and 2000s.

Figure 2: The Incidence of Financial Crisis and Economic Growth in 10 Advanced Economies Since 1880



Notes: For a full country breakdown by year see [online appendix](#). The definition of a financial crisis is provided in the main body of the *Commentary*.

Source: Data for Panel A of the Figure are from Bordo and Meissner (2016). Data for Panel B are from Bordo and Siklos (2016). Data are annual for the 1870-2015 period.

expansionary fiscal policy and manipulated the Phillips curve trade-off (between inflation and employment) to maintain full employment (Bordo and Orphanides 2013).

The oil price shocks of the 1970s were both an endogenous response to the 1965-1982 Great Inflation and an exacerbating factor. In the end, the Great Inflation was brought under control by the tight monetary policy strategies of US Federal Reserve Chair Paul Volcker beginning in 1979, along with similar policies adopted in the UK and Canada. In the 1970s and 1980s, through fits and starts, policymakers tried to control inflation through limiting exchange rate movements and targeting money growth, but both approaches were met with limited success (Bernanke and Mishkin 1992). By the early 1990s, the desirability of price stability, for example via targeting inflation, was thought to be the best way to anchor inflation expectations as long, of course, as the targets were credible. Hence, the drive to enhance central bank transparency, together with an increase in accountability.¹⁷

The combination of these developments led to lower and more stable inflation rates than at almost any other time in history (Bordo and Schwartz 1999, Benati and Goodhart 2010). While median inflation rates were low by historical standards during the heyday of the gold standard in the late 19th and early 20th centuries, they were volatile, and the gold standard comparison is not helpful in this case because monetary policy was passive then, unlike the activist monetary policy of recent decades.

Central Banks and Financial Stability

No common understanding about how to define financial instability exists. Hence, it becomes difficult to design effective policies to counteract it when there is no agreement about when an economy reaches such a state. Typically, financial stability refers to policies intended to build and maintain confidence in the financial system, improve a country's resilience to shocks and prevent financial disruptions or the rise of financial imbalances spilling over into the real economy.¹⁸

Even if we agree on a consensus definition of financial stability, central banks themselves have acknowledged that monetary policy can come into conflict with the objective of financial stability. In the words of the Bank of Canada (2018):

On the one hand, financial system conditions can affect the effectiveness of monetary policy. On the other hand, monetary policy can contribute to the build-up of financial imbalances, thus magnifying the economic consequences of future adverse shocks and increasing the probability and severity of future crises.

Nonetheless, central banks have arguably not been deaf to concerns about financial stability, even though their mandate increasingly centred on price stability. There was also hope that low and stable inflation rates would create an environment that ensures financial stability even if proponents of such a view did not explicitly view this link as causal. Siklos (2002, Table 3.6), which was written several years before the global financial crisis, suggests that financial stability concerns led to changes in central bank statutes in several advanced economies during the 1990s, including

17 Another important contributor to this outcome was greater central bank autonomy. Although there is a consensus that improvements in inflation control were facilitated by more independent central banks, this relationship remains somewhat controversial. See, for example, Cukierman (2008), Siklos (2008), Cargill (2014) and Parkin (2014).

18 Siklos (2017, Table 6.2) provides a long list of new financial-stability related language introduced by several central banks around the world since the global financial crisis.

in Canada and a majority of the other economies considered in this *Commentary*.¹⁹ There would be more changes, of course, following the financial crisis, and it is instructive to consider the nature of these changes in central bank responsibilities. The modifications made in the 1990s were, for the most part, a response to the growing speed with which financial transactions were being carried out, both domestically and around the globe. As a result, concerns were raised about the smooth functioning of payment systems and the threat this might pose in the case of a breakdown in the ability (and trust) of counterparties to clear transactions (Friedman 1999, Goodhart 2000).

Such worries eventually passed, but the appropriate responsibility for managing risks was left unresolved. A former central banker would later observe that, on the eve of the global crisis, the problem was that “...no single body was given both the resources to monitor the ebb and flow of risks within the financial system as a whole and the responsibility to deliver on that mandate” (Barwell 2013, p. 12). Beyond noting the negligence of overall risk levels in the financial system, the quote is consistent with the view that the central bank should be primarily responsible for this task, in part because it is already the lender of last resort.²⁰

The foregoing view is subject to a variety of criticisms. First, there is a potential conflict of interest within an institution that is responsible for mitigating the economic consequences of a financial crisis, while simultaneously holding power as the lender of last resort. Indeed, central banks such as the US Federal Reserve, accused of permitting lax lending practices, were quick to bail out parts of the financial system once it became clear that a crisis was underway.²¹ The so-called moral-hazard argument can, at least in theory, be overcome if effective governance arrangements are in place and function as designed. So-called best-laid plans are not a guarantee that the Chinese wall – a barrier between a central bank’s financial stability and monetary policy responsibilities – will not be breached in a time of crisis, leading to a bailout. Indeed, the emergence and growth of the shadow-banking sector is one reason that policymakers are often unable or unwilling to commit to limiting their intervention within some arbitrary ring-fence that defines the financial system.²²

Second, it remains unclear what the risks to monetary policy, and inflation, are when the risks to financial stability change over time. Indeed, in recent years a debate has emerged between those who favour leaning against the wind, while

19 The only exceptions were the US, Switzerland and Norway. By the late 1990s, the European Central Bank came into existence and replaced many, though not all, of the central bank functions with financial stability implications in Italy, Germany and France. Indeed, this was one of the reasons given for the severity of the crisis and policymakers’ slow response (James 2012, Brunnermeier, James, and Landau 2016, Mody 2018).

20 Barwell is primarily inspired by his experience in the UK where responsibility for financial stability was eventually given to a separate agency, the Financial Stability Agency (FSA), from 2001 to 2013. One of culprits in the 2008-09 financial crisis was the failure of the FSA to adequately coordinate with the Bank of England. But this is an indictment of how these institutions performed and not an argument for housing responsibility for financial stability primarily, if not solely, with the central bank.

21 A consequence was that new US legislation (*Dodd-Frank Act* of 2010) restricts the power and ability of the Fed to intervene in the event of a future financial crisis.

22 In many instances, existing regulatory frameworks, because they tend to be backward-looking, cannot anticipate the limits to the intervention of any legal authority. The US Fed’s intervention with AIG in 2008 represents one such example. See, for example, Bernanke (2015).

others argue that other instruments, for example macroprudential policy instruments, can be used to dampen excessive financial imbalances.²³ The debate remains largely theoretical as there is insufficient historical data to assess which position delivers the best economic results (Svensson 2018, Filardo, Rungcharoenkitkul 2016).

Even if policymakers can fine-tune the choice between leaning against the wind and some alternative response, there remains an important gulf between how monetary policy and financial stability objectives operate. Monetary policy's success in recent decades is due, in no small part, to a critical forward-looking component. In contrast, financial stability remains largely backward looking since, as Panel A of Figure 2 suggests, bouts of instability and financial crises erupt at irregular moments in time and spread unevenly among the advanced economies.

If the tension between inflation control and financial stability is unclear, institutions whose core concern is to seek and preserve credibility will face challenge in doing so. As Bordo and Siklos (2016, 2017, 2018) argue, the long-run historical experience, as well as more recent events, clearly demonstrate that central banks with credibility were better able to weather the consequences for inflation of the great financial crisis. Arguably, the narrow mandate of achieving price stability, such

as is the case for the Bank of Canada, generated forces to enhance both the accountability and transparency of these central banks. While a little luck also helped, in the form of years of benign economic shocks soon after inflation objectives were introduced, it is also clear that central banks sought to enhance their reputation by relying on, and by and large meeting, those inflation targets. In so doing, the banks enhanced their ability to ensure that inflation expectations were better anchored to their mandates.²⁴ As a result, the banks have secured resilience against a loss of reputation in the event targets cannot be achieved temporarily.

Five of the 10 economies in our sample formally target inflation around 2 percent (Italy, Canada, UK, Norway and Sweden). The remaining economies, while formally supportive of the goal of price stability (also around 2 percent), are not considered among the inflation-targeting group of countries.²⁵ As seen in the range of inflation rates in the inflation targeting group (Figure 3), they have consistently remained relatively close to the 2 percent objective since the early 1990s. In contrast, the non-targeting economies have recently struggled, with inflation rates well below the 2 percent level since the onset of the financial crisis. Note that two of the inflation-targeting economies in our sample, Norway and Sweden, did experience a financial crisis (twin banking and currency crises)

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- 23 The term macroprudential refers to economy-wide threats to financial stability as distinct from microprudential concerns that involve the regulation and supervision of individual financial institutions. The literature is split about the ability of so-called macroprudential instruments to substitute for what would otherwise necessitate, say, a tightening of the monetary-policy stance. See, for example, Lombardi and Siklos (2016) and references therein. The issue is not whether there is a place for macroprudential instruments but how much responsibility a central bank ought to shoulder in implementing these, as well as their effectiveness. These considerations would take us far afield and hence are not discussed further.
- 24 Good luck, in the form of an era of small shocks, helped policymakers maintain low and stable inflation (Stock and Watson 2003).
- 25 Japan is a grey area and is left out of the inflation-targeting group of countries since its adoption of a 2 percent target in 2013 is aspirational rather than formal. Indeed, reaching the 2 percent goal has, since April 2013, been delayed at least twice.

in the early 1990s, thereby illustrating the point made earlier that CPI inflation is not a financial phenomenon.²⁶

Beyond the considerations discussed above, there is another complication stemming from the tension between the inflation control and financial stability objectives raised in the Bank of Canada's medium-term research program. If there exists a financial cycle whose amplitude and duration differs from the well-known business cycle (Borio 2014), but has some predictive ability to forecast it (Mian and Sufi 2018, Borio, Drehmann and Xia 2018), then it becomes much more difficult to perform the balancing act between policies meant to avoid the build-up of financial imbalances versus the desire to use monetary policy to ensure price stability.

Asking a single institution to guarantee financial stability as well as meet an inflation target may be unrealistic and, as noted already, increases the likelihood of a future loss of credibility and reputation.²⁷ Indeed, central banks that became accustomed to using a single instrument to control inflation, namely a policy rate, point out that this strategy is unable to satisfy two different objectives.²⁸

Other instruments, namely using the central bank's balance sheet to inject liquidity into the system, while undoubtedly one of the success stories in some monetary authorities' belated response to

the financial crisis, may be difficult to use again with the same force and scope. The reasons are straightforward: so-called Quantitative Easing (QE) policies have, at times, been likened to monetary policy spilling over into the realm of fiscal policy or direct intervention in the private financial sector.²⁹ QE tools include: large-scale purchases of government bonds, especially of the long-term variety whose price may change and impact the financial position of the central bank; favourable lending terms to the private sector; the purchase of mortgage-related debt; and the purchase of private-sector shares – all are examples of how a central bank can play a role in fiscal policy and influence the functioning of the private sector. However, these kinds of activities can sit uncomfortably with the traditional mandate of central banking.³⁰

There are skeptics about the economic benefits of QE-type policies. For example, the scale of interventions has been extraordinary, amounting to trillions of US dollars in some economies, and their scope was also unprecedented. This has raised concerns about inducing distortions in financial markets (Borio and Disyatat 2010). Other concerns are that low policy interest rates and additional QE stimulus have exacerbated international spillover effects (Rajan 2014). As a result, central banks have been accused of risking the loss of their hard-earned credibility in managing inflation expectations

26 It is, however, worth noting that a convergence in inflation rates in the AE shown here, emerges by the end of 2018.

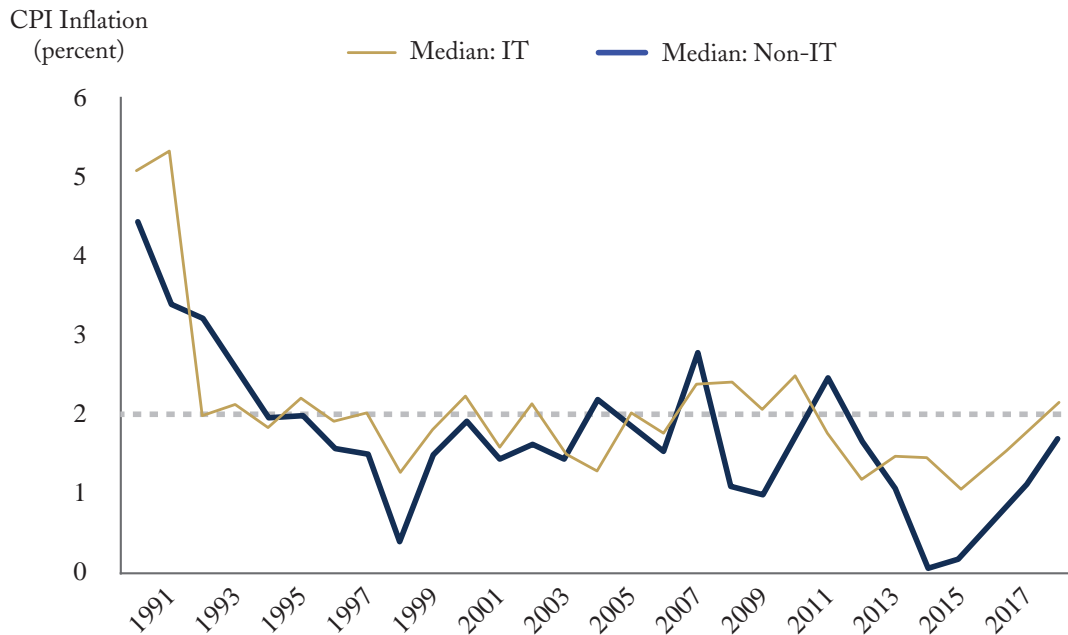
27 Note that we are not suggesting that the two objectives be met simultaneously. This does not prevent politicians or the public from expecting that the two should always be pursued, raising a difficult communication problem that is outside the scope of this *Commentary*. See, however, Born, Ehrmann and Fratzscher (2013), who delve into the issue.

28 This is known in economics as Tinbergen's rule, named after Dutch economist Jan Tinbergen, the first Nobel Laureate in economics, who demonstrated that policymakers require at least as many instruments as there are targets.

29 Canada has the good fortune of not having to cross that QE bridge yet, although the financial crisis did prompt the central bank to prepare for such an eventuality (e.g., negative policy rates), if required in future. For a review of the international record of QE to date, see, for example, Lombardi, Siklos and St. Amand (2018).

30 We are not suggesting that such interventions should never take place. Instead, the conditions under which they take place should make it clear that they are exceptional. Also helpful in this connection are agreements between central banks and governments that indemnify the banks against balance sheet losses.

Figure 3: Median Inflation in Inflation and Non-Inflation Targeting Economies Since 1990



Notes: IT means inflation targeting. IT economies are: Canada, Norway, Sweden and the UK. Non-IT countries are: France, Germany, Italy, Japan, Switzerland and the US. Data are annual for the 1990-2018 period. Source: See Figure 1 for data sources and sampling frequency.

(Taylor 2014), not to mention moving away from rules-based monetary policy of the kind promoted by the eponymous Taylor Rule toward considerable discretion via reliance on a large balance sheet.³¹

What we have shown from this historical analysis is that there are at least three critical challenges for central banks that have responsibilities for maintaining financial stability:

(i) crises are episodic events, often with unique characteristics that do not lend themselves to simple rules preventing their recurrence;

(ii) unless governance and the scope of responsibilities of a central bank burdened with the task of preventing financial crises are clearly thought through, the public's trust in the monetary authority is likely to be negatively affected; and

(iii) there remains considerable resistance to interventions by central banks in private financial markets on the scale experienced during the 2008-09 global and the Eurozone sovereign debt financial crises.

31 The Taylor Rule is an interest rate setting model proposed by economist John Taylor.

Two other issues are also worth mentioning as potential fallouts from QE-style policies. First, as the separation between fiscal and monetary policies becomes more blurred, there is a greater threat of loss of central bank autonomy. Second, devices such as forward guidance represent attempts to introduce considerably more discretion in monetary policy. Indeed, it is partly for this reason that Bank of Canada Governor Stephen Poloz came to view forward guidance as a policy to be used only in crisis conditions (Poloz 2015).

The Financial Cycle and the Business Cycle: Two Peas in a Pod?

One way of illustrating the challenge of adding an explicit financial stability mandate is to empirically contrast business and financial cycles. Business cycles are the metric used by central banks, for example, to gauge the appropriateness of the stance of monetary policy and whether there is a need to tighten or loosen it to ensure that inflation is kept under control while preventing large swings in output and inflation. In contrast, the financial cycle describes "...self-reinforcing interactions between ... risk-taking and financing constraints (Borio 2014)."

The impact of these "interactions" is reflected primarily in financial asset prices and credit growth. In principle, there is nothing to suggest that the duration or amplitude of these cycles differ; yet the proponents of financial cycles have argued, primarily through empirical evidence, that financial cycles are relatively longer in duration than business cycles. Even if this is the case, and the evidence is not yet conclusive, neither business nor financial cycles are time invariant. This alone greatly complicates the task of the central bank.³²

Consider first Panel A of Figure 4. Two sets of bars are shown. The 'C.D. Howe Institute' bars show the peak to troughs during a business cycle, the usual definition of a recession, as defined in an Institute study by Cross and Bergevin (2012). The authors are inspired by the well-known US chronology from the National Bureau of Economic Research (NBER).³³

A well-known approach that seeks to mirror judgment in the dating of business cycles with evidence based on numerical economic performance is a technique originally developed by Bry and Boschan (1971) and revived by Harding and Pagan (2002). Essentially, the technique identifies turning points in the data, such as real GDP, which are then quantified. This approach has the virtue of relying on observable economic performance while closely mimicking the NBER's chronology.³⁴ We apply this approach to several Canadian macroeconomic indicators. They are: annual retail sales data, real GDP growth rates and an employment index since the early 1930s. All of these provide useful signals of the overall state of the Canadian economy. Next, we combine the estimates by asking how often these indicators likely send the same signal about overall economic conditions; that is, serve as an indicator

32 Bekiros et. al. (2019) dispute the usual characterizations of financial cycles and business cycles with some long-run US empirical evidence. They also find that financial cycles change over time so that the claim that macroprudential and monetary policy can easily complement each other is in doubt. Also, see Lombardi and Siklos (2016).

33 "A recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in production, employment, real income, and other indicators (NBER 2008, <https://www.nber.org/cycles/dec2008.html>)."

Cross and Bergevin (2012) identify the quarter and year recessions begin and end. Here we rely on annual data. The C.D. Howe Institute also has a Business Cycle Council that reports on the stage of the business cycle in Canada.

34 The basic notion is to create an algorithm that minimizes the role of individual judgment when selecting turning points in economic activity that give rise to business (or financial) cycles. The closeness of the Bry-Boschan and NBER chronologies is considered a strength of the procedure and helps explain its wide applicability in dating business cycles.

of business cycle synchronicity.³⁵ If the C.D. Howe chronology is adopted, then our combined indicator misses the 1947 and 1951 recessions, while the same ratio identifies a recession in 1977 that the C.D. Howe Institute method does not. Otherwise, both the judgmental and quantitative indicators match quite well.

Next, we turn our attention to constructing a synchronicity indicator for variables that reflect financial conditions. They are: bank loans, public debt as a percentage of GDP, house prices, the spread between short-term and long-term government debt, also called the term spread, and equity prices. Loans, house prices and equity prices are deflated by consumer prices and, therefore, are expressed in real terms.

The results are shown in Panel B of Figure 4. Other than around the period of the Great Depression of the 1930s and again during the 2008-09 financial crisis, there is almost no overlap between the two cycles. There is only a small overlap during the early 1970s that saw the two oil price shocks and the return to floating exchange rates as the Bretton Woods era ended.

It is also clear from Figure 4 that the frequency and timing of Canadian business and financial cycles differ.³⁶ Even if policymakers agree on how and when to use a monetary-policy instrument to control inflation and mitigate business-cycle contractions, central banks also charged with a financial-stability goal must simultaneously consider whether to use macroprudential instruments to tame the financial cycle. Given the differences in the behaviour of business and financial cycles, central banks must decide whether and when policy-rate changes represent too blunt an instrument to deal with a threat to financial stability. This is a complex task and, as previously discussed, the debate on this issue remains unsettled.³⁷

The evidence presented so far is largely descriptive. We next provide more formal, though still illustrative, evidence in two steps. First, we combine the available financial variables into a smaller set of indicators, called factors, not only to simplify the discussion but because the supremacy of using an aggregate indicator of credit to represent financial conditions has not been

35 These estimates are combined using a “wiring ratio,” defined as the fraction of times pairs of the chronologies generated signal a downturn. Let S_{it} represent the incidence of signals of the number of times an indicator indicates a recession.

When a recession is identified, $S=1$. If n represents the total number of indicators (three in this case, or four if we include

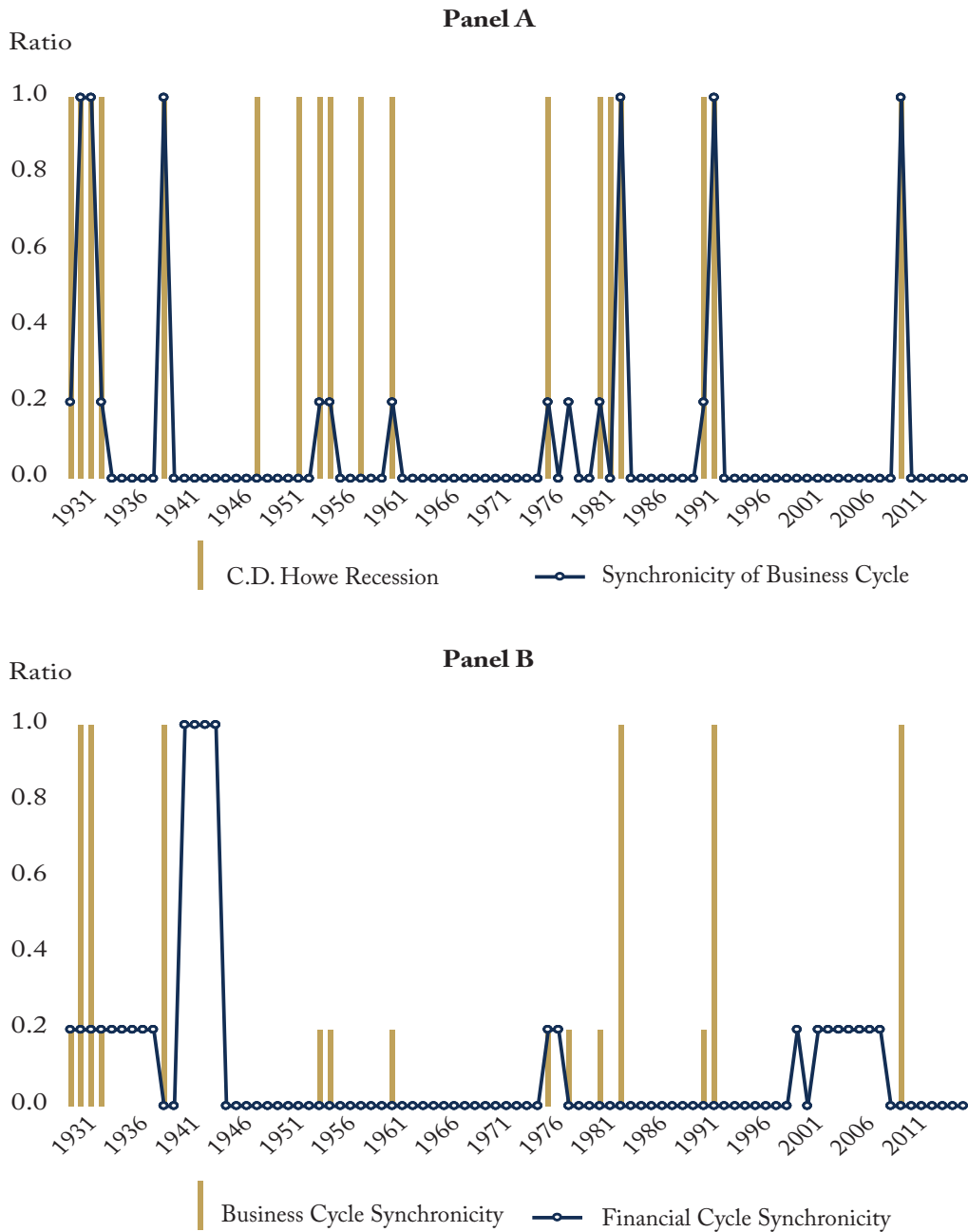
Cross and Bergevin’s chronology) and we define $r_t = \sum_{i=1}^n S_{it}/n$ and $\eta_t = \sum_{i=1}^n S_{it}$, then the wiring ratio is defined as

$w_t = \frac{\eta_t(\eta_t-1)}{n(n-1)}$. Hence, for example, if there are at most 12 pairs of indicators and half of them agree there is a downturn, then $w=0.50$. If all recession indicators point in the same direction, then $w=1$. Berge (2012) and Jordà, Schularick and Taylor (2011) also use the wiring ratio to combine recession indicators for the US, and financial crises across countries, respectively.

36 Lee-Poy (2018), using a much shorter sample, reports for Canadian data that the duration of financial cycles is twice as long as the business cycle.

37 Indeed, this dilemma is referred to as the risk-taking channel of monetary policy (Adrian, Estrella, Shin 2019) because the maintenance of, say, ultra-low interest rates to support economic activity leads to a build-up of financial imbalances that are offset via the application of macroprudential instruments.

Figure 4: Business and Financial Cycle Chronologies for Canada Since 1931



Notes: The formula for the wiring ratio is given in n. 32. For the business cycle, the variables used consist of retail sales, employment and real GDP. For the financial cycle, the variables are: (real) bank loans, public debt to GDP ratio, (real) house prices, the long-short interest rate spread and (real) equity prices. Data are for the 1929-2015 period and are annual.

Source: C.D. Howe Institute business cycle chronology from Cross and Bergevin (2012).

definitively established.³⁸ Several central banks, including the Bank of Canada, routinely perform similar calculations to gauge the level of pressure on the financial system.³⁹

Based on our estimates, it appears that two sets of factors drive the variables used to summarize financial conditions in Canada. The first set of factors is dominated by real house prices, while the second is primarily driven by the term spread on bonds, public debt to GDP and stock returns.⁴⁰ Hence, we will refer to the first factor as the property factor. The second factor, largely driven by interest rates and government debt, is accordingly referred to as the sovereign factor. The resulting series are displayed in Figure 5, together with the C.D. Howe Institute business cycle chronology indicated by vertical lines or shaded areas. Positive values for the property factor can be interpreted as akin to increases in real housing prices, while negative values indicate a fall. Similarly, a rise in the sovereign factor signals improvements in financial

conditions and the opposite when the same factor experiences a decline.

We observe that, on a few occasions, financial stress originating from the spread, government debt, and property price developments coincides with a recession. But this is not always the case. Indeed, in 1975, property prices were rising pre-recession, while the spread and debt fell. Once again, the results illustrate the challenge of simultaneously managing business and financial cycles.

Next, we ask: is there a statistical relationship between our financial-condition indicators and business cycle activity in Canada? To obtain an answer, we regress an indicator of medium-term fluctuations in real GDP, the generally accepted proxy for the state of the business cycle, against the two financial factors described above. Table 1 provides the results.⁴¹ Both factors are statistically significant, but the estimated coefficients are economically small. A rise in the property factor has a modest negative impact on real GDP two

38 The combinations are generated via a principal component analysis applied to five time series. They are: real loans, the public debt to GDP ratio, real house prices, the term spread (long-term less short-term interest rates on government bonds) and a real stock price index. All series, except the spread and public debt to GDP ratio, are expressed as rates of change. Changes in the levels of the spread and in the public debt to GDP are used. In principle, if there are n series, there are potentially $n-1$ factors. The chief benefit of principal component analysis is to reduce the number of factors to a small number that can be interpreted in terms of the variables that drive each factor. The estimated factor is said to proxy financial conditions.

39 The indicators in question are typically called financial, credit conditions or financial stress indexes. See <https://credit.bankofcanada.ca/financialindicators> for an indication of the series that are candidates for inclusion in such an index in Canada. In what follows, we rely on indicators available over a long sample. In practice, other series, available more recently, could also be added.

40 In more technical terms, the variables that combine most strongly to create the factors are referred to as the loadings. Loadings indicate, in effect, the relative importance of the variables in question, that is, their relative weight in driving factor variation.

41 We were careful to retain only the business cycle and medium-term variations in real GDP. This is done by computing two-year centered moving averages for the logarithm of real GDP and then using the Bry-Boschan algorithm referred to above to identify turning points and, therefore, identify peaks and troughs in business cycle activity. The same procedure is used for the financial variables, except that a five-year centered moving average is used (the five-year moving average translates into a 10-year horizon deemed to approximate the length of a financial cycle in Canada). Burnside, Eichenbaum and Rebelo (2016) also use the centered moving average approach to identify medium-term fluctuations in housing prices.

years into the future, while the same rise in the sovereign factor has a positive influence.⁴² When both financial factors are combined, their total impact on medium-term real GDP is found to be not statistically different from zero (not shown).

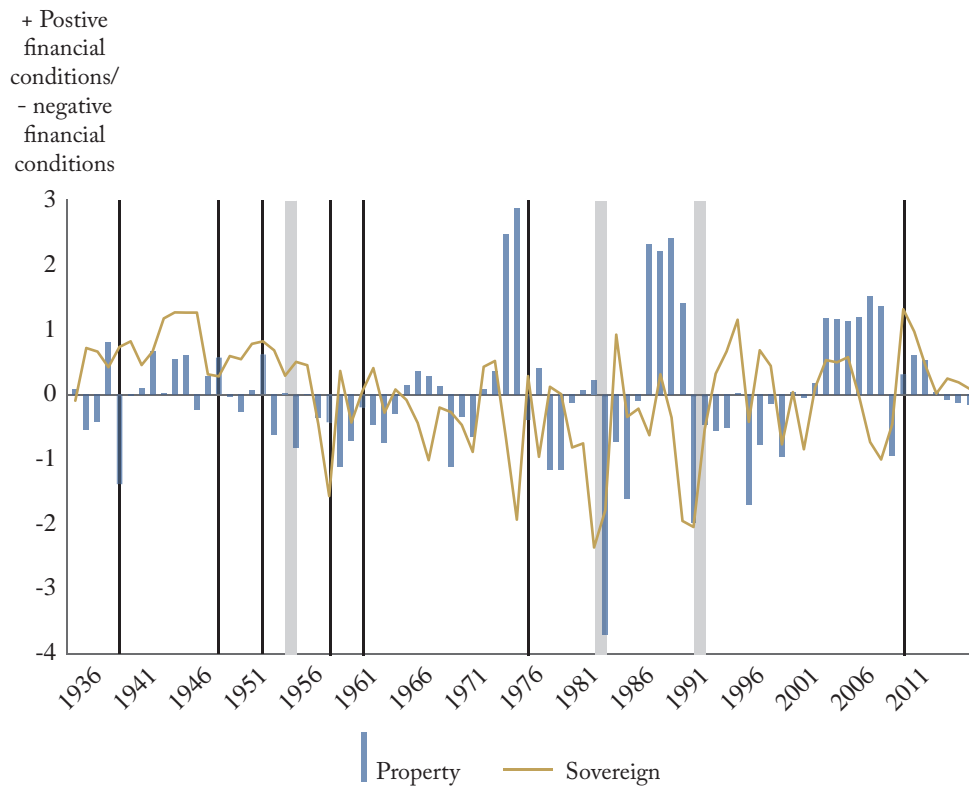
We perform one final test. Assume that real GDP growth, as well as the property and sovereign factors, are jointly determined.⁴³ Next, we ask how a shock, that is, an unexpected change in any of the three variables, impacts the other variables. The results are shown in Figure 6.⁴⁴ A positive sovereign factor shock, signalling a temporary improvement in fiscal conditions, raises real GDP growth for three years. More precisely, a 1 percent sovereign shock raises real GDP growth by less than 1 percent at its peak (around 0.8 percent). An increase in the sovereign factor also increases property prices by a small amount, roughly 0.2 percent after two years (bottom left plot).⁴⁵ These results are expected since both shocks are consistent with improved economic conditions. There are, however, a couple of offsetting effects. Rising property prices negatively impact real GDP growth after three and four years, a result also reported for the US (Case, Quigley, and

Shiller 2006). Finally, rising property prices depress the sovereign factor, that is, produce a deterioration in financial conditions.

To conclude, two results stand out. Overall, links between financial variables that give rise to a financial cycle and the business cycle are weak (also see Bordo 2018).⁴⁶ Of course, an exercise such as the one conducted above is, arguably, incomplete as it ignores other factors over the past several decades that might play a role in impacting economic and financial performance. But part of the difficulty with trying to understand how the financial system interacts with the real economy is that, ideally, we require a long span of data to enable successful policies to be developed. Yet, history and the evidence presented above also suggest that while the era of the Great Depression followed by the most recent financial crisis stand out, these events should not be conflated with other financial crises that are, sadly, recurring events around the globe. Stated differently, financial imbalances of the kind experienced a decade ago are rare events and do not translate into a stylized fact about all financial crises.

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- 42 The overall conclusions are unchanged if we look at the impact of financial factors on real GDP, one or three years lagged. However, both factors are only statistically significant when they are lagged two years.
- 43 In the language of economics, the three variables are endogenously determined.
- 44 Since there are three variables, a total of nine permutations of shocks on the variables in the model are possible. We omit the impact of own shocks, that is, the impact of past shocks of each variable on itself, as well as the impact of real economic shocks on financial factors. The model is a vector auto-regression (VAR) consisting of real GDP growth and the two factors. Versions that rely only on the medium-term fluctuations in real GDP, alternative estimates of the financial factors and ones that add a dummy variable for the sum of banking, currency, inflation and sovereign debt crises produced similar conclusions. The VAR is estimated with two lags and a constant. Adding dummies for the years when there is a financial crisis (banking, currency, inflation and debt) does not impact the results. Clearly, the model estimated here is simplistic and merely illustrates the interactions between the real economy and the financial sector.
- 45 The cumulative impact of the sovereign factor on real GDP growth is about 1 percent after 10 years, while the cumulative effect of sovereign shocks on property prices is less than 1 percent (about 0.8 percent) over the same horizon.
- 46 The results are even weaker if we are less generous when specifying the confidence bands shown in Figure 6.

Figure 5: Measuring Financial Conditions in Canada by Factor



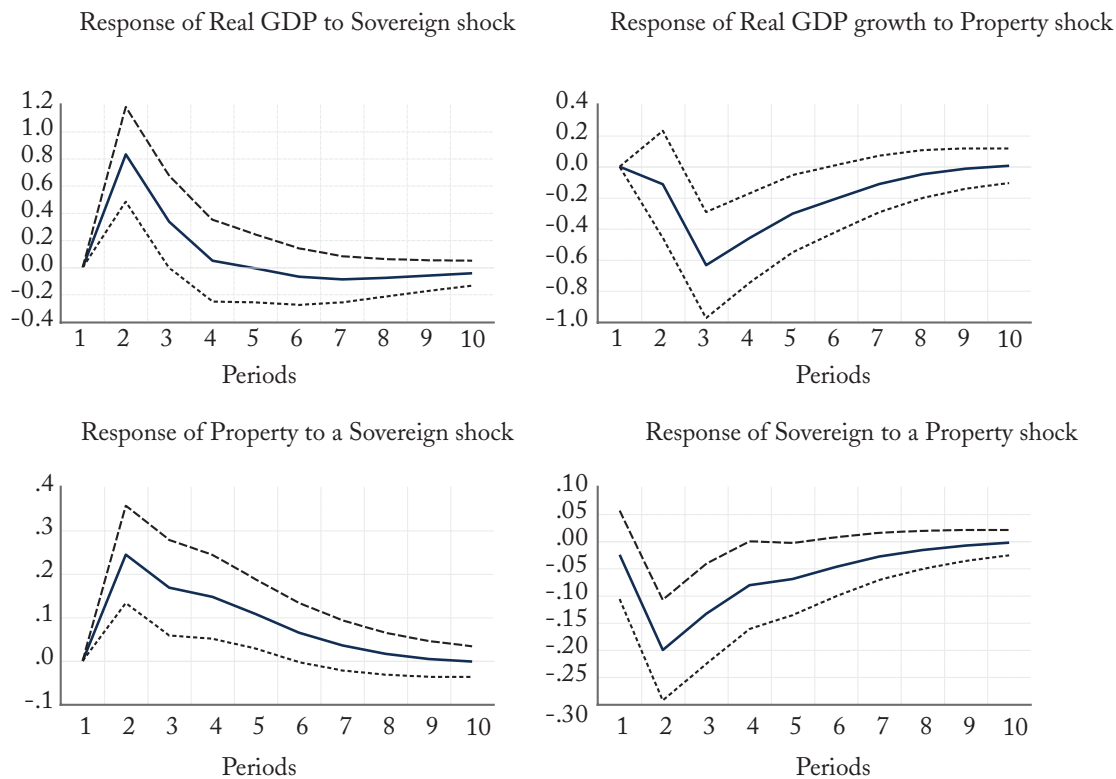
Notes: Factor scores from a principal components analysis applied to the five financial series listed in the notes to Figure 5. Two principal components are extracted. Factor loadings and other details are available in a separate appendix on request. Since data are annual a vertical line indicates a recession that took place in a single year. Shaded areas indicate recessions of a longer duration. Source: Authors' calculations.

Table 1 Financial Factors and Medium-Term Real GDP in Canada Since 1936

Dependent Variable: Medium-term (log) Real GDP				
Factors	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.025	0.003	8.839	0.000
PROPERTY (-2)	-0.005	0.003	-1.775	0.080
SOVEREIGN (-2)	0.006	0.003	1.887	0.063
R-squared	0.081			
Adjusted R-squared	0.056			
F-statistic	3.298			
Prob(F-statistic)	0.042			

Source: Authors' calculation of ordinary least squares estimate of the medium-term portion of the logarithm of real GDP (see main body of the text for a description) on the estimated factors (see notes to Figure 5) lagged two periods. Data are annual for the period 1936-2013.

Figure 6: The Impact of Two Kinds of Financial Shocks



Notes: Two lags are used. The dashed lines are the confidence intervals estimated via Monte Carlo methods based on 1,000 replications representing ± 1 standard deviation. The solid lines are the point estimates of the impulse responses to the shock shown in the heading to each figure. Each shock is one standard deviation or 1 percent in size in the variable that is being shocked.

Source: Author's estimates based on a vector autoregression of real GDP growth, the property and sovereign factors, in that order (also see notes to Figure 6).

CONCLUSIONS

The Bank for International Settlements (BIS) may have been farsighted when it warned about a possible financial crisis well before 2007.⁴⁷ Perhaps spurred by the dot-com bubble of 2001,

the BIS's 2001/02 annual report lamented that the forecasting economic activity:

...presumes an understanding of the way in which the fortunes of the real economy affect the health of the financial system. ... The truth is that our understanding of each link is limited, and the

⁴⁷ Warnings about factors that would lead to a financial crisis of some kind can, of course, be traced back earlier, (Minsky 1977, Kindleberger 1978), while the BIS's view was no doubt also influenced by William White, BIS economic adviser at the time (see White 2000, 2006, Borio and White 2003). Their forecasts of serious financial instability were generally wrong until the 2008-09 crisis. Hence, audiences were not as receptive of their views then as they are today.

possibility of unexpected interactions between these various forces makes our knowledge more limited still. Things could indeed turn out quite well, in a self-reinforcing way, but they could also turn out quite messily. (BIS 2002, pp. 141-142.)

Indeed, a complete chapter in that report focuses on the channels of influence from the financial sector to the real sector. Almost two decades later, it remains hard to know how to square a financial cycle with a monetary policy that aims for price stability and is more responsive to business cycles.

International regulatory schemes meant to reduce the incidence of financial crises (e.g., Basel I to III, and the Financial Stability Board) typically are a reaction to past financial crises. They may notionally attempt to put in place a regime that forestalls the next crisis, but since these are generally unpredictable, their success is doubtful. After all, the Basel I international regulatory framework of the late 1980s was succeeded by Basel II in the early 2000s, which was followed by Basel III in the wake of the global financial crisis.⁴⁸ But none was able to prevent a future financial crisis. Nevertheless, the extent that these arrangements reduced the severity of previous financial crises argues in favour of a collaborative approach across various agencies, not only central banks, in maintaining financial stability; a system in place in Canada at present. While monetary policy became more successful by taking a forward-looking view of economic conditions as a device to manage expectations, central banks and other agencies are not yet able to do the same when it comes to predicting levels of financial stability.

The bottom line is that the Bank of Canada's mandate should not be expanded. As noted previously, our recommendation does not depart

from others who have expressed similar sentiments (Laidler 2004, Crow 2012, Thiessen and Jenkins 2012), along with Jenkins and Longworth (2015). However, we have emphasized, among other issues, the risks for the central bank being too closely involved in implementing policies that potentially violate the monetary policy principle of "doing no harm."

The Bank should remain a critical partner among others in the maintenance of financial stability. There is simply too much heterogeneity in the sources, types and scope of past financial crises to offer any guidance about how a financial stability mandate would translate into practice. Moreover, history does not treat kindly central banks that become an arm of the fiscal authorities. Finally, a country is best prepared for a financial crisis, especially the kind that afflicted the global economy in 2008-09, when monetary, regulatory and fiscal authorities jointly respond aggressively to looming threats and consequences of financial malfeasance. We may express the wish that this time is different, but we should also be skeptical in believing such sentiments.

Why should these issues concern Canada? Although a financial crisis was avoided in 2008-2009, the economic fallout from the US led to a brief but sharp downturn in the Canadian economy. Indeed, the IMF in its 2009 Article IV assessment of Canada's economy noted our country's "sound regulation and conservative banking practices (IMF 2019, p. 3)," but then went on to highlight the looming "strains" of household indebtedness, a point that the Bank of Canada has repeatedly raised and remains vigilant about. Hence, if our economy is to retain its enviable record of resilience to financial shocks, whether of the domestic or external

48 Named after the Basel Committee on banking supervision housed at the BIS in Basel, Switzerland. To be fair, Basel III has yet to be tested.

varieties, it is pertinent to revisit the question of whether the Bank's mandate ought to explicitly incorporate a financial stability goal.

The Bank of Canada's mandate should not change, but it should be asked to be more forward-looking about future sources of financial instability and be encouraged to highlight, when necessary and possible, how partner agencies can pre-empt a future crisis, all while striving to maintain inflation within the target range. Of course, we are not suggesting that the Bank, or any central bank for

that matter, announce the next financial crisis in advance. This would be tantamount to yelling "fire" in a crowded room. Nevertheless, the Bank can be expected to warn its partners in macroeconomic and regulatory policy more forcefully of any imminent dangers to the stability of the financial system.⁴⁹ As Karl Blessing, President of the Bundesbank during the Bretton Woods era, remarked: "A central bank which never fights, which at times of economic tension never raises its voice, that central bank will be viewed with mistrust."⁵⁰

49 Readers might point out that several central banks, including the Bank of Canada, publish financial stability reports. Perhaps unsurprisingly, some have found that these can under-emphasize financial-stability risks. See, for example, Osterloo, de Haan and Jong-A-Pin (2007), and Wilkinson, Spong and Christensson (2010).

50 As quoted in Marsh (1992, pp. 256-57). Nevertheless, the spread of such reports suggests there is unhappiness with the status quo, and that central banks require clarity if and when they are called upon to deal with the next financial crisis. It is instructive that the US is currently undergoing a review of the Federal Reserve's financial-stability role, which raises issues quite similar to the ones that will challenge policymakers in Canada (Kashyap and Siegert 2019).

REFERENCES

- Adrian, T., A. Estrella, and H. Shin. 2019. "Risk-Taking Channel of Monetary Policy." *Financial Management* 48 (Fall).
- Albanesi, S., De Giorgi, G, and J. Nosal. 2017. "Credit Growth and the Financial Crisis: A New Narrative." NBER Working Paper 23740. August.
- Bank of Canada. 2006. "Renewal of the Inflation Control Target." Available at www.bankofcanada.ca.
- _____. 2016. "Renewal of the Inflation Control Target." Available at www.bankofcanada.ca.
- _____. 2018. "The Bank's Medium-Term Research Plan." Available at www.bankofcanada.ca.
- Bank for International Settlements. 2002. *72nd Annual Report*. Basel, Switzerland: Bank for International Settlements.
- Barwell, R. 2013. *Macroprudential Policy*. New York: Palgrave Macmillan.
- Bekiros, S. et al. 2019. "Credit Cycles Since 1870." Working Paper. European University Institute. San Domenico di Fiesole, Italy.
- Benati, L., and C. Goodhart. 2010. "Monetary Policy Regimes and Economic Performance: The Historical record, 1979-2008." In B. Friedman and M. Woodford (Eds.). *Handbook of Monetary Economics*. Vol. 1D. Amsterdam: North Holland. pp. 1,159-1,236.
- Berge, T. 2012. "Has Globalization Increased the Synchronicity of International Business Cycles?" *Economic Review*. Federal reserve Bank of Kansas City. Third Quarter: pp. 5-39.
- Bernanke, B. S. 2004. "The Great Moderation." Speech at the Meetings of the Eastern Economics Association. Washington, D.C. 20 February. Available at www.federalreserve.gov.
- _____. 2015. *The Courage to Act*. New York: W.W. Norton.
- Bernanke, B.S., and M. Gertler. 2001. "Should Central Banks respond to Movements in Asset Prices?" *American Economic Review*. 91. May.
- Bernanke, B.S., and F. Mishkin. 1992. "Central Bank Behavior and the strategy of Monetary Policy: Observations from Six Industrialized Countries." In O.J. Blanchard, S. Fischer (Eds.). *NBER Macroeconomic Annual*. Cambridge, Mass.: The MIT Press. pp. 183-238.
- Blinder, Alan S. 2013. *After the Music Stopped*. New York: Penguin Press.
- Bordo, M.D. 1990. "The Lender of Last Resort: Alternative Views and Historical Experience." *Economic Review*. Federal Reserve Bank of Richmond. 76, no. 1: 18-29.
- _____. 2008. "An Historical Perspective on the Crisis of 2007-2008." NBER working paper 14569. December.
- _____. 2018. "A Historical Perspective on the Quest for Financial Stability and the Monetary Regime." *Journal of Economic History*. 78 (June): 319-357.
- Bordo, M.D., and P.L. Siklos. 2016., "Central Bank Credibility: An Historical and Quantitative Exploration." in M.D. Bordo et al. (Eds.) *Central Banks at A Crossroads*. Cambridge, MA: Cambridge University Press., pp. 62-144.
- _____. 2017. "Central bank Credibility Before and After the Crisis." *Open Economies Review*. 28 (February): 19-45.
- _____. 2018. "Central Banks: Evolution and Innovation in Historical Perspective." In R. Edvinsson, T. Jacobson, and D. Waldenström (Eds.). *Sveriges Riksbank and the History of Central Banking*. Cambridge, UK: Cambridge University Press, pp. 26-89.
- _____. 2019. "The Transformation and Performance of Emerging Market Economies Across the Great Divide of the Global Financial Crisis of 2007-2008." Paper presented for the XXIII Annual Conference of the Central Bank of Chile "Independence, Credibility and Communication of Central Banking." July.

- Bordo, M., and C. Meissner. 2016. "Fiscal and Financial Crises." in J. Taylor, H. Uhlig (Eds.), *Handbook of Macroeconomics*, v. 2A. Amsterdam: Elsevier. pp. 355-412.
- Bordo, M. D., and J. Landon-Lane. 2012. "The Global Financial Crisis: Is It Unprecedented?" In M. Obstfeld, D. Cho and A. Mason (Eds.). *Global Economic Crisis: Impacts, Transmission and Recovery*. Cheltenham, UK: Edward Elgar. pp. 19-56.
- Bordo, M.D., and O. Jeanne. 2004. "U.S. Housing Price Booms and Busts in Historical Perspective." in R.C.K. Burdekin and P.L. Siklos (Eds.) *Deflation*. Cambridge, Mass.: Cambridge University Press. pp. 131-165.
- Bordo, M. D. et al. 2001. "Is the Crisis Problem Growing More Severe?" *Economic Policy*. April.
- Bordo, M.D., and A. J. Schwartz. 1999. "Monetary Policy Regimes and Economic Performance: The Historical Record." in J. Taylor and M. Woodford (Eds.). *Handbook of Macroeconomics*, vol. 1A. Amsterdam: North-Holland. pp. 149-234.
- Bordo, M.D., and D. Wheelock. 1998. "Price Stability and Financial Stability." *Review*. Federal Reserve Bank of St. Louis. September/October: 41-62.
- Bordo, M.D., and F. Kydland. 1990. "The Gold Standard as a Rule." *Explorations in Economic History*. 32 October: 423-464.
- Bordo, M., and A. Schwartz, Eds. 1984. *A Retrospective on the Classical Gold Standard, 1821-1931*. Chicago: University of Chicago Press.
- Borio, C. 2014. "The Financial Cycle and Macroeconomics: What Have We Learnt?" *Journal of Banking and Finance*. 45 May: 182-198.
- Borio, C., and W. White. 2003. "Whither Monetary and Financial Stability? The Implications of Evolving Regimes." In *Whither Monetary and Financial Stability? The Implications of Evolving Policy Regimes*. Federal Reserve Bank of Kansas City Symposium. pp. 131-211.
- Borio, C., and P. Disyatat. 2010. "Unconventional monetary policies: an appraisal." *The Manchester School*. 78 September: 53-89.
- Borio, C., M. Drehmann, and D. Xia. 2018. "The Financial Cycle and Recession Risk." *BIS Quarterly Review*. December: 59-71.
- Born, B., M. Ehrmann, and M. Fratzscher. 2013. "Central Bank Communication on Financial Stability." *Economic Journal*. 124 (June): 701-34.
- Brunnermeier, M., H. James, and J.-P. Landau. 2016. *The Euro and the Battle of Ideas*. Princeton, N.J.: Princeton University Press.
- Bruno, M., and W. Easterly. 1998. "Inflation Crises and Long-Run Growth." *Journal of Monetary Economics*. 41 February: 3-26.
- Bry, G., and C. Boschan. 1971. "Programmed Selection of Cyclical Turning Points." In G. Bry and C. Boschan (Eds.). *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs*. Cambridge, Mass.: National Bureau of Economic Research. pp. 7-63.
- Burdekin, R.C.K., and P. L. Siklos. 2004. "Fears of Deflation and the Role of Monetary Policy: Some Lessons and An Overview." In R.C.K. Burdekin and P.L. Siklos (Eds.). *Deflation*. Cambridge, Mass.: Cambridge University Press.
- Burnside, C., M. Eichenbaum, and S. Rebelo. 2016. "Understanding Booms and Busts in Housing Markets." *Journal of Political Economy*. 124 (4): 1,088-1,147.
- Cargill, T. 2012. "A Critical Assessment of Measures of Central Bank Independence." *Economic Inquiry*. 51 January: 260-72.
- Case, K., J. Quigley, and R. Shiller. 2006. "Comparing Wealth Effects: The Stock Market vs. the Equity Market." *Advances in Macroeconomics*. 5(1): 1-34.
- Cecchetti, S. et al. 2000. "Asset Prices and Central Bank Policy." ICMB/CEPR Report No. 2.
- Cross, P., and P. Bergevin. 2012. *Turning Points: Business Cycles in Canada Since 1926*. Commentary 366. Toronto: C.D. Howe Institute, October.
- Crowe, J. 2012. *Seeking Financial System Stability: Seeking the Best Role for the Bank of Canada*. Commentary 369. Toronto: C.D. Howe Institute. December.

- Cukierman, A. 2008. "Central Bank Independence and Monetary Policy Making Institutions – Past, Present, and Future." *European Journal of Political Economy*. 24: 722-736.
- Didier, T., C. Hevia, and S. Schmukler. 2011. "How Resilient Were Emerging Markets to the Global Economic Crisis?" World Bank Policy Research Working Paper 5637. August.
- The Economist*. 2009. "Counting Their Blessings." December 30.
- Eichengreen, Barry. 2015. *Hall of Mirrors*. New York: Oxford University Press.
- Eichengreen, B., and R. Portes. 1987. "Anatomy of Financial Crises." In R. Portes and A. Swoboda (Eds.). *From Threats to International Financial Stability*, Cambridge, UK: Cambridge University Press. pp. 10-58.
- Filardo, A., and P. Rungcharoenkitkul. 2016. "A Quantitative Case for Leaning Against the Wind." BIS Working Paper No. 584.
- Friedman, B. 1999. "The Future of Monetary Policy: The Central Bank As an Army with Only a Signal Corps?" *International Finance*. 2(3): 321-338.
- Goodhart, C.A.E. 2000. "Can Central Banking Survive the IT Revolution?" *International Finance*. 3 (2): 189-209.
- Gordon, L., and M. Eghbal. 2008. "BRIC Economies Withstand Global Financial Crisis." *Euromonitor International*. November 7.
- Harding, D., and A. Pagan. 2002. "Dissecting the Cycle: A Methodological Investigation." *Journal of Monetary Economics*. 49 March: 365-381.
- Hoenig, T. 2016. "WSJ Pro Financial Regulation Inaugural Event: A Discussion With Thoms Hoenig." March 16. Available at www.wsj.com.
- International Monetary Fund. 2009. "Canada: 2009 Article IV Consultations." IMF Country Report. 09/162. May.
- _____. 2010. "How Did Emerging Markets Cope with the Crisis?" prepared by the IMF Strategy, Policy, and Review Department. 15 June.
- James, Harold. 2012. *Making the European Monetary Union*. Cambridge, Mass.: Harvard University Press.
- Jenkins, P., and D. Longworth. 2015. *Securing Monetary and Financial Stability: Why Canada Needs a Macroprudential Framework*. Commentary 429. Toronto: C.D. Howe Institute. June.
- Jordà, O., M. Schukarick, and A. Taylor. 2011. "Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons." *IMF Economic Review*. 59 June: 340-378.
- Kashyap, A., and C. Siegert. 2019. "Financial Stability Considerations and Monetary Policy." Working Paper. University of Chicago. May.
- Kindleberger, C.P. 1978. *Manias, Panics, and Crashes: A History of Financial Crises*. New York: Basic Books.
- King, M. 2016. *The End of Alchemy*. New York: W.W. Norton.
- Laidler, D. 2004. *Sticking to Its Knitting: Why the Bank of Canada Should Focus on Inflation Control, Not Financial Stability*. Commentary No. 196. Toronto: C.D. Howe Institute. February.
- Lee-Poy, A. 2018. "Characterizing the Canadian Financial Cycle With Frequency Filtering Approaches." Bank of Canada Staff Analytical Note. 2018-34.
- Lombardi, D., P.L. Siklos, and S. St. Amand. 2018. "A Survey of the International Evidence and Lessons Learned About Unconventional Monetary Policies: Is a 'New Normal' in Our Future?" *Journal of Economic Surveys*. 32 December: 1229-1256.
- Lombardi, D., and P.L. Siklos. 2016. "Benchmarking Macroprudential Policies: An Initial Assessment." *Journal of Financial Stability*. 27 December: 35-49.
- Marsh, D. 1992. *The Bundesbank: The Bank That Ruled Europe*. London: Heinemann.
- Mayes, D. 2019. "The Changing Role of the Central Bank in Crisis Avoidance and Management." In D. Mayes, P. Siklos, and J.-E. Sturm (eds). *Oxford Handbook of the Economics of Central Banking*. Oxford: Oxford University Press.

- Mian, Atif, and Amir Sufi. 2018. "Finance and Business Cycles: The Credit-Driven Household Demand Channel." *Journal of Economic Perspectives*. 32 (3): 31-58.
- Minsky, H. 1977. "The Financial Instability Hypothesis: An Interpretation of Keynes and an Alternative to Standard Theory." *Journal of Economics and Business*. 16 (1): 5-16.
- Mishkin, F., and E. N. White. 2008. "U.S. Stock Market Crashes and their Aftermath: Implications for Monetary Policy." In W. B. Hunter, G. Kaufman, and M. Pomerleano (Eds.). *Asset Price Bubbles: The Implications for Monetary, Regulatory and International Policies*. Cambridge, Mass.: The MIT Press. pp. 53-79.
- Mody, A. 2018. *Eurotragedy: A Drama in Nine Acts*. Oxford, UK: Oxford University Press.
- National Bureau of Economic Research. 2008. "Determination of the December 2007 Peak in Economic Activity." News release. Available at www.nber.org.
- Osterloo, S., J. de Haan, and R. Jong-A-Pin. 2007. "Financial Stability Reviews: A First Empirical Analysis." *Journal of Financial Stability*. 2 March: 337-355.
- Parkin, M. 2014. "The Effects of Central Bank Independence and Inflation Targeting on Macroeconomic Performance: Evidence from Natural Experiments." *Review of Economic Analysis*. 6: 1-35.
- Poloz, S. 2015. "Central bank Credibility and Policy Normalization." Speech given at the Canada-UK Chamber of Commerce. London. March 26.
- Rajan, R. 2014. "Competitive Monetary Easing – Is It Yesterday Once More?" Remarks at the Brookings Institution. Washington, D.C. April 10. Available from www.bis.org.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2009. *This Time Is Different*. Princeton, N.J.: Princeton University Press.
- Romer, C., and D. Romer. 2017. "Why Some Times Are Different: Macroeconomic Policy and the Aftermath of Financial Crises." NBER Working Paper 23391. October.
- Schularick, M., and A. Taylor. 2012. "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008." *American Economic Review*. 102 April: 1,029-1,061.
- Siklos, P.L. 2008. "No Single Definition of Central Bank Independence is Right for All Countries." *European Journal of Political Economy*. 24: 802-816.
- _____. 2017. *Central Banks into the Breach*. Oxford, UK: Oxford University Press.
- Sinai, T. 2013. "House Price Movements in Boom-Bust Cycles." In E. Glaeser and T. Sinai (Eds.). *Housing and the Financial Crisis*. Chicago: Chicago University Press. pp. 19-68.
- Stock, J., and M. Watson. 2003. "Has the Business Cycle Changed and Why?" In *NBER Macroeconomics Annual 2002*. M. Gertler and K. Rogoff (Eds.). 17: 159-218.
- Sun, M. 2009. "China: Unscathed Through the Global Financial Tsunami." *China and the World Economy*. 17(2): 24-42.
- Svensson, L. 2018. "Monetary Policy and Macroprudential Policy: Different and Separate?" *Canadian Journal of Economics*. 51 August: 802-827.
- Thiessen, G., and P. Jenkins. 2012. *Reducing the Potential for Future Financial Crises: A Framework for Macroprudential Policy in Canada*. Commentary 351. Toronto: C.D. Howe Institute. May.
- Tooze, A. 2018. *Crashed: How A Decade of Financial Crises Changed the World*. New York: Penguin Random House.
- White, William. 2000. "What Have We Learned from Recent Financial Crises and Policy Responses?" In J.R. Bisignano, W.C. Hunter, and G. Kaufman (eds.). *Global Financial Crises*. Amsterdam: Kluwer Academic Publishers. pp. 177-200.
- _____. 2006. "Is Price Stability Enough?" BIS Working Paper 205. April.
- Wilkinson, J., K. Spong, and J. Christensson. 2010. "Financial Stability Reports: How Useful During a Financial Crisis?" *Economic Review*. Federal Reserve Bank of Kansas City. Winter. 41-70.

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