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Financial Stability: Taking Care of Unfinished Business

A clear lesson of history is that a "sine qua non" for sustained economic recovery following a financial crisis is a thoroughgoing repair of the financial system.
(Former Chair of the US Federal Reserve System Janet Yellen, 2009)[1]

Introduction

Here we are, 10 years after the financial crisis, still tallying the costs, studying causes and drawing lessons from it.

The outcome would have been worse in 2008 and the following years had it not been for the swift and coordinated efforts of policy-makers around the world to boost demand and repair the financial system. Even so, it has been estimated that the crisis cost the global economy 62 million jobs and more than US$10 trillion in lost output.[2] Although Canada's recession was less deep than experienced in countries at the epicentre of the crisis, it was still painful for many people.

It took more than a decade—and a series of aftershocks—to get to a place where we feel that emergency measures, such as ultra-low interest rates, may at last no longer be needed.

[1] J. Yellen, "Comments on 'The Revival of Fiscal Policy'" (remarks to Annual AEA/ASSA Conference, San Francisco, California, January 4, 2009).
[2] This estimate of job losses is relative to trend. See "Global Employment Trends 2014: Risk of a Jobless Recovery?" International Labour Organization, Geneva, January 21, 2014.

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While uncertainty about trade polices continues to cloud the global and Canadian outlooks, for a central banker like me, this moment feels like it has been a long time coming. We responded to contagion from abroad with aggressive monetary policy actions. We have estimated that without these actions, the recession might have been a year longer and an additional half a million jobs would have been lost.[3] We worked with our Canadian and international colleagues—and some of you here—to put critical programs in place to ensure liquidity in core funding markets during the crisis. And, we co-operated on a series of global financial reforms. Having been personally involved on several fronts, I know just how much of a collective effort this was. Many of you here today have worked hard in your own institutions to comply with new rules and shore up risk management. We have all accomplished a lot.

But, let's face it, the job is still not done. Winston Churchill once said, "All men make mistakes, but only wise men learn from their mistakes." So, it is wise to have conferences like this one, where we can continue to reflect on what went wrong. That is why I am pleased to be here; I would like to thank the organizers for the invitation.

The experts who spoke before me gave us insights into the genesis of the crisis and the subsequent lessons. My intention is to push the conversation forward and spark discussion in three areas where I believe we have unfinished business:

1. *Understanding the role of monetary policy in financial stability*—if there is one thing we have learned since the turn of the century, it is that price stability does not guarantee financial stability.

2. *Keeping policy current as risks to the system evolve*—leverage and liquidity are important usual suspects, but the trickiest part may be understanding the risks that stem from interconnectedness in an ecosystem that is changing rapidly.

3. *Being ready for when things go wrong*—being well prepared will help keep the financial damage to a minimum, especially for people who did not take the risk in the first place.

Central banks, along with other authorities and financial system participants, have a strong role to play in all these areas.

Monetary policy cannot do it all

Let me start with the role of monetary policy in financial stability. Monetary stability—low, stable and predictable inflation—is at the heart of a solid macroeconomy and financial stability. Since the Bank of Canada adopted its inflation-control target in 1991, there has been a reduction in the variability of economic growth by more than one-third and in unemployment by 40 per cent, even when accounting for the crisis. This has been particularly beneficial for younger people and workers with a lower level of

[3] These estimates were produced by running a simulation with ToTEM, the Bank of Canada's main policy model.

education, who tend to have more precarious employment.[4] Successful inflation targeting in Canada and elsewhere is considered one of the factors behind this "Great Moderation," together with some helpful changes to structural policies and a little good luck.[5]

We know that many factors contributed to the crisis—including inadequate regulatory safeguards and global macroeconomic imbalances. That said, the crisis made clear what some economists had previously suspected: price stability alone is not enough to ensure financial stability and could, in some circumstances, contribute to the buildup of financial vulnerabilities.[6] Central bankers were of course already aware that vulnerabilities could build up via the traditional channel of monetary policy that works through asset prices and credit markets. But we learned the hard way that another channel—the risk-taking channel—could be a powerful amplification mechanism. In fact, it is now evident that low interest rates encourage people not only to borrow more but also to make riskier investments to get better returns.[7]

Hindsight is 20/20, but we can all think of an episode that fits the risk-taking narrative. For me, it is the substantial rise in the issuance of structured credit in the mid-2000s that facilitated a huge increase in subprime mortgages and leveraged buyouts driven by private equity.[8]

The unfinished business here is coming to a consensus about what monetary policy can and should do about financial vulnerabilities, and about how monetary policy fits into the rest of the policy framework. Clearly microprudential and macroprudential regulations are on the front lines, and inflation targeting is the central bank's primary mission. Nevertheless, we take financial stability into account in our decisions, consistent with

[4] For estimates by demographic group of the benefits of reduced cyclical variability, see Table 2 in T. Macklem, "Promoting Growth, Mitigating Cycles and Inequality: The Role of Price and Financial Stability" (remarks to the Brazil-Canada Chamber of Commerce, São Paulo, Brazil, March 12, 2012).
[5] See B. S. Bernanke, "The Great Moderation" (remarks to the Eastern Economic Association, Washington, DC, February 20, 2004).
[6] See, for example, W. R. White, "Is Price Stability Enough?" Bank for International Settlements Working Paper No. 205 (April 2006).
[7] See T. Paligorova and J. A. Sierra Jimenez, "Monetary Policy and the Risk-Taking Channel: Insights from the Lending Behaviour of Banks," *Bank of Canada Review* (Autumn 2012): 23–30; C. Borio and H. Zhu, "Capital Regulation, Risk-Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?" *Journal of Financial Stability* 8 (4) (December 2012): 236–251; V. Bruno and H. S. Shin, "Capital Flows and the Risk-Taking Channel of Monetary Policy," *Journal of Monetary Economics* 71 (April 2015): 119–132; G. Dell'Ariccia, L. Laeven and G. A. Suarez, "Bank Leverage and Monetary Policy's Risk-Taking Channel: Evidence from the United States," *The Journal of Finance* 72 (2) (April 2017): 613–654.
[8] For more on leveraged buyouts, see Committee on the Global Financial System, "Private Equity and Leveraged Finance Markets," CGFS Papers No. 30 (July 2008).

our risk-management approach.[9] The current situation offers an example. With high levels of household debt and the Canadian economy operating close to capacity, monetary policy actions to achieve the inflation target and support financial stability are currently complementary. The Bank of Canada has underscored that there is nonetheless a fine balance to be struck here: while moving too slowly would allow more time for financial vulnerabilities to build, moving too quickly could have outsized effects, given the high level of household indebtedness.

There may be, in different situations, a case for taking longer to bring inflation back to target than the usual six to eight quarters.[10] That was something we considered in late 2013. Inflation was running below target and the economy had excess capacity, which might have warranted an easing in policy. However, we judged that the best course of action was to leave our policy rate at 1 per cent to avoid exacerbating financial vulnerabilities in the household sector, while still returning inflation to target over a reasonable time horizon.

There is still debate about how best to integrate financial stability considerations into monetary policy. I would like to highlight a couple of promising avenues to help advance this discussion. The first is to invest in policy models that do a better job of capturing the interlinkages between the financial system and the economy, such as those that can lead to defaults on loans, asset fire sales and other real-world events. I don't think any model will ever be perfect, so we will always be operating with a heavy dose of uncertainty. Yet, this research will yield insightful answers to the question of how monetary policy should respond to a buildup of financial vulnerabilities, if at all.[11]

The second avenue is to strengthen our framework for macroprudential policies, which are better suited to target financial system risks. Taking a page from the inflation-targeting regime, there is a benefit to clarity about objectives, governance and tools for the job.[12] The focus in Canada has understandably been on macroprudential policies related to household finance to improve the quality of debt and limit its growth. Many of these policies, such as recent changes to mortgage underwriting rules, are aimed at increasing the resilience of the financial system on an ongoing basis. Authorities could use other tools to dampen financial cycles and boost the resilience of the banking system when bank credit has been growing rapidly. An example is the countercyclical capital buffer introduced as part of the Basel III reforms. The Bank of England has put

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[9] See S. S. Poloz, "Integrating Uncertainty and Monetary Policy-Making: A Practitioner's Perspective," Bank of Canada Staff Discussion Paper No. 2014-6 (October 2014).

[10] For more on the role of monetary policy in counteracting financial imbalances and the related case for a flexible target horizon, see J. Boivin, T. Lane and C. Meh, "Should Monetary Policy Be Used to Counteract Financial Imbalances?" *Bank of Canada Review* (Summer 2010): 23–36; and D. Coletti, J. Selody and C. A. Wilkins, "Another Look at the Inflation-Target Horizon," *Bank of Canada Review* (Summer 2006): 31–37.

[11] For an example of such an exercise, see Box 6 in "Renewal of the Inflation-Control Target: Background Information—October 2016," Bank of Canada (2016): 28.

[12] Committee on the Global Financial System, "Objective-Setting and Communication of Macroprudential Policies," CGFS Papers No. 57 (November 2016).

such countercyclical measures in place, and the Office of the Superintendent of Financial Institutions (OSFI) is working on implementing similar measures in Canada.[13]

Despite the promise of macroprudential policy, we need to be humble about what we know in practice. As we gain experience with these tools, in Canada and abroad, we should sharpen our understanding of their effectiveness. And we should continue to strengthen the framework in which monetary policy and macroprudential policies reinforce each other.[14] A solid framework is essential to reduce the likelihood of undue pressure for monetary policy to lean against the build-up of financial vulnerabilities. Interest rates are a blunt tool, so using them to achieve financial stability could have suboptimal outcomes from the perspectives of both monetary policy and financial stability.

That is why it is imperative that academics and central banks focus our efforts on a number of areas. At the Bank of Canada, we are exploring new sources of microdata to better understand vulnerabilities and monitor the effectiveness of macroprudential tools and monetary policy. We are developing policy models that have relevant institutional features and rich heterogeneity in income and wealth to get a better handle on the efficacy and impact of macroprudential policy tools.

Even with improvements in these areas, we know that monetary and macroprudential policies will be insufficient to fully safeguard financial stability.

Keeping policy current as risks evolve

This brings me to the second area of unfinished business, which is that our regulatory and supervisory practices need to stay current as risks evolve. The key issues that got us into the crisis—leverage, illiquidity and interconnectedness—are still the right ones to look at. We have taken great steps to identify, manage and mitigate these vulnerabilities in financial institutions. Basel III is largely in place globally, which has tightened banks' capital and liquidity requirements and set a limit on leverage. We have enhanced bank resolution tools and shifted the largest portions of over-the-counter derivatives to central

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[13] For more information on the Bank of England's countercyclical bank capital buffers, see "The Financial Policy Committee's Approach to Setting the Countercyclical Capital Buffer" (April 2016).

[14] For more information on the nexus between monetary and macroprudential policy, see S. Alpanda, G. Cateau and C. Meh, "A Policy Model to Analyze Macroprudential Regulations and Monetary Policy," Bank of Canada Staff Working Paper No. 2014-6 (February 2014); M. Kuncl, "Assessment of the Effects of Macroprudential Tightening in Canada," Bank of Canada Staff Analytical Note No. 2016-12 (August 2016); H. E. Damar and M. Molico, "On the Nexus of Monetary Policy and Financial Stability: Effectiveness of Macroprudential Tools in Building Resilience and Mitigating Financial Imbalances," Bank of Canada Staff Discussion Paper No. 2016-11 (May 2016); and J. Allen, T. Grieder, B. Peterson and T. Roberts, "The Impact of Macroprudential Housing Finance Tools in Canada," *Journal of Financial Intermediation* (in press) (September 1, 2017).

counterparties (CCPs). And, many of the weaknesses in market-based financing that made the system vulnerable before the crisis have been addressed.[15]

The job is never done, however, because risk is constantly shifting. We learned from the crisis that, while trouble is a complex brew, financial innovation is usually a key ingredient. Financial innovation has not slowed since the crisis. It can often help improve our financial system, yet it can also carry risks. That's why risk management needs to become more nimble.

A couple of areas worry me right now, and they need concerted attention. Both relate to interconnectedness and trust in the system.

My first concern is one that I know is shared by many here in relation to your own activities: cyber risk. In fact, a recent survey conducted by Risk.net found that disruption in information technology leads the list of the top 10 operational risks for 2018.[16] When it comes to cyber risk, and many other operational risks, we are all connected. Now, some new technologies, such as cloud computing, may be safer than legacy systems. Yet cyber risk is heightened in other ways because of an increasing number of points of access to core parts of the financial system and the growing sophistication of those launching cyber attacks. It is part of our digital world.

The Bank of Canada is responsible for oversight of critical financial market infrastructures (FMIs). We already impose strong requirements to support the stability of these infrastructures, such as payment systems and CCPs, and we are working to further contain and respond to cyber risks. The systems that underpin all financial transactions in our economy are highly interconnected, and a cyber attack on one could quickly propagate and cause major disruptions.[17] The costs might not stop there. Households and businesses typically do not think about these systems because they operate smoothly behind the scenes. However, trust in core systems could be undermined if participants felt that their information or assets were vulnerable. That is why we are working with Payments Canada and the six largest Canadian banks to reduce the chance of a serious cyber event, and to mitigate the impact and recover quickly if such an event were to materialize.

My second area of concern is related to the rapid pace of financial innovation. Such innovation can bring lower costs and increase the range of investment strategies. Exchange-traded products, for example, offer investors relatively easy access to illiquid, complex strategies. The issue is that some of these strategies rely on derivative

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[15] Financial Stability Board, "Assessment of Shadow Banking Activities, Risks and the Adequacy of Post-Crisis Policy Tools to Address Financial Stability Concerns," July 3, 2017.
[16] See S. Marlin, "Top 10 Op Risks: IT Disruption Heads 2018 Poll," Risk.net (February 21, 2018).
[17] For more on cyber risk, see S. S. Poloz, "Three Things Keeping Me Awake at Night" (speech to the Canadian Club Toronto, Toronto, Ontario, December 14, 2017).

structures that have counterparty and collateral risks.[18] These products can be surprisingly troublesome if they are not well understood, yet become popular, particularly with retail investors. This hearkens back to Canada's experience with third-party asset-backed commercial paper leading up to the crisis. A recent—albeit more contained—example is inverse volatility exchange-traded products. Many investors were attracted to the high returns earned on these products in the low-volatility environment of recent years. At the beginning of February, however, these products lost nearly all their value in one day when US equity volatility spiked.[19] The good news is that markets were resilient to this event. The unease is because, aside from the obvious suitability issue, many were unaware of the extent of the underlying interlinkages between products, in this case, leveraged long and short volatility products. These interlinkages, or dynamics, worked to amplify the volatility by creating a one-way market in VIX futures.[20]

Even further along the risk spectrum are private crypto assets. I do not refer to the existing products as currency because they do not perform any of the key functions of money. While activity may be too small right now to be systemic, at some point they could have financial stability implications. The crypto world is moving fast, and is largely unchecked. This certainly raises concerns about investor protection, market integrity and the use of crypto assets in illegal activities. In fact, there is evidence of widespread use of some crypto assets for money laundering and other illegal activities, and some rather spectacular incidents of theft and fraud have occurred. And we have seen significant financial risk, given the volatility and illiquidity of the assets.

Authorities should work toward a coherent set of policies for crypto assets that is aligned internationally. This strategy will need to cover risks in both cash and derivatives products, as well as in the related ecosystem. The Canadian Securities Administrators (CSA) launched work on offerings of crypto assets last year, noting that—where appropriate—they are treating these as securities.[21] I just returned from the G20 meetings in Buenos Aires and am pleased that the G20 is increasing its focus in this area, given the global nature of these products.[22]

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[18] See I. Foucher and K. Gray, "Exchange-Traded Funds: Evolution of Benefits, Vulnerabilities and Risks," Bank of Canada *Financial System Review* (December 2014): 37–46.
[19] These ETPs formed part of a larger "short vol" trade, which before early February some estimates put as high as US$2 trillion, and which allowed retail investors to access complex and leveraged trading strategies that were typically done only by sophisticated investors. See Box 3 in the Bank of Canada *Financial System Review* (November 2017): 14.
[20] See Box A in Bank for International Settlements, "International Banking and Financial Market Developments," BIS Quarterly Review (March 2018).
[21] For more information, see CSA Staff Notice 46-307 *Cryptocurrency Offerings* (August 24, 2017). See also Committee on Payments and Market Infrastructures Markets Committee, "Central Bank Digital Currencies," Bank for International Settlements (March 2018).
[22] For more information, see the G20's March 20 communiqué.

My bottom line here is that we need a sharpened focus on consumer and investor protection, and market integrity. These are foundational elements of a sound financial system because they support trust.

Plan for when things go wrong

The last area I want to highlight is readiness: we need to be prepared for when things go wrong. It is impossible to be rid of all risks, and undesirable as well. A modern economy advances because people work hard and are willing to stick their necks out. That means that some risk will materialize. That said, the system should be able to withstand some failures without imposing huge costs on those who did not take the risk in the first place.

We have made a lot of progress in a number of areas, but more needs to be done. For example, we identified the financial institutions and FMIs that could have outsized impacts on the financial system if they failed, and we are subjecting them to more stringent regulation and supervision, including recovery and resolution planning.[23]

Central banks and international policy organizations have also worked to develop early-warning indicators of risks to the global financial system.[24] While these are helpful as a starting point, we need to recognize their limitations, particularly if they rely on deviations from historical trends or threshold values. That is why it is important to push the analysis further to properly gauge the risk. Stress tests are an excellent way to help us understand what could happen if financial institutions were subject to adverse events, such as a steep house price decline or a Brexit vote. They also provide practical information about what might be needed to withstand and recover from these events. The Bank of Canada works with other organizations, such as OSFI and the International Monetary Fund, to conduct regular stress-testing exercises of financial institutions and to improve our modelling techniques.[25]

The unfinished business here is that models used for stress testing capture mainly first-round effects, with limited ability to identify spillovers that we know can end up being even more important. For example, while the Bank's current framework does capture second-round effects that could come from interbank exposures and asset fire sales, it could be improved. The Bank, and others who conduct stress tests, could introduce

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[23] The Basel Committee on Banking Supervision has developed quantitative metrics for identifying global systemically important banks (G-SIBs) and a set of principles (no quantitative metrics) for assessing domestic systemically important banks (D-SIBs): "Global Systemically Important Banks: Updated Assessment Methodology and the Higher Loss Absorbency Requirement" (July 2013) and "A Framework for Dealing with Domestic Systemically Important Banks" (October 2012).

[24] For example, see Bank for International Settlements, "Early Warning Indicators of Banking Crises: Expanding the Family" (March 2018); and T. Duprey and T. Roberts, "A Barometer of Canadian Financial System Vulnerabilities," Bank of Canada Staff Analytical Note No. 2017-24 (December 2017).

[25] K. Anand, G. Bédard-Pagé and V. Traclet, "Stress Testing the Canadian Banking System: A System-Wide Approach," Bank of Canada *Financial System Review* (June 2014): 61–68.

behavioural aspects, such as the reactions of bank managers and other financial market participants, and feedback to the real economy. This would require mapping a broader range of interconnections among financial players, which is not a trivial exercise. We would also need to keep this mapping fresh by considering changes in the financial system that might affect the results. An example would be potential changes in the stickiness of retail deposits in an environment of open banking.

Of course, it's not all about banks. Stress-testing frameworks have been designed for CCPs to test their capacity to absorb losses stemming from the default of a participant. More work is being done here as well. Many CCPs have clearing members in common, and so international standard-setting bodies are developing a framework for supervisory stress tests of multiple CCPs across jurisdictions.

We know that being well prepared will increase the odds that financial institutions will recover from stress events; we also know that recovery is not always possible. Effective resolution regimes and credible plans are needed to resolve systemically important financial institutions if they fail. Together with other members of the Financial Stability Board, Canada has committed to establishing effective resolution regimes for its systemically important banks (D-SIBs) and FMIs.

As part of this effort, Canada introduced the legislative framework for a bail-in regime to ensure that people who invest in long-term bank-issued debt, along with equity holders, share in the financial burden of resolving systemically important banks.[26] Aside from protecting the taxpayer, this kind of regime will help avoid adverse implications for the distribution of wealth that can follow a bailout.[27] It will also support market discipline on banks in good times.[28]

Development of the rest of the framework is also under way. Canadian banks are working hard with the Canada Deposit Insurance Corporation on their resolution plans. These plans are particularly complicated for those with significant cross-border activities, because home and host regulatory authorities need to develop a clearer sense of how financial institutions with global footprints would collaborate in stressful times. With respect to Canada's systemically important FMIs, this year's federal budget included plans to implement a resolution framework, although it still needs to be operationalized. Rest assured, we will not be satisfied until all these plans meet an appropriate standard.

[26] For details, see "Backgrounder: Regulations to Implement the Bank Recapitalization (Bail-in) Regime," Department of Finance Canada (June 2017).
[27] This cost is analyzed in J. Schroth, "Financial Crisis Interventions," Bank of Canada Staff Working Paper No. 2016-29 (June 2016).
[28] See P. P. Mora, "The 'Too Big to Fail' Subsidy in Canada: Some Estimates," Bank of Canada Staff Working Paper No. 2018-9 (February 2018).

Conclusion

It's time to wrap up. Janet Yellen said in 2009 that an imperative "for sustained economic recovery following a financial crisis is a thoroughgoing repair of the financial system." On this front, we have accomplished much over the past decade, and we are now reaping the benefits.

They might not be durable, though, unless we focus on some unfinished business: refining our understanding of the role of monetary policy in supporting financial stability, keeping regulatory and supervisory policies current as risks evolve, and planning for recovery and resolution when things go wrong. The Bank of Canada is committed to playing a strong role in all of these areas, both domestically and at international tables.

And let us remember, whether it is through our own financial decisions, our advice to policy-makers or our policy actions, we all play a role in the health of the financial system, and in the trust that people place in it.