Staff Discussion Paper/Document d'analyse du personnel 2016-12

On the Nexus of Monetary Policy and Financial Stability: Is the Financial System More Resilient?

by Patricia Palhau Mora and Michael Januska

www.bank-banque-canada.ca

Bank of Canada Staff Discussion Paper 2016-12

May 2016

On the Nexus of Monetary Policy and Financial Stability: Is the Financial System More Resilient?

by

Patricia Palhau Mora[1] and Michael Januska[2]

Financial Stability Department
Bank of Canada
Ottawa, Ontario, Canada K1A 0G9
[1]ppalhaumora@bankofcanada.ca
[2]mjanuska@bankofcanada.ca

ISSN 1914-0568

Abstract

Monetary policy and financial stability are closely intertwined, and the resilience of the financial system carries weight in this relationship. This paper explores whether the financial system is more resilient as a result of the G20's post-crisis agenda for financial regulatory reform. It summarizes the agenda's key measures and implementation schedules, both internationally and in Canada, reviews the effectiveness of the reform measures in preventing and addressing financial imbalances, and outlines outstanding issues. It finds that, to date, there is evidence that the G20's reform measures are increasing financial system resilience globally, especially in the banking sector. Yet, implementation is still ongoing, and it may be too early to judge how the reform measures are interacting with one another. In Canada, the resilience of the financial system is being enhanced by the ongoing implementation of more-rigorous global regulatory and supervisory standards. Consequently, the likelihood and impact of severe financial stress in the future should be reduced, supporting the primary focus of monetary policy on achieving its 2 per cent inflation target.

JEL classification: E52, G01, G21, G23, G28

Bank classification: Financial stability; Financial system regulation and policies; Monetary policy framework

Résumé

La politique monétaire et la stabilité financière sont étroitement liées, et la résilience du système financier est un aspect important de cette relation. Le système financier est-il devenu plus résilient à l'issue du programme de réforme de la réglementation financière mis en place par le G20 après la crise? Le propos de cette étude est de répondre à cette question. Sont résumées les principales mesures du programme ainsi que les progrès accomplis ou anticipés, tant à l'étranger qu'au Canada. L'étude évalue l'efficacité de ces mesures pour la prévention et la correction des déséquilibres financiers et souligne les problèmes restés en suspens. Sur la base d'un certain nombre d'observations, elle révèle que les réformes du G20 ont permis, jusqu'ici, d'accroître la résilience du système financier international, notamment au sein du secteur bancaire. Cependant, des réformes sont encore à appliquer, et il est peut-être trop tôt pour apprécier les effets que les mesures ont les unes sur les autres. Au Canada, les normes internationales de réglementation et de supervision plus strictes mises en œuvre sont en train de renforcer la résilience du système financier. La probabilité que surviennent de graves tensions devrait, par conséquent, diminuer à l'avenir, tout comme l'ampleur des répercussions potentielles. Une plus grande résilience du système financier permettra donc à la politique monétaire d'être focalisée sur l'atteinte de la cible d'inflation de 2 %, son objectif premier.

Classification JEL : E52, G01, G21, G23, G28

Classification de la Banque : Stabilité financière; Réglementation et politiques relatives au système financier; Cadre de la politique monétaire

Summary

- Monetary policy and financial stability are closely intertwined. While low interest rates foster economic growth, expansionary monetary policy can potentially give rise to greater vulnerabilities. The resilience of the financial system carries weight in this relationship. If the financial system is more resilient, then monetary policy may need to give less consideration to such negative externalities and can continue to focus on its primary goal of low and stable inflation.
- The scope of the post-crisis G20 agenda for financial regulatory reform is broad and ambitious and strives to address the weaknesses exposed by the global financial crisis. The reform measures focus on three key objectives: (i) reducing the probability of severe stress, (ii) decreasing the financial and economic impact of severe stress, and (iii) restoring integrity and confidence in the financial system to promote global financial and economic integration. The reform agenda has reinforced microprudential regulation and supervision within a sufficiently broad regulatory perimeter and underlined the importance of mitigating systemic risk by adopting a macroprudential lens.
- To date, there is evidence that the reform measures are increasing financial system resilience. This is especially true in the banking sector, which has more and higher-quality capital, holds more-liquid assets and is less leveraged, and is subject to more-intensive supervision. Higher bank capital levels are generally associated with a significant reduction in the frequency and severity of banking crises.
- Nevertheless, authorities must be aware of new risks and vulnerabilities and of the necessity for monitoring any unintended consequences to ensure that “leakages” and migration of risks do not undermine the effectiveness of the reforms.
- Further, implementation of agreed reforms is still ongoing, and it may be too early to judge how these reform measures are interacting with one another and whether the reform agenda will be effective in increasing the resilience of the overall system. However, jurisdictions’ commitment to consistent implementation of these reforms, and their ongoing efforts to monitor the effectiveness of the rules, should help to ensure that the reforms deliver their intended benefits and mitigate undesired effects.
- The resilience of the financial system is Canada is being enhanced by the ongoing implementation of more-rigorous global regulatory and supervisory standards. Consequently, the likelihood and impact of severe financial stress should be reduced in the future. This greater financial resilience supports the primary focus of monetary policy on achieving its 2 per cent inflation target.

Introduction

"Monetary policy has the ability to influence financial stability, for good or ill,"[1] and thus financial sector reforms and monetary policy are closely intertwined. Both aim to preserve economic stability in the interest of maximizing sustained long-term growth, and both operate by affecting financial conditions primarily through changes in the price and availability of credit. However, each has a different intermediate goal. Monetary policy in Canada focuses on achieving economic stability by promoting price stability, while financial reforms aim to promote financial stability by strengthening the resilience of the financial system and reducing the buildup of imbalances. As demonstrated by the financial crisis (2008–09), predictable and stable low inflation is a necessary, but not sufficient, condition to foster financial and economic stability. Furthermore, monetary policy could contribute to financial instability by incentivizing excessive risk taking by economic agents, increased levels of debt and new imbalances.[2] Analogously, the effects of financial reforms on intermediation costs can affect the incentives to borrow and spend and, hence, aggregate demand and the level of inflation.

Given the post-crisis regulatory framework, increased system resilience could have important implications for the role of monetary policy in addressing financial stability concerns. The success of the agenda for financial system reform is important in determining the extent to which monetary policy might need to potentially "mop up" in the aftermath of a financial crisis, or "lean against" emerging vulnerabilities.

The systemic reach of the financial crisis and subsequent severe economic distress[3] (the Great Recession) prompted a fundamental overhaul of the financial system's regulatory and supervisory framework. In the immediate aftermath of the crisis, G20 leaders committed to fundamental reforms of the global financial system to repair fault lines and move toward increased resilience and enhanced financial stability. An ambitious regulatory reform agenda has since been put in place, targeted at reducing the likelihood and impact of future financial crises, promoting confidence in the financial system, and supporting sustainable economic growth. The reform agenda reinforced microprudential regulatory measures and enhanced oversight, as well as underlined the importance of adopting a macroprudential lens and a sufficiently broad regulatory perimeter.

The remainder of this note (i) summarizes the key measures and implementation schedules of the financial regulatory reform agenda since the financial crisis, both internationally and in Canada; (ii) reviews the effectiveness of the reform measures in preventing and addressing financial imbalances; and (iii) reviews outstanding issues.

---

[1] Lane (2016) provides a comprehensive discussion of the nexus between monetary policy and financial stability.

[2] Jordà, Schularick and Taylor (2014) analyzed the determinants of financial crises in 17 advanced economies from 1870 to 2011 and reaffirmed the central role played by the borrowing behaviour of the private sector in the buildup of financial fragility.

[3] The cost of the crisis includes output losses, increased unemployment and higher public debt, and its impact was prolonged. The IMF (2015b) notes that the overall fiscal cost of the crisis (including indirect effects, which capture the impact on the real economy) may have reached 18 per cent of annual GDP in advanced economies, largely exceeding direct fiscal costs (about 4.2 per cent of annual GDP). Poloz (2014) notes that the impact of the financial crisis is estimated to have cost the world economy at least US$10 trillion in lost output, or almost 15 per cent of production. Luttrell, Atkinson and Rosenblum (2013) estimate cyclical output losses of US$6 trillion–14 trillion.

1. The Post-Crisis Regulatory Reform Agenda: Key Aspects and Implementation Status

The reform agenda reflected lessons from the crisis, including the moral hazard risks posed by financial institutions that are *too big to fail* or *too interconnected to fail*, as well as a lack of effective international coordination across regulators and slow progress at the Basel Committee on Banking Supervision (BCBS) and the Financial Stability Board (FSB). A strong emphasis on microprudential regulation in the pre-crisis period and the significant impact of the Great Recession provided a rationale not only for strengthening microprudential regulation, but also for developing macroprudential policy frameworks and tools. Further, a new focus was put on promoting adherence to international standards consistently across jurisdictions.

The recent regulatory reform agenda aims to increase resilience both ex ante and ex post. Lower systemic risk could mean that vulnerabilities and potential triggers are reduced (ex ante resilience) but also that the impact of a potential crisis is limited and risks do not spread across the system (ex post resilience). Reform measures address both time dimensions of resilience and focus on the three general categories:

- **Reducing the probability of severe stress**[4] by enhancing the resilience of financial intermediaries, markets and infrastructures.[5]
- **Decreasing the impact of severe stress**, for example, by introducing robust and transparent crisis-management protocols and credible resolution frameworks that foster increased burden sharing and reduce the potential fiscal impact of a crisis.[6]
- **Restoring the integrity of and confidence in the financial system** through a focus on more-rigorous corporate governance and greater transparency (including adequate conduct, incentives and risk management).

There are four core elements to these reforms, which have been coordinated by the FSB: building resilient financial institutions; ending too big to fail; making derivatives markets safer; and transforming shadow banking into resilient market-based finance. Key observations regarding these measures and their implementation are as follows:

- **To make financial institutions more resilient**, many post-crisis regulatory reforms have been aimed at strengthening banks' balance sheets through increased and improved capital and liquidity and a reduction in leverage. Despite differences across jurisdictions, implementation of Basel III has generally

[4] The Basel III capital and liquidity framework is designed to lower the risk profile of core financial institutions and to increase their resilience in times of market stress.

[5] Some examples are more and better-quality capital, targeted measures for the largest banks and insurers with regard to resolution, countercyclical buffers, reduced interconnectedness, increased transparency, enhanced supervision and market discipline, greater central clearing of derivatives, and a renewed focus on the shadow banking system. The FSB defines shadow banking as "credit intermediation involving entities and activities (fully or partly) outside the regular banking system" (FSB 2015d).

[6] The FSB established principles (Key Attributes of Effective Resolution Regimes for Financial Institutions) for dealing with banks and other financial institutions that come under severe stress. As well, international standards for financial market infrastructures (CPMI-IOSCO's Principles for FMIs) that facilitate the clearing, settlement and recording of monetary and other financial transactions were recently updated. This has resulted in considerably stronger risk-management standards, making FIs and FMIs more resilient to shocks. The principles establish that if an FI or FMI cannot ultimately recover on its own, authorities can take steps to return it to viability or liquidate it in an orderly fashion, while maintaining critical functions and sheltering taxpayers from losses.

been timely, and banks have significantly increased their capital and are on track to meet more-stringent liquidity standards.[7]

- **To end too big to fail**, additional requirements have been imposed on global systemically important institutions, justified by the systemic dimension of their activities and by the moral hazard concern implicit in being too big to fail. Examples of the requirements include designation as a G-SIB or a global systemically important insurer (G-SII), recovery and resolution plans, bail-in and increased total loss-absorbency (TLAC) standards, supervisory colleges, and crisis-management groups.
- **To make derivatives markets safer**, non-centrally cleared derivatives contracts are now, or soon will be, subject to higher capital and minimum margining requirements. In addition, central clearing of standardized over-the-counter (OTC) derivatives, particularly for the largest markets, has increased substantially since the crisis. As well, new standards (Principles for FMIs) were designed to ensure that the infrastructure[8] supporting global financial markets is more robust and to mitigate the impact of shocks. However, implementation of OTC derivatives reforms continues to be uneven and behind schedule, posing a risk of duplicative requirements and increased market fragmentation, which might have important implications for liquidity levels, particularly in stress periods.
- **On shadow banking**, or market-based financial intermediation, efforts within and across jurisdictions are under way to measure the sector's importance and the risks it poses and to assess the adequacy of the supervisory perimeter. The FSB`s annual monitoring exercises[9] play an important role in evaluating the size, trends and adaptations of shadow banks, and the FSB is currently undertaking a peer review on the topic.
- Regarding other reform areas, work is progressing toward closing data gaps (e.g., through the BIS International Data Hub), reducing mechanistic reliance on external credit ratings, aligning risk incentives (e.g., through the FSB Principles for Sound Compensation Practices) and addressing misconduct issues (e.g., IOSCO's Principles for Financial Benchmarks).
- Furthermore, several jurisdictions have established interagency bodies for macroprudential policies, strengthened system-wide monitoring, and broadened the toolkits to address financial stability risks.[10]
- Finally, the pace of implementation has been faster in the regions most affected by the financial crisis, particularly the United States and Europe, which now have operational resolution regimes in advanced stages of implementation.[11]

---

[7] There is some evidence that the largest financial institutions have been implementing new regulations upfront. The BCBS (2016b) progress report on the adoption of the Basel regulatory framework notes that all 27 of its members have final risk-based capital rules, liquidity coverage ratio regulations and capital conservation buffers in place, 24 have issued final rules for countercyclical capital buffers and 23 have issued final or draft rules for their domestic SIB framework. Members are now turning to the implementation of the leverage ratio and the Net Stable Funding Ratio (NSFR). All the large internationally active banks meet the fully phased-in risk-based capital requirements, and, where applicable, surcharges for G-SIBs. However, despite such progress, there is still significant variability in banks' risk-weighted asset calculations, and further work is needed to ensure that implementation across jurisdictions is consistent.

[8] This infrastructure consists of payment clearing and settlement systems, including central counterparties.

[9] Since 2010, the FSB has been coordinating an annual exercise in which it collects, aggregates and analyzes data on global trends and risks in the shadow banking system. The 2015 report covers 80 per cent of global GDP and 90 per cent of global financial system assets.

[10] As noted in the FSB's first report (2015a) to the G20 on the implementation and effects of the reforms.

[11] In the United States, the *Dodd-Frank Act* was passed in July 2010. The Act covers most elements of the US financial system, from bank resolution, derivatives regulation and bank structure to regulatory oversight, executive compensation, and investor and consumer protection. Much of the framework has been implemented. In Europe, key

A table summarizing the main regulatory reform measures since the financial crisis, their key objectives, and international and domestic implementation schedules is included in the Appendix.

2. Impact of Post-Crisis Regulatory Reform on Financial System Resilience

The reform agenda will have transitional and long-term, steady-state impacts. To assess the impact of the regulatory reform agenda on financial system resilience, we need to understand both the transitional and long-term benefits and costs of the reforms, as well as any unintended consequences that may affect financial system resilience through alternative channels.

Implementation status and early assessment of the effectiveness of reforms

Many regulatory standards have already been agreed to, and others are close to being finalized, but we have yet to reach the steady state. Implementation of the great majority of rules has only recently started, and extended phase-in periods are common. Furthermore, many of these changes have been introduced at a time of very accommodative monetary policies. It may still be too early to understand what the steady-state impact of the reform measures will be in limiting the frequency and severity of crises.

To get a preliminary sense of the effectiveness of the reforms, we can turn to ex ante and partial assessments, including quantitative impact studies. These analyses tend to be qualitative in nature and narrowly focused, singling out the effects of specific reform measures in individual jurisdictions and not accounting for the interaction of multiple measures. A comprehensive analysis that takes into account major regulations as a group and their interactions, and how banks, other financial institutions and markets endogenously react to them, has yet to be done. As well, because the effectiveness of reforms might differ across jurisdictions, given different starting points and supervisory frameworks, one should be careful to draw broader inferences from partial conclusions. Additional challenges relate to (i) the inadequacy of the pre-crisis conditions to serve as an appropriate benchmark against which to judge the effects of reforms, including the unsustainable business models of many financial institutions; (ii) the difficulty in isolating the effects of reforms from other factors such as changes in technology, demography and more general preferences; (iii) the reform agenda's stronger focus on (large) banks with risks migrating to the shadow banking sector, where they may not yet be fully visible; and (iv) severe data and model limitations that impede the quantitative assessment of many reform measures.

The FSB and other standard-setting bodies are increasingly focused on evaluating the cumulative impact of the reforms and are committed to producing regular assessments as implementation progresses.[12] Ongoing monitoring and review of all the reforms is required to ensure that they deliver their intended benefits while avoiding undesired effects.

---

reforms include the Capital Requirements Regulation and Directive (CRD IV package) and a centralized framework for supervision and crisis management (Single Resolution Mechanism, Bank Recovery and Resolution, and the Deposit Guarantee Schemes directives).

[12] The FSB published its first annual report on the implementation and effects of the reforms in 2015.

Regulatory reforms and the banking sector

Caveats aside, one of the most visible effects of the post-crisis reform agenda is that the banking sector has become more, and better, capitalized,[13] improved its funding profile by moving away from short-term wholesale sources of funding,[14] and is now less leveraged (FSB 2015a). By gradually replacing the Basel II framework, Basel III reinforced capital requirements, especially for systemic institutions, and introduced new liquidity regulations. Canada is actively involved in adopting international reforms. By committing to implement Basel III in its entirety, and doing so ahead of schedule, it introduced higher capital, tighter leverage and more-stringent liquidity requirements, which might help to reduce the risk of adverse contagion effects from abroad and knock-on effects in markets (Chouinard and Paulin (2014).

Higher bank capital levels are generally associated with a significant reduction in the frequency and severity of banking crises (Miles, Yang, Marcheggiano 2011, BCBS 2010, Junge and Kugler 2013),[15] and additional buffers should be capable of absorbing losses in distress. Regulators' agreement to longer implementation periods permits a gradual adoption of the new measures and aims to mitigate the impact of increased capital costs on lending rates and GDP.[16] With regard to the steady-state impact of new capital regulation, despite measurement difficulties and limited evidence, impact studies generally find that the social benefits (generally public) of additional regulation significantly outweigh the costs (mostly private) (BCBS 2010, Junge and Kugler 2013, European Commission 2014). Overall, it may be fair to conclude that banks, in particular large banks, are now more resilient to shocks. Nevertheless, risk-weighted assets ratios can be an imperfect measure of bank riskiness, since they can be arbitraged, which tends to water down the effectiveness of regulation over time.[17] This evidence provides a rationale for establishing a backstop to capital (the "belt and suspenders" approach) in the form of a leverage ratio, with calibration still being finalized. The level will matter—if it is too low, it might fail to influence the risk-taking behaviour of bank agents, serving otherwise as an early signal for regulatory intervention (Swiss Finance Institute 2014).

Further to a stronger focus on compliance and more-stringent supervisory rules that seem to have worked to improve banks' risk-management procedures and mitigate conduct issues, bank business models are adjusting to carry less risk.[18] Nevertheless, however small the impact of new regulations may be on the cost

---

[13] The tightening in the definitions of risk-weighted assets and capital under Basel III itself doubled effective capital requirements, while the numerical requirements have more than tripled.

[14] Although the Net Stable Funding Ratio provides incentives for banks to issue liabilities with terms longer than one year, it does not prescribe a longer minimum average maturity.

[15] These papers note that doubling risk-weighted capital levels (CET1) from 7 per cent to 14 per cent results in a decrease in the annual probability of a banking crisis of between 3.6 and 4.2 percentage points (from 4.2–4.6 per cent to 0.6–0.4 per cent). The incremental benefit of higher capital levels appears to become asymptotic and becomes more limited above levels of risk-weighted capital of 11 per cent.

[16] The Swiss Finance Institute (2014) white paper notes that some large banks were able to meet increased capital requirements well ahead of implementation deadlines. The BCBS (2016a) recently mentioned that if the new Basel III capital rules had been fully in force at the end of June 2015, all the top banks would have met minimum CET1 capital requirements and target levels (including the capital conservation buffer). The rules come into full force in 2019, but regulatory and market pressure has prompted lenders to comply sooner, to dispel any doubts about their health.

[17] See Acharya 2012, Vallascas and Hagendorff 2013, Mariathasan and Merrouche 2014, Blundell-Wignall et al. 2014. Weaknesses in risk modelling and assessment are causing financial authorities in some countries to be reluctant to rely excessively on the risk-weighted asset framework. The BCBS is currently undertaking a revision of the framework that might significantly affect future minimum capital requirements and ratios for certain banks (expected to be in effect as of 2019).

[18] A joint study by Oliver Wyman and Morgan Stanley (2015) shows that wholesale bank balance sheets supporting traded markets have decreased by 40 per cent in terms of risk-weighted assets and 20 per cent in total balance-sheet

of capital[19] and credit provisioning, the cumulative effect of higher capital and liquidity safety margins could push some activity to the non-bank sector (IMF 2012). There is evidence that banks are divesting themselves of more capital-intensive business lines, such as investment banking activities, and may be retrenching from non-core markets (Oliver Wyman and Morgan Stanley 2015, Wilkins 2015). This leads to lower-risk bank business models (although it also reduces the opportunity to diversify assets) but not necessarily lower risk in the financial system if activities are migrating to non-regulated non-banking market players.[20] Although this could partially enhance overall financial system stability (given the improved ability of some shadow banking players to focus on long-term lending, and also because losses would be shared among more players) the migration of risks to other areas of the financial system requires increased monitoring efforts from authorities and stresses the need for an evolving and potentially enlarged regulatory perimeter.

Market-based reforms

Regulatory reform is bringing important changes to the way derivatives are traded. Central clearing of derivatives was a fundamental tenet of regulatory reform to reduce contagion risks and interconnectedness between financial institutions. Increasing volumes of OTC derivative contracts are now centrally cleared.[21] The drawback is a concentration of risks at the level of central counterparties and potential increases in the cost of financial intermediation. However, these risk areas are either the subject of ongoing work and addressed through careful implementation, or will be subject to continuous monitoring, since regulators are aware that there is a need to ensure that central counterparties do not themselves become too big to fail. Accordingly, in 2015, the FSB developed, together with CPMI, IOSCO and the BCBS, a work plan for identifying and addressing remaining gaps in, and potential financial stability risks relating to, CCPs that are systemic across multiple jurisdictions. The plan covers resilience, recovery and resolution and expects to reinforce the CCPs' transparency, stress testing and risk-management framework. This includes establishing systematic cross-border resolution-planning processes for the largest CCPs and ensuring that they hold increased resources to deal with the failure of one of a CCP's members. In Canada, federal authorities are

---

terms between 2010 and 2015. Further, a recent survey by the consultancy group Ernst & Young (2015) has found that the Basel III rules are having an impact on banks' business models by pushing them out of more complex, less-liquid products and limiting the number of jurisdictions in which they are active.

[19] There is evidence that credit provision to the real economy has not been severely affected by the introduction of more-stringent regulation, with banks meeting higher capital requirements through retained earnings and by raising new equity (FSB 2015a). Other factors, such as very low interest rates globally, may have helped banks weather the impact of higher capital costs.

[20] The FSB "Global Shadow Banking Monitoring Report" (2015d) shows faster growth in shadow banking assets globally than in banking assets over recent years.

[21] Since 2010, average volumes of OTC interest rate and credit derivatives cleared by US and European CCPs increased fourfold and onefold, respectively (FSB 2015e). In the United States, a large proportion of the index market for interest rate derivatives and credit default swaps (CDS) is now centrally cleared. According to ISDA, during the first half of 2015, 75 per cent of average daily nominal volumes in interest rate derivatives were centrally cleared. That compares with 57.9 per cent in the first quarter of 2013, before the US clearing mandates came into force. In Canada, 74 per cent of interest rate OTC derivatives' volumes were centrally cleared as of the second quarter of 2015; this is up from 46 per cent two years before. The interest rate derivatives market is the largest derivatives asset class, comprising 80 per cent of total derivatives notional outstanding, according to the Bank for International Settlements. Similarly, in the CDS index market, 77.5 per cent of daily average notional volume was centrally cleared over the first half of 2015. Despite the trend toward central clearing, a significant share of the derivatives market will remain outside of clearing houses, e.g., cross-currency swaps, which are not currently centrally cleared (ISDA 2015a).

examining a Canadian resolution regime for designated FMIs,[22] and the Bank is leading Canada's international engagement on FMI resolution.

Market analysts frequently note concerns about a reduction in liquidity in a number of markets and view this as a spillover from the post-crisis regulatory changes.[23] The rationale is that new regulations that have forced dealers to be better capitalized and to manage risk more prudently have increased the cost of market-making and promote exit from these business areas. There are also concerns that uneven implementation of reform measures across jurisdictions could be contributing to some of the fragmentation in derivatives markets (ISDA 2015b).[24] Globally, while current levels of liquidity appear similar to those observed before the crisis, sudden spikes in illiquidity[25] seem to have become more common. However, direct evidence of a deterioration in market liquidity is hard to obtain.[26, 27, 28] Beyond regulation, there could be other factors at play, such as a move toward electronic trading platforms, dark pools and the characteristics of new market participants, e.g., longer-term oriented and less willing to trade (PricewaterhouseCoopers 2015). Nevertheless, regulators have been putting increased emphasis on analyzing market conditions to better understand the phenomenon and its implications.

Credibility of resolution

A move toward credible resolution regimes that allow for the effective resolution of G-SIBs in the event of failure is expected to impose greater market discipline and limit taxpayers' exposure to loss by progressively replacing discretionary regulatory actions by an orderly framework based on ex ante rules. To this end, the FSB's Key Attributes of Effective Resolution Regimes for Financial Institutions set out core elements of an operational resolution regime. FSB members have committed to implementing the Key Attributes, with the United States and European Union member countries already having adopted operational resolution

---

[22] Work is currently on track toward the development of high-level policy proposals for the regime.

[23] The IMF (2015a) finds that regulatory changes, coupled with bank balance-sheet weaknesses, can explain roughly half of the drop in cross-border claims to GDP from their pre-crisis levels. See also CGFS (2016), available at http://www.bis.org/publ/cgfs55.htm.

[24] Members of the ISDA (2015) noted that derivatives dealers appear to be doing more business with domestic counterparties in part because of more-stringent, and sometimes inconsistent, rules. A number of differences have emerged in the timing and substance of derivatives regulations in individual jurisdictions. Rather than being subject to multiple, potentially inconsistent requirements, derivatives users appear to be increasingly choosing to trade with counterparties in their own jurisdictions. ISDA research shows that 87.7 per cent of regional European interdealer volume in euro interest rate swaps was traded between European dealers in the fourth quarter of 2014, compared with 73.4 per cent in the third quarter of 2013. The change in trading behaviour coincided with the introduction of the US Swap Execution Facilities (SEF) rules, which encouraged non-US entities to avoid trading mandated products with US counterparties so as not to be required to trade on an SEF registered with the US Commodity Futures Trading Commission that offers restrictive methods of execution for these instruments.

[25] E.g., the equity market flash crash of 2010, the flash rally in Treasury yields on 15 October 2014 and the recent equity market volatility on 24 August 2015.

[26] Adrian et al. (2015a) and Adrian et al. (2015b) suggest that although liquidity risk in equities and Treasuries increased, there is no such evidence for corporate bonds.

[27] In a recently published analysis (Benos, Payne and Vasios 2016) of the impact of the *Dodd-Frank Act* on interest rate swap markets, the Bank of England recognizes an increase in geographical fragmentation. Nevertheless, the analysis also notes that there were significant (positive) effects for trading US-dollar-denominated swaps, since execution costs for banks and other market participants, such as corporations, fell substantially. As such, results suggest that there were improvements in transparency and no measurable negative impact on overall liquidity.

[28] As described in the December 2015 *Financial System Review*, the Bank of Canada is working on additional liquidity metrics for Government of Canada bond markets.

regimes. However, progress toward implementing statutory regimes that incorporate the bail-in provisions envisaged in the FSB's Key Attributes has been uneven across jurisdictions. In Canada, following public consultation on features of the potential bail-in framework during the summer of 2014, the government announced its intention to implement a statutory bail-in regime for Canada's systemically important banks (2015 and 2016 *Budget Implementation Act* I), in line with international standards and best practices. A limited contractual bail-in regime is already in place: since 2013, all newly issued subordinated debt and preferred share issuances have had to comply with non-viability contingent capital rules to qualify as regulatory capital. Globally, there is strong empirical evidence of a reduction in implicit subsidies accruing to banks perceived as too big to fail[29] since the peak of the crisis (IMF 2014, Santos 2014, Noss and Sowerbutts 2012, Schich and Lindh 2012, Haldane 2010, Ueda and di Mauro 2013), which might reflect increased financial system resilience.[30] Credit-rating agencies have also been revising their bank rating methodologies and public support expectations downward in response to "new forms of bank resolution."[31] However, given the relative novelty of these innovative resolution tools, the willingness, and capacity, of authorities to use such powers remain untested (Goodhart and Avgouleas 2014).[32]

Sufficient loss-absorbing capacity (resources that may be bailed-in) is a pre-condition for bail-in regimes to be credible. The FSB finalized the total loss-absorbing capacity (TLAC) requirement[33] in November 2015. Although the TLAC requirement applies only to G-SIBS, its features are likely to influence the final design of the Canadian loss-absorbing capacity requirements, which should be in force for D-SIBs as part of the introduction of a domestic bail-in regime,[34] and the Minimum Requirement of Eligible Liabilities (MREL) standard in Europe. According to the FSB, the introduction of the requirement, as well as improved bank resolution regimes, is estimated to reduce the cost of a financial crisis by 5.4 percentage points of GDP.[35] Further, academic literature reviewed by the FSB suggests that enhancements to resolution decrease the

[29] Although subsidies still appear to persist.

[30] These analyses also show that some implicit subsidies persist, suggesting that challenges to effective resolution still remain. Likewise, ratings agencies continue to factor in expectations of public support.

[31] Given the newly improved regulatory environment, in particular the introduction of bail-in resolution tools, credit-rating agencies began revising their methodologies and assumptions about government support. Going forward, the rating assigned to each creditor class will incorporate specific expectations for loss given failure in response to different forms of resolution and pre-existing loss-absorbency capacity. In anticipation of a forthcoming bail-in framework in Canada, Moody's, S&P, DBRS and Fitch issued negative outlooks for the ratings of the largest domestic banks (domestic systemically important banks and the Caisse centrale Desjardins).

[32] The authors argue that a bail-in should work to limit financial instability in specific stress environments but is likely to be procyclical and ineffective in a systemic crisis scenario, amplifying the potential for runs and financial instability.

[33] The main features of the TLAC standard are as follows: (i) (external) TLAC of 16–18 per cent of risk-weighted assets, without including capital buffers. As a backstop, there is a TLAC Leverage Ratio Exposure Minimum, proposed at 6 per cent–6.75 per cent; (ii) In addition to the minimum external TLAC, there is an internal TLAC requirement, equal to 75 per cent–90 per cent of external TLAC, applied to material subgroups. Implementation will take place in two phases. Phase 1 of the conformance period begins 1 January 2019, and Phase 2 on 1 January 2022. Phase-in periods for global systemically important banks headquartered in emerging-market economies (four Chinese banks as per the 2015 G-SIB list) are further extended to 2025 and 2028. Banks that become G-SIBs after 2019 will have a grace period of 36 months to meet the standard. If a bank fails and enters resolution, it will have 24 months to come back into compliance with TLAC if it is still determined to be a G-SIB after it exits resolution.

[34] As of September 2015, the "HLA proxy" for Canadian D-SIBs ranged between 28 per cent and 40 per cent of risk-weighted assets, meaning the banks should have the capacity to meet a high calibration for the requirement.

[35] This relates to the combined effect of the lower fiscal costs (no bail-outs) and greater leeway for use of fiscal policy (3.8 percentage points) and the impact of lower yields during crisis periods on the credit costs of the private sector (1.6 ppt).

probability of crises by one-third, also due to the disciplinary effects of greater loss absorbency on risk taking.

Despite material progress on resolution, further substantial work remains to be done with regard to the cross-border recovery and resolution of global banks. Concerted efforts between national regulators[36] could help reduce the potential for disruptive ex post ring-fencing actions, which would undermine the spirit of international co-operation.

3. Conclusion

The main expected benefits of the regulatory reform agenda are greater stability and reduced impact of future financial crises. Globally, there is some evidence that the regulatory reform agenda is working toward effectively addressing the regulatory shortcomings and market failures that contributed to the Great Recession. Enhanced supervision and market discipline, greater transparency and changes to culture work to limit excessive risk taking by market participants, especially banks, and should limit the impact of a crisis. Macroprudential policy appears to be the correct tool to build resilience ex ante and to counter emerging risks and vulnerabilities, suggesting that there may be less of a case for using monetary policy to counter vulnerabilities, since it seems to be a relatively less effective and more costly tool to "lean against the wind."

Looking ahead, continued progress on implementation is needed to fully assess the impact of the financial reform agenda. Potential unintended, and unattended, consequences risk impacting the effectiveness of the reforms. Remaining and emerging challenges relate to the (in)consistency of implementation and coordination of policies across jurisdictions; concerns over reduced market liquidity and its potential impact, particularly during stress periods; the need to ensure that resolution frameworks are credible; and the impact of a prolonged cycle of expansionary monetary policies in stemming new vulnerabilities.

Although the G20 and the FSB are putting greater emphasis on monitoring implementation and outcomes to ensure that the spirit of the international reforms is not compromised, the pace of implementation has been uneven and there have been inconsistencies in implementation across jurisdictions.

Canada has been at the forefront of the process of drafting and implementing regulatory reform. Despite the challenges, the resilience of the financial system is Canada is being enhanced by the ongoing implementation of more rigorous global regulatory and supervisory standards. Consequently, the likelihood and impact of severe financial stress should be reduced in the future. Increased financial resilience supports the focus of monetary policy on achieving its primary goal: meeting the 2 per cent inflation target.

[36] Effective cross-border recognition of resolution, as well as regulatory co-operation, requires increased harmonization of resolution frameworks and powers. Ideally this would mean establishing a statutory framework for cross-border recognition of resolution actions. In the interim, the new ISDA Protocol is an important step, since it may prove effective in extending the reach of certain resolution actions beyond national borders (e.g., the ability to stay early termination of derivatives contracts). The success of this mechanism requires broad adoption by market participants and global reach.

References

Acharya, 2012. “The Dodd-Frank Act and Basel III: Intentions, Unintended Consequences, and Lessons for Emerging Markets”. ADBI Working Paper 392, October.

Adrian, Fleming, Stackman, and Vogt, 2015a. “Has Liquidity Risk in the Treasury and Equity Markets Increased?” Federal Reserve Bank of New York Liberty Street Economics Blog, October.

Adrian, Fleming, Shachar, Stackman, and Vogt, 2015b. “Has Liquidity Risk in the Corporate Bond Market Increased?” Federal Reserve Bank of New York Liberty Street Economics Blog, October.

Bank for International Settlements and International Organization of Securities Commissions, 2012. “Principles for financial market infrastructures”, April.

Basel Committee on Banking Supervision (BCBS), 2016a. Basel III Monitoring Report, March.

BCBS, 2016b. Tenth progress report on adoption of the Basel regulatory framework, April.

BCBS – Macroeconomic Assessment Group, 2010. "Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements", December.

BCBS – Macroeconomic Assessment G Group, 2011. "Assessing the macroeconomic impact of higher loss absorbency for global systemically important banks", October.

Benos, Payne and Vasios, 2016. “Centralized trading, transparency and interest rate swap market liquidity: evidence from the implementation of the Dodd-Franck Act”, Bank of England staff working paper No. 580, January.

Blundell-Wignall, Atkinson, and Roulet, 2014. “Bank business models and the Basel system: complexity and interconnectedness”, Financial Market trends, Issue 2.

Chouinard and Paulin, 2014. “Making Banks Safer: Implementing Basel III,” Bank of Canada Financial System Review, 53–59, June.

Department of Finance Canada, 2015. “Taxpayer protection and bank recapitalization regime: consultation paper”, August.

Ernst & Young, 2015. “Rethinking risk management”, 2015 risk management survey of major financial institutions.

European Commission, 2014. “Economic Review of the Financial Regulation Agenda”, Commission staff working document.

Financial Stability Board (FSB), 2009. “FSB Principles for Sound Compensation Practices Implementation Standards”.

FSB, 2015a, “Overview of Progress in the Implementation of the G20 Recommendations for Strengthening Financial Stability”, report to G20 Leaders.

FSB TLAC Steering Group, 2015b. “Summary of Findings from the TLAC Impact Assessment Studies”, report.

FSB, 2015c. “Principles on Loss Absorbing and Recapitalization Capacity of G-SIBs in Resolution, Total Loss Absorbing Capacity (TLAC) Term Sheet”, report.

FSB, 2015d. "Global shadow banking monitoring report 2015", report, November.

FSB, 2015e. “FSB 2015 Workshop on Compensation Practices”, report, April.

FSB, 2015f. “Ninth Progress Report on Implementation of OTC Derivatives Market Reforms”, report, July.

FSB, 2015g. “Summary of Findings from the TLAC Impact Assessment Studies”, overview Report. November.

Freixas, Laeven and Peydro, 2015. “Systemic risk, crisis, and macro-prudential regulation”, MIT Press.

Goodhart, Avgouleas, 2014. “A Critical Evaluation of Bail-Ins as Bank Recapitalisation Mechanisms”, Centre for Economic Policy Research Discussion Paper 10065, July.

Haldane, 2010. “The $100 billion question.” Speech at the Institute of Regulation & Risk, North Asia (IRRNA), Hong Kong, March.

International Monetary Fund (IMF), 2012. “Assessing the Cost of Financial Regulation”. IMF Working Paper WP/12/233, September.

IMF, 2014. “How Big is the Implicit Subsidy for Banks Considered Too Important to Fail?”, Global Financial Stability Report, Chapter 3, April.

IMF, 2015a, “Navigating Monetary Policy Challenges and Managing Risks”, Global Financial Stability Report, April.

IMF, 2015b. “From banking to sovereign stress: implications for public debt”.

International Organization of Securities Commissions, 2013. “Principles for Financial Benchmarks”, July.

International Swaps and Derivatives Association (ISDA), 2015a. “The Dodd-Frank Act: Five years on”. Briefing note, July.

ISDA, 2015b. “The Impact of Compression on the Interest Rate Derivatives Market”. Research Note, July.

Jordà, Schularick, and Taylor, 2014. “Sovereigns versus banks: Credit, crises and consequences” Institute for Economic Thinking Working Paper No. 3 or Federal Reserve Bank of San Francisco Working Paper Series 2013-37

Junge, Kugler, 2013. “Quantifying the impact of higher capital requirements on the Swiss economy”, Swiss Journal of Economics and Statistics, Volume 149, issue III, 313-356.

Kryvstov, Molico, Tomlin, 2015. “On the Nexus of Monetary Policy and Financial Stability: Recent Developments and Research”, Bank of Canada internal note.

Lane, 2016. “Monetary Policy and Financial Stability—Looking for the Right Tools” remarks at HEC Montréal, Montréal, Quebec, 8 February 2016.

Luttrell, Atkinson and Rosenblum, 2013. “Assessing the Costs and Consequences of the 2007–09 Financial Crisis and Its Aftermath”, Economic Letter, Dallas Fed, volume 8, number 7, September.

Mariathasan, Merrouche, 2014. “The manipulation of Basel risk-weights”. Journal of Financial Intermediation 23(3), 300–321.

Miles, Yang and Marcheggiano, 2011. "Optimal bank capital". Bank of England Discussion Paper n. 31.

Noss, Sowerbutts, 2012. “The Implicit Subsidy of Banks,” Financial Stability Paper No. 15, Bank of England.

Oliver Wyman and Morgan Stanley, 2015. “Wholesale & Investment Banking Outlook”, Blue Paper, March.

Poloz, 2014. “The Legacy of the Financial Crisis: What we know, and what we don’t”, remarks at the Canadian Council for Public-Private Partnerships, Toronto, Ontario, 3 November 2014.

PricewaterhouseCoopers 2015, “Global financial markets liquidity” paper, August.

Santos, 2014. “Evidence from the Bond Market on Banks’ ‘Too-Big-to-Fail’ Subsidy,” Economic Policy Review, Federal Reserve Bank of New York, Volume 20, Number 2.

Schich, Lindh, 2012. “Implicit Guarantees for Bank Debt: Where Do We Stand?”, OECD Journal: Financial Market Trends.

Schularick, Taylor, 2012. “Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008”. The American Economic Review 102(2), 1029.

Swiss Finance Institute (Jean-Charles Rochet), 2014. “The extra cost of Swiss banking regulation”, white paper, February.

Ueda, di Mauro, 2013. “Quantifying structural subsidy values for systemically important financial institutions”, Journal of Banking & Finance, 37 (2013) 3830–3842, May.

Vallascas, Hagendorff, 2013. “The risk sensitivity of capital requirements: Evidence from an international sample of large banks”. Review of Finance 17(6), 1947–1988.

Wilkins, 2015. “Fragmentation Risk in Financial Services: A Retreat from Globalization?” panel remarks at the International Economic Forum of the Americas, Montréal, Quebec, 8 June 2015.

Appendix

Key post-crisis regulatory reform measures (2009–15)

Area of reform	Measure	Requirement	Implementation	
			Global	Canada
Building Resilient Financial Institutions				
Minimum capital requirements	Common Equity Tier 1	4.5% risk weighted assets (RWA)	2013-2015	Implemented
	Tier 1	6% RWA	2015	Implemented
	Total Capital	8% RWA	2012	Implemented
	Capital Conservation Buffer	2.5% RWA	2019	Phase in by 2019
	Countercyclical Capital Buffer	0 - 2.5% RWA	2016 - 2018	Phase in by 2019
	Leverage Ratio	3% total assets	2016 - 2018	Implemented (disclosure)
Liquidity regulations	Liquidity Coverage Ratio	Cover net cash outflows over 30 days	2019	2015 (disclosure)
	Net Stable Funding Ratio	Stable funding beyond 1 year	2018	2018 (minimum standard)
Ending "Too Big To Fail"				
Identification of systemically important financial institutions (SIFIs)	SIFI designation[1]	Standard	30 G-SIBs, 9 G-SIIs (updated annually)	6 D-SIBs (2013)
Crisis management, recovery and resolution	Recovery and resolution plans	Periodic submissions	2011	2013
	Bail-in regime	Legal powers to recapitalize failed institutions	In effect in Eurozone and US	2013 (contractual bail-in/NVCC)
	Total Loss Absorbing Capacity (TLAC) standard	16-18% RWA loss absorbency	2019 - 2022; 2022-2025 for EME G-SIBs	-
	Systemically Important Bank surcharge	1-3.5% RWA	2014	2016
	Structural reform[2]	Separation between "core" banking functions and investment banking/capital market activities.	FSB, IMF, OECD to update in 2016	Not currently envisoned
	Cross-border recognition of resolution regimes	Contractual recognition (ISDA Resolution Protocol); Statutory recognition regimes (in progress)	ISDA Protocol adherence: 2014 (18 G-SIBs)	-
Enhanced supervision	Reinforced supervisory frameworks	Principles for effective risk data aggregation and risk reporting	2016	On-going
Toward increased confidence in financial markets and infrastructures				
Over the Counter (OTC) derivatives market reform[3]	Reporting to trade repositories (TR)	All OTC derivatives reported to TRs	Majority of FSB jurisdictions have reporting requirements in place on over 90% of OTC derivatives (2015)	Final rules in place for certain provinces (ON, QC, and MB) as of Oct 2014
	Centralized trading and clearing for standardized contracts	Standardized derivatives to be centrally cleared through central counterparties	7 FSB members (as of June 2015); 50% FSB members (expected by end 2016)	Legislative framework in place to determine criteria for centrally cleared transactions
	Higher margin requirements for non-centrally cleared contracts	8 key principles (BIS September 2013)	Phase-in rules (end-2015)	2016 (margin requirements for non-centrally cleared derivative)
	Higher capital requirements for non-centrally cleared contracts			
Principles for Financial Market Infrastructures (FMIs)	24 FSB key principles	FMIs to incorporate Principles	2012	2012
FMI recovery and resolution	Key principles setting out recovery and resolution frameworks	Minimum capital for FMIs, recovery plans		2015
Reducing mechanistic reliance on external ratings (CRA)	Principles for reducing mechanistic reliance on credit rating agencies	Develop alternative standards of creditworthiness	2012	Mechanistic reliance on CRA ratings has been eliminated in the investment of Canada's foreign exchange reserves; limited progress on addressing references to CRA ratings in regulation and supervision
Reforming financial benchmarks (interest rate)	Enhanced IBORs: LIBOR, EURIBOR and TIBOR	Enhance existing IBORS and develop alternative risk-free rates	2015	-
Toward resilient market-based finance				
Monitoring Exercises	Annual Global Shadow Banking (SB) Monitoring	Measure and monitor trends and growth	2011	Semi-Annual domestic SB monitoring, participation in international exercises
Mitigate risk of spillovers	Risk sensitve capital requirements for banks' investments in the equity of funds		2017	Implemented as part of Basel III (confirm)
	Large exposure limits	25% of Tier 1 capital, 15% for G-SIBs	2019	Implemented as part of Basel III (confirm)
Regulation and management of Money Market Funds (MMF)	Floating Net Asset Value	Floating Net Asset Value	US moving to floating NAV for prime funds. EU introduced a 3% capital buffer for fized NAV funds	Most MMFs remain fixed NAV
Greater transparency/ improved incentives in securitizations	Transparency, standardisation, and risk retention	Conducting "level one" peer review to assess and implement requirements	IOSCO's "level one" report in Q2-2015	
Dampen procyclicality in securities financing transactions	Minimum haircuts on non-centrally cleared transactions	Minimum haircuts for bank to non-bank transactions	End-2017	Unlikely to implement for NB-to-NB transactions (immaterial)

[1] Methodology for non-bank, non-insurers in progress

[2] E.g., US: Volker Rule; UK: Vickers Report; EU: Liikanen Report

[3] Includes reporting OTC derivative contracts to trade repositories; centralized trading and clearing for standardized contracts; higher capital and margining requirements for non-centrally cleared contracts