

CIGI Papers No. 191 – September 2018

Unpacking Macroprudential Policies

Strengths and Weaknesses

Idris Ademuyiwa, Pierre L. Siklos
and Samantha St. Amand



CIGI Papers No. 191 – September 2018

Unpacking Macroprudential Policies

Strengths and Weaknesses

Idris Ademuyiwa, Pierre L. Siklos
and Samantha St. Amand

CIGI Masthead

Executive

President **Rohinton P. Medhora**
Deputy Director, International Intellectual Property Law and Innovation **Bassem Awad**
Chief Financial Officer and Director of Operations **Shelley Boettger**
Director of the Global Economy Program **Robert Fay**
Director of the International Law Research Program **Oonagh Fitzgerald**
Director of the Global Security & Politics Program **Fen Osler Hampson**
Director of Human Resources **Laura Kacur**
Deputy Director, International Environmental Law **Silvia Maciunas**
Deputy Director, International Economic Law **Hugo Perezcano Díaz**
Director, Evaluation and Partnerships **Erica Shaw**
Managing Director and General Counsel **Aaron Shull**
Director of Communications and Digital Media **Spencer Tripp**

Publications

Publisher **Carol Bonnett**
Senior Publications Editor **Jennifer Goyder**
Publications Editor **Susan Bubak**
Publications Editor **Patricia Holmes**
Publications Editor **Nicole Langlois**
Publications Editor **Lynn Schellenberg**
Graphic Designer **Melodie Wakefield**

For publications enquiries, please contact publications@cigionline.org.

Communications

For media enquiries, please contact communications@cigionline.org.

🐦 [@cigionline](https://twitter.com/cigionline)

Copyright © 2018 by the Centre for International Governance Innovation

The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Centre for International Governance Innovation or its Board of Directors.



This work is licensed under a Creative Commons Attribution – Non-commercial – No Derivatives License. To view this license, visit (www.creativecommons.org/licenses/by-nc-nd/3.0/). For re-use or distribution, please include this copyright notice.

Printed in Canada on paper containing 100% post-consumer fibre and certified by the Forest Stewardship Council® and the Sustainable Forestry Initiative.

Centre for International Governance Innovation and CIGI are registered trademarks.

Centre for International Governance Innovation

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
www.cigionline.org

Table of Contents

| | |
|-----|---|
| vi | About the Authors |
| vii | About the Global Economy Program |
| 1 | Executive Summary |
| 1 | Introduction |
| 3 | Finding the Right Balance: Financial Liberalization versus Financial Repression |
| 6 | The Elements of Financial Stability and Macroprudential Frameworks: An International Perspective |
| 11 | Macroprudential Frameworks and Financial Repression: A Little Bit of Evidence |
| 16 | Conclusions and Policy Recommendations |
| 18 | Works Cited |
| 21 | Appendix: Country List |
| 22 | About CIGI |
| 22 | À propos du CIGI |

About the Authors

Idris Ademuyiwa is a CIGI research associate in the Global Economy Program. He has a B.Sc. and an M.Sc. in economics from the University of Ibadan and an M.A. in economics from the University of Waterloo. Prior to joining CIGI, Idris was a research fellow and head of the Trade Investment and Growth Unit at the Centre for the Study of the Economies of Africa, Abuja.

Idris's current research focuses on central banking, macroprudential policy and international financial regulations. His research interests also include international macroeconomics, Sub-Saharan African economies and regional trade agreements. Idris has produced chapters in books and published in peer-reviewed academic journals, including *Energy Economics* and *Economics Bulletin*.

Pierre L. Siklos is a CIGI senior fellow. He has held seven visiting researcher positions at central banks in European and Asian countries, including Germany, Hong Kong, Hungary and Japan. Pierre has also held more than 20 visiting fellowships at leading academic institutions, such as the International School of Economic Research in Siena, Italy, Oxford University in the United Kingdom and Princeton University in the United States.

He has a particular interest in central bank independence, the governance models of central banks and the challenges that arise in an interdependent world. To that end, he has compared and contrasted how European models of integration differ from those in Asia. His work in applied time series analysis and monetary policy focuses on inflation and financial markets.

Pierre teaches macroeconomics at Wilfrid Laurier University. He is a former chair of the Bundesbank Foundation of International Monetary Economics at Freie Universität in Berlin, Germany. He is also a research associate at Australian National University's Centre for Macroeconomic Analysis in Canberra, and a senior fellow at the Rimini Centre for Economic Analysis in Italy. Pierre serves on the editorial boards of *Economics Research International*, *Economic Systems* and the *Journal of Economic Research*, and is the former managing editor of the *North American Journal of Economics and Finance*.

Pierre earned his Ph.D. in economics from Carleton University and his M.A. in economics

from the University of Western Ontario. He joined CIGI as a senior fellow in 2009 and is fluent in English, French and Hungarian.

Samantha St. Amand is a CIGI senior research associate in the Global Economy Program. She has a B.A. (honours) in economics from Wilfrid Laurier University and an M.A. in economics from the University of Waterloo. Samantha previously worked as a research assistant at the Viessmann European Research Centre in Waterloo.

Samantha's current research focuses on central bank governance and policies, including the international implications of unconventional monetary policy, the effectiveness of monetary policy at the zero lower bound, and the role of central banks in financial stability policy. Her research has been published in several academic journals, including *Applied Economic Letters* and *Economic Notes*. Other research interests include global growth and debt sustainability, the euro-zone crisis and EU economic governance.

About the Global Economy Program

Addressing limitations in the ways nations tackle shared economic challenges, the Global Economy Program at CIGI strives to inform and guide policy debates through world-leading research and sustained stakeholder engagement.

With experts from academia, national agencies, international institutions and the private sector, the Global Economy Program supports research in the following areas: management of severe sovereign debt crises; central banking and international financial regulation; China's role in the global economy; governance and policies of the Bretton Woods institutions; the Group of Twenty; global, plurilateral and regional trade agreements; and financing sustainable development. Each year, the Global Economy Program hosts, co-hosts and participates in many events worldwide, working with trusted international partners, which allows the program to disseminate policy recommendations to an international audience of policy makers.

Through its research, collaboration and publications, the Global Economy Program informs decision makers, fosters dialogue and debate on policy-relevant ideas and strengthens multilateral responses to the most pressing international governance issues.

Executive Summary

The global financial crisis (GFC) put paid to the notion that financial shocks are benign most of the time and revived the idea that microprudential policies needed to be paired with macroprudential policies. These policy developments have been referred to as financial repression, in part because the pre-crisis belief that markets ought to be unfettered was being challenged. While restraints on the financial sector are largely welcome, it is worth considering whether the response to the fallout from the crisis is going too far. Arguably, lost in the discussion over financial reform is the need to balance the benefits and costs of financial liberalization versus financial repression. The paper highlights two weaknesses in current macroprudential policy strategies and presents some evidence of rising financial repression globally. First, a considerable emphasis has been placed on the content as opposed to the effectiveness of macroprudential frameworks. In addition, there is currently insufficient understanding of and experience with the global transmission of shocks that emanate from manipulating macroprudential instruments. Second, if macroprudential frameworks are increasingly used to reinforce economic sovereignty, this may threaten the transparency of the global financial system. Finally, empirical results that highlight the links between domestic institutions and the deployment of macroprudential instruments over the past decade are provided. Ultimately, the success and failure of any macroprudential framework must be evaluated by the strength and governance of domestic institutions that support its delivery.

Introduction

As the gradual normalization in monetary policy takes hold, efforts to understand how to combine a strategy aimed at keeping inflation stable and the economy at potential, while avoiding another major financial crisis, have not died down. It is easy to understand why. Pre-crisis conventional wisdom was that the economy could be kept at potential by using a monetary policy strategy that manipulates a policy rate such that inflation hovers near some

explicit or implicit target. Financial stability would then take care of itself or be supported using microprudential policy, that is, via the regulation and supervision of individual financial institutions. While there were a few voices claiming that financial stability would follow once best practices in monetary policy were in place (see, for example, Schwartz 1995) any causal link was downplayed. The GFC put paid to the notion that financial shocks are benign most of the time. Even if a second great depression was avoided (see, for example, Wessel 2009) policy makers had to revive an old idea, namely that microprudential policies needed to be paired with a macroprudential policy strategy.¹

Monetary policy has become intertwined with both microprudential and macroprudential policies in many parts of the world (see, for example, BIS 2018; Cerutti, Claessens and Laeven 2017; Lim et al. 2011; Lombardi and Siklos 2016). Because finance remains global, there are also ongoing attempts to achieve some cross-border agreements to limit the spread of financial shocks through regulatory arbitrage or contagion principally under the auspices of the Financial Stability Board (FSB).² Regardless of these developments, there is little doubt that the reforms to date amount to a return to a form of financial repression — in that they restrict the financial system's ability to provide credit. Lost in the discussion on efforts to banish the possibility of another financial crisis on the same scale as the GFC, is the need to balance the benefits and costs of the two-sided coin defined by financial liberalization versus financial repression. The second section of the paper briefly summarizes the literature concerning what we know about finding the right balance between these two forces in order to minimize the incidence of financial crises.

The paper then goes on to highlight two weaknesses in current macroprudential policy strategies. First, there is an excessive focus on the content as opposed to the effectiveness of macroprudential frameworks in advanced economies, in particular among the more systematically important ones

1 Macroprudential lines of thought are not new. They originated with Bach (1949) and Robinson (1950). They have simply found a new life since the GFC although more recent thinking, pre-dating the GFC, was spearheaded by the Bank for International Settlements (BIS). See, for example, Crockett (2000) and Borio (2003).

2 See www.fsb.org/what-we-do/policy-development/. Almost 70 agencies and central banks participate in the work of the FSB, which was created in 2009 (April) to replace the Financial Stability Forum. The FSB has no legal authority and essentially relies on a form of "moral suasion" to get its members to adopt its recommended policies.

(i.e., the United States, the euro zone, Japan and, more recently, China).³ This is understandable because the last two financial crises originated in that part of the world and learning about the overall impact of macroprudential instruments remains a work in progress.⁴ But the introduction of macroprudential instruments elsewhere, notably in emerging markets and developing countries, raises important questions about implications for monetary policy sovereignty (see, for example, Quarles 2018). If a macroprudential framework is a device that reinforces monetary autonomy, there are implications — for example, for our understanding of how exchange rate regimes absorb external shocks, as well as the incentives for cross-border cooperation. Put differently, the spread of macroprudential frameworks is a reminder, this time in the financial sphere, of the debate over spillover effects from unconventional monetary policies (UMPs) that were pursued for a decade by a handful of advanced economies (see, for example, Lombardi, Siklos and St. Amand 2018).

Second, if macroprudential frameworks are seen as reinforcing economic sovereignty, then there is the risk of a race to the bottom in the spread of a long list of policy instruments; this threatens to reduce the transparency of the global financial system.⁵ A false impression is given that the proliferation of macroprudential frameworks will make the global financial system safer when we have yet to develop a clear understanding of the economic effects of existing instruments. These weaknesses complicate the cooperative efforts of central banks and governments in international fora such as the FSB, the Group of Twenty (G20) and the International Monetary Fund (IMF), to give some examples, to find the appropriate level of constraints imposed on financial markets.

The good news is that there is some evidence of common features in macroprudential frameworks. Unfortunately, we have an insufficient understanding of the global transmission of shocks that might emanate from manipulating macroprudential instruments.⁶ The task is complicated because if the authorities react to an emerging problem that threatens financial stability, it can take some time for a preventive measure to take hold. In contrast, deactivating some macroprudential instrument may have an immediate impact (see, for example, Barwell 2013; BIS 2018). The bottom line, however, is that greater investment of resources in macroprudential strategies has translated into more financial repression without a clear statement about the appropriateness of current policy instruments.⁷

A consequence of the foregoing challenges is that existing attempts at evaluating the impact of macroprudential frameworks — a topic addressed in the third section of the paper — are unable to capture adequately the relative importance of the many components of existing macroprudential frameworks. Hence, the failure to reach strong conclusions, at an economy-wide level, about the effectiveness of macroprudential frameworks owes as much to mis-measurement and complexity as it does to lingering uncertainty about how effectively macroprudential instruments can withstand or prevent a large systemic global shock. Moreover, if changes in the balance between financial repression and liberalization swing too sharply (see, for example, Ademuyiwa, Siklos and St. Amand 2018; Bordo 2017; Siklos 2018) there are two additional consequences.

Excessive financial repression can increase the likelihood of complacency because policy makers believe that known sources of future financial crises have been identified. History, as we know it, disproves this hypothesis. In any case, just as too little regulation and supervision was one of the most important culprits of the GFC (see, for example, Blinder 2013), too much financial

3 It must be acknowledged that the regimes that define these frameworks in the economies other than China begin from positions that were far more liberal than has always been the case for China.

4 The GFC is the first crisis; it was soon followed, beginning in 2010, with the euro-zone sovereign debt crisis.

5 Complicating matters is that some instruments are meant to be pre-emptive while others are intended to increase the resilience of the financial system. The distinction also raises the question of whether the authorities responsible for ensuring financial system stability should “lean against the wind” if signs point to a future crisis or seek to minimize the severity of financial market turbulence. The paper sidesteps the issue to focus on the other questions raised; however, see Svensson (2017), and Filardo and Rungcharoenkitkul (2016).

6 Let alone the effectiveness of communicating such policies, which includes moral suasion. Moreover, we do not know what the global economic impact would have been under a counterfactual wherein unconventional or unorthodox monetary policies are deployed in a more coordinated manner than has been the case.

7 As one reviewer correctly pointed out, the scale of the various forms of intervention in the sphere of monetary policy and financial stability policy spilled over into the political sphere with global cries to never let an event like the GFC happen again.

repression creates forces that will eventually lead to a rollback of constraints on the financial sector. Indeed, the response to the last major crisis, the scale of which was only surpassed by the Great Depression almost 80 years earlier, may well harbour conditions that will produce an even larger financial crisis in future. To borrow from Rudiger Dornbusch's aphorism: "In economics, things take longer to happen than you think, and then they happen faster than you thought they could."⁸

Finally, the paper presents some statistical evidence that financial repression has risen globally, as well as econometric evidence that highlight the links between domestic institutions and the deployment of macroprudential instruments. The implication is that the success and failure of any macroprudential framework cannot be divorced from the strength and governance of domestic institutions that support its delivery.

The paper concludes with a summary and some policy recommendations. Even if the introduction and deployment of a large number of macroprudential instruments indicates welcome activism on the part of policy makers who do not wish to relive the GFC or the euro-zone sovereign debt crisis, what is fundamentally needed are only a few interventions at the micro- and macroprudential levels. Arguably, we remain in the exploratory phase of learning which macroprudential tools work best. Nevertheless, introducing too many tools simultaneously may also make it difficult to determine which ones will be most effective in future unless we understand how they interact with each other. A multiplicity of instruments, while useful, will not prevent the next crisis.

8 Dornbusch was a professor of economics at the Massachusetts Institute of Technology and the statement has been attributed to him but not apparently in any published work. Instead, it has been repeated by former students and colleagues. For example, see Summer (2011).

Finding the Right Balance: Financial Liberalization versus Financial Repression

The occurrence of booms and busts in financial markets is now well established. A great deal of empirical evidence has accumulated, especially over the last decade, demonstrating the recurrence of financial crises and their lingering economic impact (see, for example, Bordo and Landon-Lane 2010; Jordà, Shularick and Taylor 2016, and references therein). The topic continues to fascinate because financial crises differ considerably according to their sources, scope and impact on inflation and real economic growth (see, for example, Bordo 2017; Reinhart and Rogoff 2009; Romer and Romer 2017). Much like the business cycle is a staple of macroeconomic analysis, so has the financial cycle become *de rigueur* an area that is becoming studied more intensely (see, for example, Borio 2012; Jordà et al. 2016). However, an important distinguishing characteristic of financial cycles is that their duration is longer and they occur less frequently than business cycles.

Historically, in response to a financial crisis, it is common to tighten standards of lending and generally restrict the financial system's ability to provide credit. This kind of response is known as financial repression.⁹ Eventually, episodes of financial repression give rise to financial liberalization.

The economics profession has made great strides in improving our knowledge of the economic impact of financial crises, covering well over a century of data, and the swings between eras of financial repression and liberalization are known to exist and have been studied for decades. Ronald I. McKinnon (1973) and Edward S. Shaw (1973) are early examples who explored the impact of financial liberalization. Since financial crises used to be concentrated in emerging market developing countries (see, for example, Claessens and Kose

9 Examples of policies that repress the financial system include interest rate ceilings, liquidity ratio requirements, high bank reserve requirements, capital controls and credit allocation restrictions, to name a few. This issue is returned to later in the paper.

2013) there was, understandably, a focus on the economic impact in these countries. The large literature that emerged could not, however, come to a widely shared consensus about the net benefits of financial liberalization except to underscore the importance of institutional design and governance as decisive variables in the outcome. Studies in this vein include Nouriel Roubini and Xavier Sala-i-Martin (1992), Asli Demirgüç-Kunt and Enrica Detragiache (1998), Ilan Noy (2004) and Anginand, Sawangngoenyuan and Wihlborg (2010).¹⁰ Others argue (see, for example, Reinhart, Reinhart and Rogoff 2015) that financial repression is a vehicle to reduce high and, presumably, unsustainable, debt-to-GDP ratios built up after wars.

The GFC of 2007-2008 revived the issue of the costs versus the benefits of a more *laissez-faire*-style financial system like the one that prevailed in the years leading up to the GFC. However, instead of a discussion about whether financial repression should once again rule financial systems as it did decades ago, the debate focused on finding the right combination of regulation and controls on the ability of financial institutions to extend credit without imperiling financial system stability.¹¹ Emphasis was instead on finding mechanisms that would limit the extent to which the public sector would be required to absorb the financial and economic consequences of future financial crises (see, for example, Honohan, Lombardi and St. Amand, forthcoming 2019; Mayes, forthcoming 2019, and references therein).

These developments highlight differences between the GFC and earlier financial crises since the Great Depression of 1929–1933. First, the globalization of finance that began in earnest during the 1980s, and gathered pace during the early 2000s (see, for example, Broner and Ventura 2016; Levy-Yeyati and Williams 2011), meant that financial shocks, especially from the large economies (that is, the United States, the euro zone, Japan and, more recently, China), were transmitted more quickly and with greater economic impact around the globe.

The relaxation of restrictions on the movements of funds and capital worldwide clearly contributed to this development (see, for example, Chinn and Ito 2006). Next, unlike financial crises since World War II, the latest crisis originated in advanced economies, not emerging market developing countries. Consequently, the implications were not only potentially global, but grew out of financial systems in economies that previously extolled the virtues of unfettered financial systems.¹²

What emerged from the GFC is a revival of an idea that circulated in the early 2000s: financial system stability cannot be adequately secured through conventional regulation and supervision — that is, via microprudential means — and the conventional interest rate tools of monetary policy can be too blunt to achieve this goal. What is required is a macroprudential framework alongside a microprudential one in order to contain the aggregate economic consequences of financial booms and busts (see, for example, Barwell 2013). While it is acknowledged that macroprudential frameworks imply a form of financial repression (see, for example, Reinhart, Kirkegaard and Sbrancia 2011; Reinhart and Sbrancia 2015), what is emphasized is the need to reign in the financial sector just enough to prevent a recurrence of large financial crises. Put differently, in the aftermath of financial crises, the benefits of financial repression are extolled, while financial liberalization is seen as delaying economic costs that may emerge in the future.

More than a decade has passed since the first hints of the looming financial crisis became clear. Nevertheless, there continue to be many unknowns about the scope, consequences and effectiveness of macroprudential regimes in place. While the BIS (2018, chapter IV) claims that macroprudential policy strategies have made the financial system more resilient to the changes since the end of the GFC, the same report goes on to state that these developments are no “panacea.”

¹⁰ Interestingly, this literature ignores a role for the exchange rate regime. See, for example, Siklos (2017, chapter 3).

¹¹ The recognition that some financial repression is desirable especially, but not exclusively, when government debt-to-GDP ratios are large has spawned a sizeable literature that considers both the post-World War II experience and earlier historical episodes, as well as the development of theoretical models to explain how economies can extricate themselves from unsustainable debt positions. See, for example, Chari, DAVIS and Kehoe (2016), which also contains a good review of the relevant literature.

¹² See, for example, Reinhart and Rogoff (2009) and Siklos (2017, chapter 4) for a description of the incidence of financial crises in advanced economies versus emerging market developing countries and possible links with inflation and real economic growth. Both works also contain references to other relevant studies of this kind. While it is commonplace to refer to the events of 2007-2008 as the global financial crisis, it is also the case that many economies in the Asia-Pacific did not suffer the same fate as did much of the advanced world. Nevertheless, the GFC expression, while an apt description of the worldwide impact of the financial crisis, is also referred to as the great financial crisis. In what follows the original meaning of GFC is retained.

The list of unfinished tasks that remain to be completed, while ensuring stable and sustainable economic growth, remains long and daunting. Joshua Aizenman, Menzie D. Chinn and Hiro Ito (2017) represent one of the few studies that highlight the differential effects of macroprudential frameworks in advanced economies versus emerging market developing countries.¹³

There are at least two reasons for continued skepticism about the role of macroprudential frameworks. First, unlike monetary policy, which, for good or ill, was reduced to a Taylor rule-type relationship, all observers agree that macroprudential frameworks have the potential to include a large number of complex policy instruments that can be deployed.¹⁴ Notwithstanding the hidden complexities and sophistication that underpin the conduct of monetary policy via a reaction function there is, as yet, no comparable way of describing what type of macroprudential instrument should be activated, changed or deactivated such that financial system stability is obtained.¹⁵ Second, and discussed to a far lesser extent, the proliferation of macroprudential frameworks, a sovereign prerogative, risks creating new tensions in the global economy. The implementation of UMPs, as well as current developments that see some central banks emerging more quickly from extraordinarily loose monetary conditions, have created frictions between policy makers.¹⁶ The prospect of macroprudential frameworks leading to spillovers across the globe, and likely ones that are far more difficult to detect and measure than the consequences of changing stances in monetary policy, promises to generate even more

conflict among policy makers, especially in fora such as the Group of Seven and the G20.¹⁷ Stated differently, despite the emergence of common macroprudential frameworks around the globe that reflect the spread of best practices, the introduction of a large number of instruments can also be viewed as tit-for-tat measures that need not guarantee financial system stability. The resulting hidden complexities may well harbour potentially negative side effects. This is just another way of arguing that spillovers matter and that there are often unintended consequences from the deployment of macroprudential instruments.¹⁸

Matters are made more difficult because we are only in the early stages of attempting to understand how existing frameworks are organized and how their governance structures operate; even agreeing on the kinds of interventions that are considered macroprudential in nature is a challenge. For example, reserve requirements were at one time considered an instrument of monetary policy,¹⁹ but they have now been repurposed as an instrument of macroprudential policy.

The small literature that attempts to quantify existing macroprudential frameworks encompasses quite different views about policies and instruments aimed specifically at maintaining financial stability. Domenico Lombardi and Pierre Siklos (2016) briefly review this literature; more recent attempts at measurement (see, for example, Budnik and Kleibl 2018) are more narrowly focused (i.e., focusing only on the experience of the European Union [EU]). Both of these efforts share the potential drawback of evaluating *de jure* over *de facto* elements of macroprudential frameworks.

Essentially, boiling down macroprudential frameworks to a series of indexes relies on cataloguing the number and type of policy

13 The authors refer to these countries as core (United States, euro zone, Japan) while the remaining countries are considered periphery economies.

14 It is likely that the case of the European Central Bank is a unique one since its supranational character creates tensions related to sovereignty that other countries may not have to face.

15 Indeed, the tendency is to modify a standard Taylor rule by adding one or more determinants intended to capture the financial stability objective of the central bank. Which one ought to be selected or whether a vector of these instruments should stand in as the proxy for financial stability remains unclear. While there are a growing number of studies claiming that counter-cyclical capital buffers are among the most effective instruments (see, for example, Aikman et al. 2017), how these interact, if at all, with the potentially large number of other instruments at the disposal of policy makers is generally ignored.

16 Shortly after the GFC erupted, this took the form of threats of a “currency war.” More recently, frictions emerged in the form of complaints over the possibility of negative spillover effects from UMPs (see, for example, Lombardi, Siklos and St. Amant 2018, and references therein).

17 These spillovers are also called “leakages” in the relevant literature. Attempts to quantify these are only now beginning to emerge. Adding to the complexity of the problem is that the size and economic impact of these leakages is a function of the instrument in question. See, for example, Reinhardt and Sowerbutts (2015) and BIS (2018). Exceptions are Shafik (2016) and Quarles (2018) who highlight the need to think globally about the consequences of macroprudential frameworks even as these are developed at the “local” level.

18 Quarles (2018, 2), vice-chairman for supervision at the Fed, reminds his audience that the GFC revealed “vulnerabilities that had developed in the financial system were global in nature.” As he goes on to point out, while the securitization of mortgages emerged and grew quickly in the United States, the largest share of holders resided outside the United States.

19 In China, for example, this remains the case today.

instruments. Governance matters and the potential impact of shadow banking are under-emphasized (Lombardi and Siklos 2016; 2017 are exceptions). This is understandable since it is far from obvious how institutional factors and largely unobservable phenomena (for example, shadow banking) should be quantified. Nevertheless, omission of these factors remains a lacuna. Readers familiar with the literature on central bank independence and transparency will recognize that similar difficulties led to considerable criticisms of empirical links between the autonomy of the monetary authorities and macroeconomic outcomes.

The Elements of Financial Stability and Macroprudential Frameworks: An International Perspective

Table 1 presents some key characteristics of macroprudential frameworks in 47 countries and the euro zone. The data are drawn from a variety of sources but are primarily derived from ongoing work at CIGI to analyze macroprudential frameworks at a global level.²⁰ The first two columns summarize the governance aspect of macroprudential frameworks, namely whether the central bank has sole responsibility for macroprudential policy or if the mandate is shared with other domestic institutions; and whether decisions about implementing macroprudential policies or changing the setting of macroprudential instruments is done by committee. By the end of 2016, the overwhelming majority of central banks had some oversight over the implementation of a macroprudential strategy. Similarly, the committee structure is most often used to make policy decisions, thus mirroring the prevalence of a committee structure in delivering monetary policy decisions.

Next, Table 1 shows the type of macroprudential instruments deployed in each country. It also

shows that the number of instruments deployed increased substantially between 2015 and 2016. No doubt the work of the FSB, which regularly assesses the progress of economies in building more resilient financial systems, has played a role (also see Lombardi and Siklos 2016). Overall, it is notable that there appears to be little correlation between the number of instruments and the extent to which a particular jurisdiction was impacted by the crisis. Nevertheless, a finer analysis finds that the countries directly impacted by the twin financial crises since 2007 often have deployed relatively more instruments. Ireland, the United Kingdom and Portugal illustrate this phenomenon. It is also worth highlighting that three sets of instruments appear to have been widely adopted around the globe, including counter-cyclical buffers, loan-to-value ratios and debt-to-income ratios. This development is also unsurprising as retrospectives of the financial crisis have pointed to the pro-cyclicality of financial cycles (see, for example, Borio, Furfine and Lowe 2001; White 2006) and household debt, notably mortgage debt, as the principal culprits of the GFC in particular (see, for example, McDonald 2015).

Despite these similarities, the list of macroprudential instruments deployed varies among countries, with some introducing up to eight different instruments to tackle financial stability concerns. The contrast with monetary policy pre-crisis, where typically a single instrument was used to accomplish one objective is notable; although, in the four systemically important economies — the United States, the euro zone, the United Kingdom and Japan — multiple instruments have been added to the monetary policy tool kit. Unlike macroprudential policies, so-called UMPs have not spread worldwide. It is worth asking whether countries outside the advanced economies directly implicated in the most recent financial crises require the same macroprudential policy treatment to prevent a future financial crisis when their financial systems are not as sophisticated or developed as the ones that triggered the global financial and euro-zone sovereign debt crises.

It is interesting to note that whereas central banks since the GFC, especially in advanced economies, have been reluctant or very slow to change their policy rates (see, for example, Lombardi, Siklos and St. Amand 2018), there has been considerably less reluctance to shy away from changing the setting of macroprudential instruments. As Table 2

²⁰ See, for example, Lombardi and Siklos (2016; 2017).

Table 1: Macroprudential Frameworks

| Country Economy | Governance of Macroprudential Policy | | Instruments | | |
|------------------|--------------------------------------|------------------------|---|-------------|-------------|
| | Central Bank Mandate | Decisions by Committee | Type | No. in 2016 | No. in 2015 |
| Argentina | Shared mandate, no committee | | NOP, RR | 2 | 2 |
| Australia | No | Yes | CCyB, DSIB | 2 | 0 |
| Austria | No | Yes | CCyB, GSIB | 2 | 0 |
| Belgium | Yes | No | CONC, TAX | 2 | 6 |
| Brazil | Yes | Yes – weak | FLCap, NOP, CCyB, DP, RR | 5 | 4 |
| Canada | Shared mandate, with committee | | LTV, DTI, LR, Inter, CONC | 5 | 0 |
| Chile | No | Yes | RR | 1 | 0 |
| China | Shared mandate, with committee | | LR, SIIB, RR, CCyB, DP, Forex risk reserve | 6 | 5 |
| Colombia | Yes | Yes | LTV, DTI, DP, LR, NOP, MM | 6 | 6 |
| Czech Republic | Yes | No | CCyB, LR, LTV, DTI, NSFR, Liq. charge, SRB | 7 | 6 |
| Denmark | No | Yes | LTV, CCyB, SRB, LiqR, CapB, SIIB | 6 | 0 |
| Estonia | Yes | Yes | SRB, OSIB, CCyB, LTV, DSTI, MM | 6 | 3 |
| EU ²¹ | Shared, with committee | | GSIB, OSIB, SRB, CCyB, LTV, DSTI, LA, LM, LTI, RW, LiqR, CCB, Liquidity requirement, LTD, LR, RW on RRE | 16 | 0 |
| Finland | No | Yes | CCyB, LTV, OSIB, CCB, RW | 5 | 0 |
| France | No | Yes | CCyB | 1 | 0 |
| Germany | No | Yes | CCyB | 1 | 0 |
| Hong Kong | Yes | Yes | LTV, DTI, RW | 3 | NA |
| Iceland | | Yes | LTV, LR, NSFR, CCyB-SRB-CCB | 4 | 0 |
| India | Yes | Yes | DP, RW, LR, CCyB, LTV | 5 | 4 |
| Indonesia | Yes | Yes | CCyB, LR, LTV, DTI, RR | 5 | 6 |
| Ireland | Yes | No | CCyB, GSIB, OSIB, SRB, RW, LTV, LR | 7 | 8 |
| Israel | Yes – no explicit framework | | LTV, DTI | 2 | 0 |
| Italy | Yes | Yes – weak | GSIB, CCB, CCyB | 3 | 0 |
| Japan | Shared, with committee | | CONC | 1 | 0 |
| Korea | No | Yes | LTV, DTI, CCyB | 3 | 0 |
| Malaysia | Yes | No | NOP, LTV-DTI | 2 | 4 |
| Mexico | Yes | Yes | LTV, Inter, CONC | 3 | 0 |
| Netherlands | Yes | Yes | CCyB, SRB, RW, loss given default | 4 | 8 |
| New Zealand | Yes | No | CCyB, CFR, SCR, LTV | 4 | 4 |
| Norway | Shared, MoF strong, no committee | | CCyB, SRB, Cap.Surc, DSIB, LTV | 5 | 0 |
| Peru | Shared, no committee | | RR, DP, NOP | 3 | 0 |
| Philippines | Yes | Yes | NOP | 1 | NA |

²¹ For the European Union, these are the elements of the CRD IV/CRR macroprudential tool kits. Members can deploy these instruments with approval from the European Systemic Risk Board.

| Country Economy | Governance of Macroprudential Policy | | Instruments | | |
|-----------------|--------------------------------------|------------------------|---|-------------|-------------|
| | Central Bank Mandate | Decisions by Committee | Type | No. in 2016 | No. in 2015 |
| Poland | No | Yes | DTI, LTV, creditworthiness guideline, domestic liquidity standard | 4 | 0 |
| Portugal | Yes | Yes | CCyB, SCR, LTV, DTI, SRB, OSIIB, exposure restrictions, LTD | 8 | 8 |
| Russia | Yes | Yes | CCyB, DP, SCR, RR, Cap.Surc, CONC | 6 | 5 |
| Saudi Arabia | Yes | No | CCyB, LTV, RR, Profit distrib. restr., NSFRR, DTI, LiqR | 7 | 2 |
| Singapore | Yes | No | CCyB, LTV, TDSR | 3 | 2 |
| Slovakia | Yes | No | CCyB, CCB, SRB, SIIB, prudential credit requirements | 5 | 5 |
| Slovenia | Yes | Yes | LTV, DTI, CCyB, OSIIB | 4 | 3 |
| South Africa | Yes | Yes | LR | 1 | 0 |
| Spain | No explicit framework, just EU | | CCyB | 1 | 0 |
| Sweden | FSA | Yes | LTV, RW, LR, CCyB, SIIB | 5 | 0 |
| Switzerland | Shared, no committee | | CCyB | 1 | 0 |
| Thailand | Yes | No | LTV, DTI, NOP | 3 | 4 |
| Turkey | Shared, with committee | | LTV, RW, RR, credit card payment limits | 4 | 0 |
| UK | Yes | Yes — internal | SCR, LR, LTI, DTI, CCB | 5 | 3 |
| USA | Shared, with committee | | LTV, LR, Inter, CONC, RR | 5 | 0 |

Sources: Adapted from Lombardi and Siklos (2016; 2017), Cerutti, Claessens and Laeven (2016), and individual central bank websites.

Abbreviations: CapB — capital buffer; cap. surc. — capital surcharge; CCB — capital conservation buffer; CCyB — counter-cyclical buffers; CONC — concentration ratio; DP — dynamic provisioning; DSIIB — domestic systematically important institution buffer; DTI — debt to income ratio; FLCap — Forex lending capital; FRR — Forex risk reserve; GSIIB — globally systematically important institution buffer; Inter — Interbank exposure limits; LGD — loss given default; Liq. Charge — liquidity charge; LiqR — liquidity coverage ratio; LR — leverage ratio; LTD — loan-to-deposit ratio; LTV — loan-to-value ratio; MM — maturity mismatch; NOP — net open position; NSFRR — net stable funding ratio; OSIIB — other systematically important institution buffers; profit distrib. restr. — profit distribution restrictions; RR — reserve requirements; RW — risk weights; SCR — sectoral capital requirements; SIIB — systematically important institution buffer; SRB — systemic risk buffer; TDSR — total debt service ratio

indicates, the most active uses of macroprudential instruments have been aimed at the real estate market and, more broadly, at domestic sources of potential financial system instability. It is also apparent that whereas advanced economies have focused attention on the housing market, emerging market developing countries have tended to use other kinds of macroprudential instruments, including ones aimed at limiting consumer credit.

Even if one accepts that some of the macroprudential instruments are capable of forestalling the next financial crisis, policy makers require clear and actionable signals to activate changes in the stance of financial conditions. Arguably, the growth of

credit is one variable that has been highlighted for its early warning capabilities (see, for example, Basu, Chamon and Crowe 2017, and references therein).

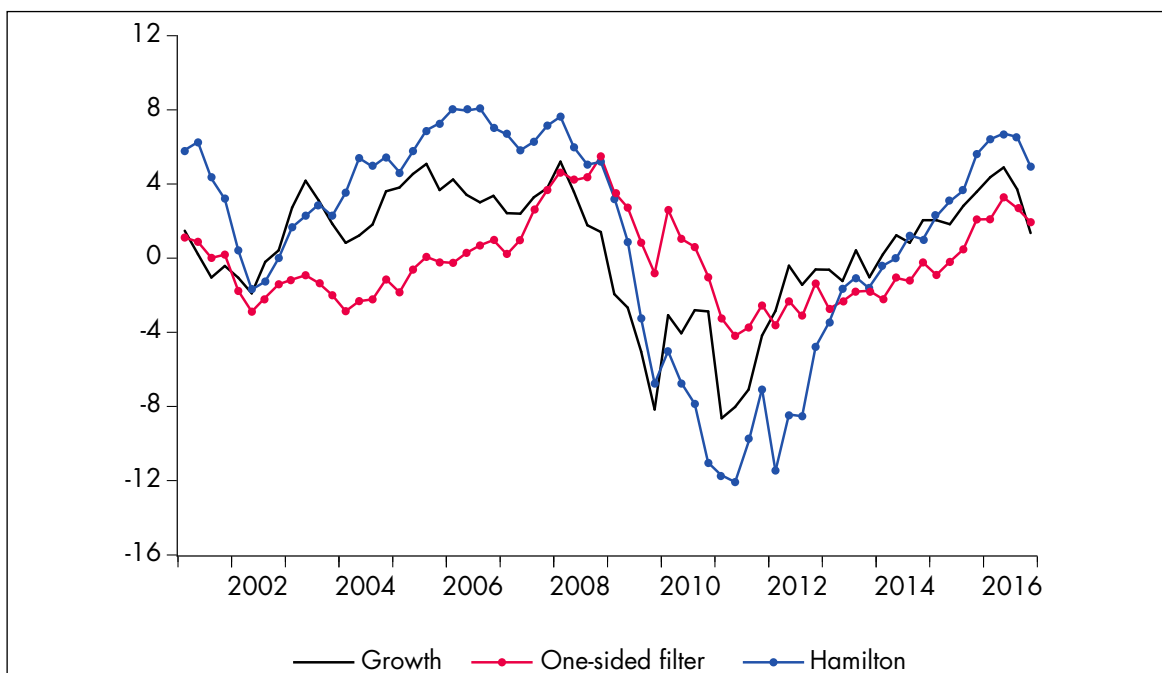
Figure 1 plots three different indicators of US credit conditions. Annual growth rates are shown as the solid black line while the other two lines reflect attempts to measure cyclical deviations in credit from some “trend” assumed to reflect

Table 2: Types of Macroprudential Instruments Deployed by Country

| Type of Macroprudential Instrument | | | | |
|--|-----------------------------------|-----------------------------------|---|--|
| Housing and Real Estate | Consumer Credit | Other | Domestically Oriented Instruments | Foreign-oriented Instruments |
| ARG, AUS, CHE, EST, EUR, HKG, IND, IRL, ISR, KOR, MYS, NOR, PER, POL, SWE, THA, TUR, ESP | AUS, BRA, IND, MYS, POL, RUS, TUR | AUS, BRA, IND, PHL, POL, SVN, TUR | ARG, AUT, BEL, BRA, CHN, COL, CZE, DEU, EST, EUR, FIN, FRA, SVK, SVN, HUN, IDN, IND, IRL, TUR, ESP, ITA, KOR, MYS, NLD, PER, PHL, PRT, RUS, SGP | ARG, BRA, CHL, CHN, COL, IDN, IST, PER, POL, RUS, SVK, SVN, THA, TUR |

Source: Based on data from 1998 to 2014 in Cerutti, Claessens and Laeven (2016). The ISO three-letter code is used to identify the countries/economies in question. See www.nationsonline.org/oneworld/country_code_list.htm. The appendix also contains the complete list of economies.

Figure 1: The Evolution of Credit in the United States, 2001–2016



Data source: Credit data (quarterly) is from the BIS.

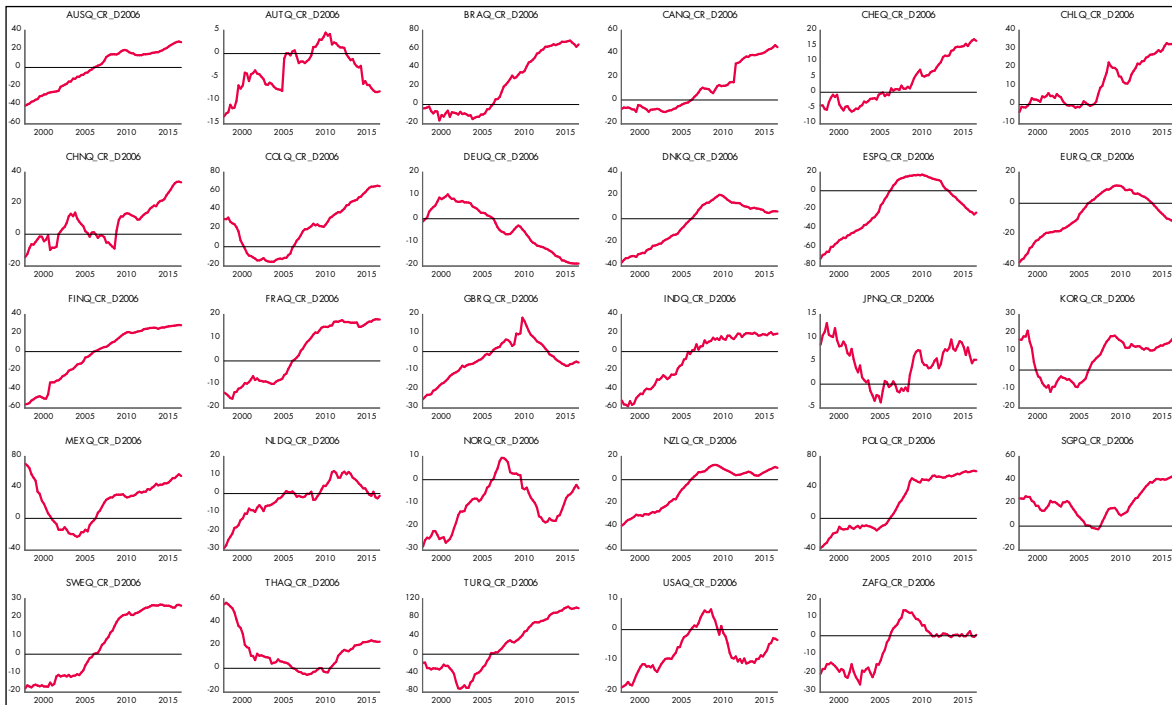
Note: Growth is the annual rate of change in private sector credit. The one-sided filter is based on the Hodrick-Prescott filter while Hamilton is the quarterly filter proposed by Hamilton (2017).

equilibrium conditions.²² Overall, the three lines display considerable co-movement. Yet, there are a few differences among these indicators that have

important implications for whether and when policy makers ought to act when financial stability is threatened. First, if credit growth above trend is considered “excessive” in some sense, then annual growth rates and one of the cyclical measures (i.e., the one-sided filter) sent quite different signals in the years leading up to the GFC. Second, post-crisis, when credit growth recovers, the timing of a return to excessive growth differs depending

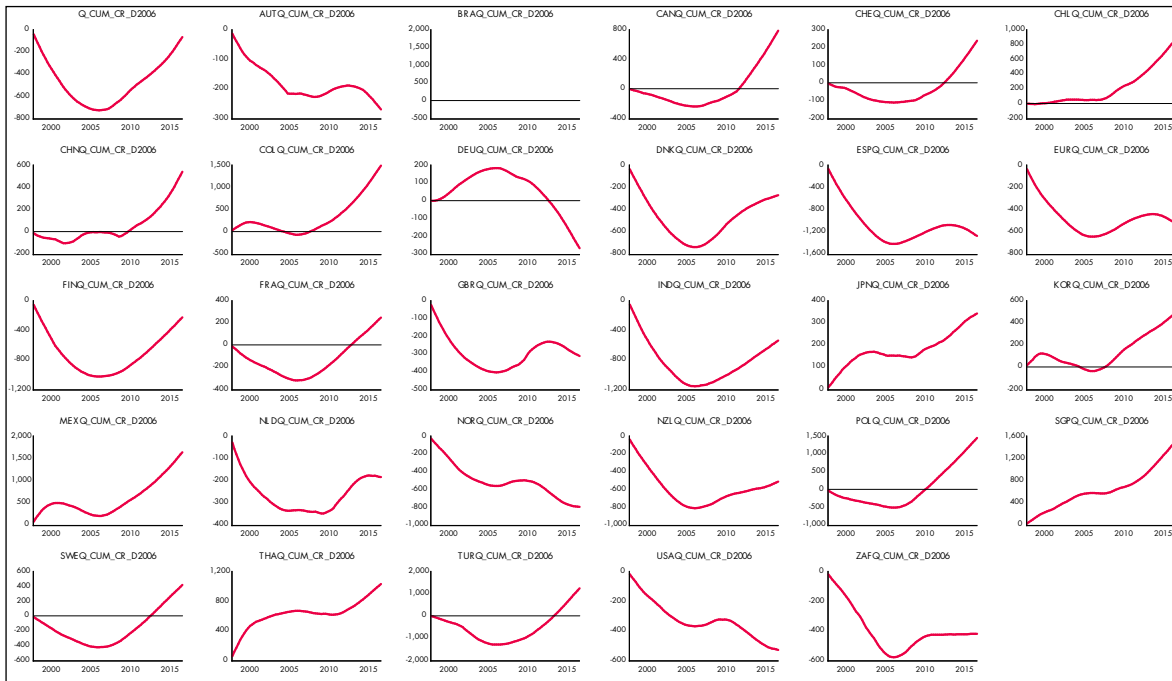
²² The “one-sided” filter is called the Hodrick-Prescott filter and it continues to be a popular method to fit trends to economic time series. The filter is non-linear and is designed so that, on average, deviations from trend are zero. James D. Hamilton (2017) harshly criticizes this filter and proposes a simpler and, according to his evidence, more effective way of modelling the trend. Technical details are beyond the scope of this paper.

Figure 2: Deviations in Credit Growth Relative to 2006



Note: Three letter ISO country codes (see appendix) followed by Q (quarterly). D2006 indicates current growth less growth in 2006, which is the benchmark. Hence, the value of the series is zero in 2006. See Figure 1 for the data source.

Figure 3: Cumulative Deviations in Credit Growth Relative to 2006



Note: See note to Figure 2. Deviations in credit growth relative to the 2006 benchmark are accumulated over time.

on how cyclical movements are measured. The same is true for the timing of a downturn in credit conditions. Similarly, the size and duration of any deterioration in credit conditions, evident from 2008 through 2012, thereby encompassing the GFC and euro-zone crises, is also highly sensitive to how cyclical movements are measured.

Figures 2 and 3 offer a version of Figure 1 for 29 economies where credit conditions are evaluated relative to 2006 as a benchmark, that is, prior to the GFC. In this way, credit conditions when economies were not in crisis can be visually assessed. Figure 3 uses the data from Figure 2, but changes in credit conditions are accumulated over time. Not surprisingly, most of the economies directly implicated in the twin financial crises see tighter credit conditions than the ones observed in 2006. This is especially noticeable for the United States, the United Kingdom and the euro zone, although a few other smaller economies also experience a tightening of the stance measured in this fashion (for example, Norway and South Africa). The cumulative impact of these developments is especially visible as shown in Figure 3. However, what is striking about the two figures is the wide variation in credit growth experienced globally after the GFC, even as a similar set of macroprudential instruments have ostensibly been deployed (see Table 1). Either credit conditions send very mixed or noisy signals across economies or there is as yet insufficient evidence that macroprudential policies are able to tame the likelihood of excessive credit growth. It is also possible, of course, that the transmission mechanism from activating or deactivating a macroprudential instrument to credit conditions is complex and not well understood.

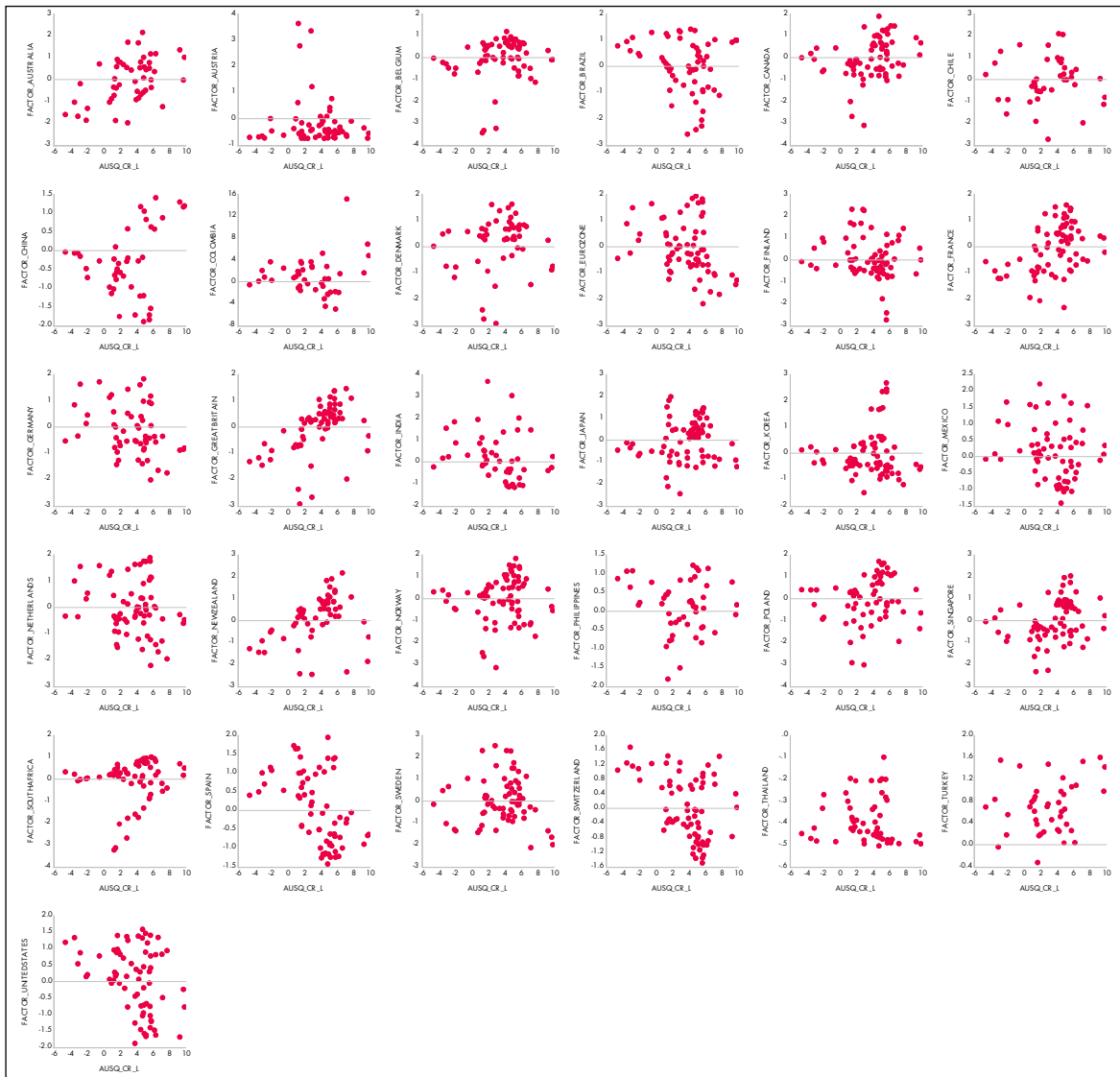
It may also be the case that credit conditions do not adequately capture the state of financial conditions. Hence, credit is an imperfect signal of financial stability. Idris Ademuyiwa, Pierre Siklos and Samantha St. Amand (2018) create an indicator of financial conditions based on a combination of eight different determinants. Figure 4 shows scatter plots of the relationship between credit conditions and the proxy for domestic financial conditions for 31 economies. For the purposes of this illustration, the annual growth in credit represents credit conditions. For most countries, there is no obvious link between the two sets of indicators. Hence, a tightening or easing of financial conditions measured by the proxy does not translate into a comparable decline or rise in credit growth.

An added complication is that if the proxy for financial conditions is seen as a relatively noisy indicator, then the link between financial conditions in the United States and credit conditions in the other economies, shown in Figure 4 in the form of a simple correlation, may have changed significantly since the GFC (details not shown). This link can be viewed as a short-hand summary of the state of financial globalization. On that score, the scope for the transmission of financial shocks from systemically important economies to the rest of the world has actually *increased* since 2008. Post-crisis, the pair-wise correlation between US financial conditions and other economies' credit conditions is positive and significant in 14 of the 30 economies considered. In contrast, the same positive and significant correlation is observed in only six economies examined in the pre-crisis period. If macroprudential policy strategies are meant to highlight sovereignty in financial conditions, while the foregoing stylized facts are suggestive of a rise in cross-border sensitivity to financial shocks emanating from the United States, then the task of maintaining global financial stability has been made more difficult. In the recent spread of macroprudential policies, countries have been using common strategies to ensure resilience against financial shocks, but it is unclear whether this strategy is fit for purpose in all jurisdictions.

Macroprudential Frameworks and Financial Repression: A Little Bit of Evidence

Macroprudential frameworks do not operate in a vacuum. The effectiveness of instruments and, by implication, the success at preventing bouts of excessive financial instability is likely to be driven, at least in part, by institutional factors. Indeed, domestic institutions — such as the central bank and government agencies with responsibility for the maintenance of financial system stability — are the most obvious representations of the importance that policy makers attach to sovereignty. Moreover, although changes in macroprudential frameworks

Figure 4: Scatter Plot of Financial Conditions against Credit Growth



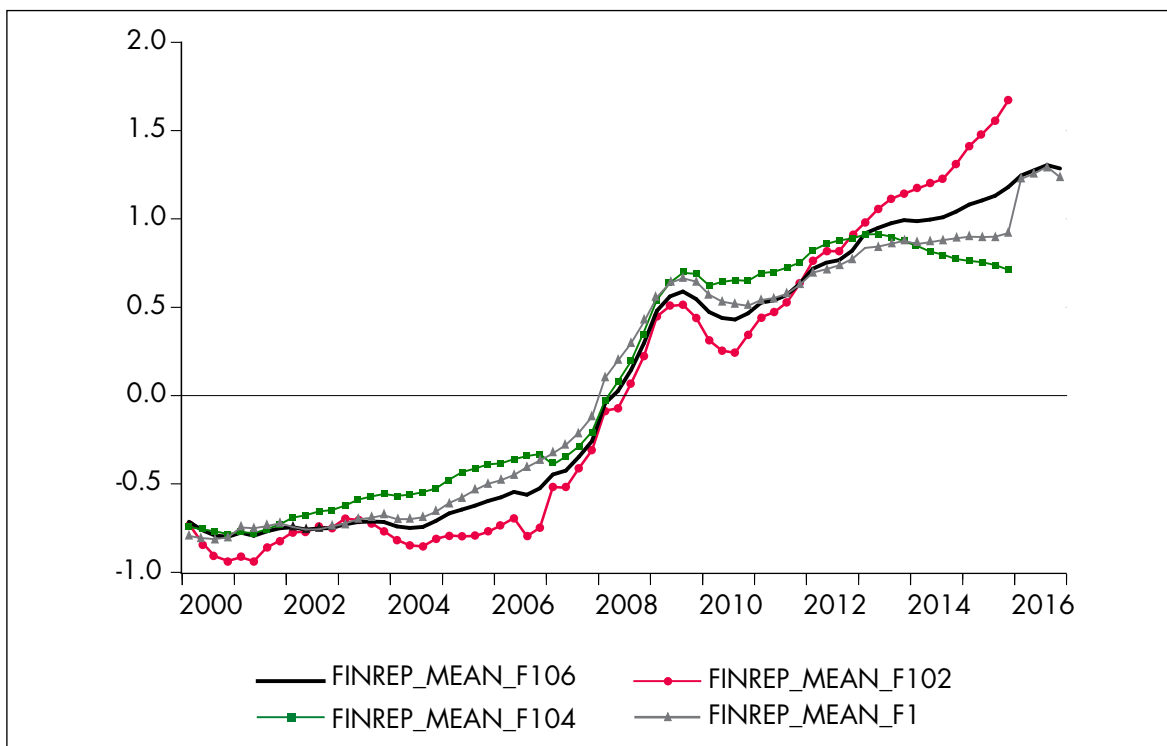
Note: See note to Figure 2. The vertical axis plots financial conditions (first principal component of financial time series labelled FACTOR followed by the country name; see Ademuyiwa, Siklos and St. Amand 2018) against annualized credit growth (country code followed by “CR_L” for credit).

are especially prevalent post-GFC, concerns about achieving financial stability predate the crisis. The authors’ study is a partial reminder to policy makers and other observers that the impact of a greater focus on financial stability is not a free lunch; it comes at the expense of increased financial repression. Even so, there has been relatively little effort to empirically assess the evolution of financial repression. Instead, most of the effort has been to evaluate macroprudential frameworks and the potential transmission mechanism of manipulating various available

instruments. There have also been suggestions that macroprudential frameworks can act as a substitute for what would, pre-GFC, have been a tightening of monetary policy when financial instability threatens economic activity (see, for example, Aikman et al. 2017; Stein 2013, Gambacorta and Murcia Pabón 2016). To date, there is no consensus about which set of tools is more appropriate when conditions require that the authorities take action.

There is no single definition of financial repression; therefore, in this paper, four indicators are used

Figure 5: Proxies for Financial Repression



Source: Authors' calculations.

Notes: FINREP means financial repression. Mean signifies the mean value across groups of countries. F106 are values for a group of 27 countries (see appendix), F104 are for the EU countries, F102 are for the emerging market developing countries and F1 are for advanced economies. The methodology is briefly explained in the text. See also Ademuyiwa, Siklos and St. Amand (2018).

to create a proxy variable. First, it is widely acknowledged that its effects will emerge via changes in the spread of interest rates on different financial instruments, both domestic as well as relative to some benchmark (i.e., US interest rates). Second, the potential for financial repression ought to be positively related to the number of instruments the authorities can deploy to maintain financial stability. Third, it is also likely that the threat to financial stability is larger when the financial system is more sophisticated and developed. Proxies that have been used in the literature include the size of bank deposits in relation to the size of the economy (i.e., GDP) or the size of privately generated credit, again as a proportion to GDP. Fourth, financial repression can be thought of, to an extent, as the crowding out of privately generated debt by public debt in order to stifle the ability of banks and other financial institutions to generate financial instability.

Acknowledging that the sources of financial repression are varied, an indicator is created by

essentially generating a linear combination of each source.²³ Some of the results are displayed in Figure 5 where, to economize on space, the indicator for four groups of economies is plotted, including a sample of 27 countries where available data could be compiled; a group of emerging market developing countries; a group of advanced economies; and economies in the sample that belong to the European Union.²⁴ A few features of the indicators are worth noting. First, except toward the end of the sample, there is broadly common movement in financial repression across the country groups shown. Second, although a rise in financial repression appears to predate the GFC,

²³ The method used to generate this kind of indicator is known as principal components analysis.

²⁴ As will be seen below, it was possible to collect data for more than 40 economies, but a comparable indicator for all of them together could not be constructed because key series were unavailable. The authors hope to be able to expand the existing data set in the future. The definitions of advanced economies versus emerging market developing country economies follows the IMF classification. See www.imf.org/external/pubs/ft/weo/2018/01/weodata/weoselagr.aspx.

there is clearly a sharp increase, together with some convergence, across the indicators shown beginning in 2008. Finally, financial repression continues to rise until the end of the sample and levels are considerably higher than even as recently as 2000.

A challenge in studying the global state of macroprudential frameworks is that, beyond advanced economies, the availability of data becomes more difficult (see also Ademuyiwa, Siklos and St. Amand 2018). Nevertheless, a data set has been constructed consisting of several institutional indicators to ask whether, empirically, these can help explain fluctuations in the intensity with which macroprudential instruments are changed over time. Sources of data are provided in Ademuyiwa, Siklos and St. Amand (2018). The following determinants are considered: economic policy uncertainty; capital controls; central bank transparency; private credit to GDP; the degree of government effectiveness and regulatory quality; central bank assets to GDP; the period identified with the GFC; bank deposits to GDP; and changes in the central bank policy rate.

All of these variables have been mentioned above and in the extant literature as contributing either directly or indirectly to financial stability. For example, it is conceivable that the likely success of implementing a macroprudential policy strategy will partly be a function of how effective a government is, as well as the quality of regulation and, by implication, supervision capabilities. Similarly, greater economic policy uncertainty may also influence the need to resort to macroprudential instruments to maintain financial system stability. Capital controls are an obvious means of preventing external financial shocks from spilling over into the domestic economy as explained previously. The degree to which the financial system is developed also provides an indication of the likely threat to the overall economy from financial stability shocks, and private credit or bank deposits to GDP have been employed as proxies for measuring how important the financial system is in an economy. As noted above, many of the developments in macroprudential frameworks have taken place since the GFC, when central banks began to rely on their balance sheets to cushion the resulting economic shocks. At the same time, there was a rapid loosening of monetary policy followed by a shift away from conventional means of changing the stance of monetary policy via changes in the policy rate.

The result may well have shown up in greater reliance on macroprudential instruments. Finally, the flip side of macroprudential policy is financial repression. Hence, how the same determinants impact the authors' indicator of financial repression is also examined. The results presented below are preliminary, given that more experience is needed, as well as more ample and better data, before stating with confidence that there are reliable empirical estimates of the principal drivers of macroprudential frameworks, especially of the institutional variety, and financial repression.

Table 3 presents some cross-section evidence of how indicators of financial stability affect changes in macroprudential policy and financial repression. The dependent variables are the fraction of changes in the setting of various kinds of macroprudential instruments as a fraction of all changes considered to be macroprudential in nature (see Table 1). More precisely, two sets of instrument classifications are considered, depending on whether they are oriented toward domestic financial markets (CM_DDP) or are aimed at preventing foreign financial shocks from creating financial instability (CM_FDP).²⁵ Obtaining these dependent variables relies on the data set constructed by Cerutti, Claessens and Laeven (2016), who indicate by a series of 0 and 1 whether the economy in question relies on the set of macroprudential instruments listed in Table 1.²⁶ Changes over time are then taken as a proportion of total changes. The sample runs from 1998 to 2014. One example is considered where the proxy for financial repression is regressed on the same set of determinants. Because of gaps in the data, results are presented for a group of only 27 when the financial repression proxy is included.

The various determinants considered do a better job of explaining changes in domestically oriented macroprudential instruments than foreign-oriented instruments. These same determinants explain a much higher proportion of the variation in financial repression. One must, however, keep in mind that there is considerably less variation in the CM_DDP and CM_FDP variables as these change relatively infrequently. In three

25 Based on the listing in Table 1, DDP instruments include: CTC, RR, LEV, LTV_CAP, CG, TAX, LTV and DTI. Instruments under the FDP heading include: FC, SIFI, INTER, RR_REV and CONC.

26 The authors contemplated adding the Lombardi and Siklos (2016; 2017) indicators of macroprudential frameworks to extend the sample, but the construction of these indexes is sufficiently different such that the two data sets are incompatible.

Table 3: The Determinants of Macroprudential Policy and Financial Repression

| Variable | Dependent Variable: CM_DDP | Dependent Variable: CM_DDP | Dependent Variable: FINREP | Dependent Variable: CM_FDP | Dependent Variable: CM_FDP |
|-------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Coefficient Std. Error | Coefficient Std. error | Coefficient Std. Error | Coefficient Std. Error | Coefficient Std. Error |
| Constant | 0.0727 0.0704 | 0.163 0.066 | -5.713 0.196 | 0.076 0.054 | 0.026 0.012 |
| Economic policy uncertainty | 0.0000 0.0001 | -0.000 0.000 | 0.002 0.000* | -0.000 0.000 | -0.0001 0.00001** |
| Capital controls indicator | -0.0116 0.0148 | -0.036 0.014** | -0.060 0.040 | -0.016 0.011 | -0.0004 0.003 |
| Central bank transparency | -0.0048 0.0049 | -0.026 0.004* | 0.190 0.013* | -0.013 0.004* | 0.001 0.001 |
| Private sector credit/GDP | -0.0018 0.0007* | -0.003 0.001* | 0.019 0.002* | -0.000 0.001 | 0.0001 0.000 |
| Government effectiveness | -0.0253 0.0373 | -0.028 0.004 | -0.224 0.103** | 0.009 0.033 | -0.031 0.010* |
| Regulatory quality | 0.1617 0.0412* | 0.086 0.037* | -0.196 0.114+ | 0.001 0.000 | 0.011 0.012 |
| Central bank assets/GDP | 0.0004 0.0004 | 0.001 0.030+ | 0.005 0.001* | 0.001 0.000 | 0.0002 0.000+ |
| GFC dummy | 0.0753 0.0196* | 0.092 0.021* | -0.053 0.052 | 0.028 0.017+ | 0.003 0.011 |
| Domestic bank deposits/GDP | 0.0002 0.0005 | 0.002 0.001* | 0.023 0.001* | 0.001 0.000** | 0.00001 0.0001 |
| Change in the policy rate | 0.0254 0.0078* | NA | NA | NA | 0.002 0.004 |
| Adjusted R-squared | 0.2238 | 0.156 | 0.713 | 0.102 | 0.014 |
| F-statistic | 14.1931* | 10.415* | 115.834* | 6.784* | 3.360* |
| Cross-sections included | 27 | 38 | 27 | 38 | 27 |
| Total observations | 1,648 | 2,288 | 1,622 | 2,352 | 1,648 |
| Redundant fixed effects tests | 8.851(26.1611) 0.000 | 4.942(37.2242) 0.000 | 77.349(26.1586) 0.000 | 5.028(37.2305) 0.000 | 1.48 (26.1612) 0.06 |

Note: Ordinary least squares estimates of an unbalanced panel for the number of cross-sections shown above. Data are quarterly from 1998 to 2014. Data are from Ademuyiwa, Siklos and St. Amand (2018); Chinn and Ito (2006); Siklos (2017); World Bank Worldwide Governance Indicators (<http://info.worldbank.org/governance/WGI/#home>); and Dominguez, Hashimoto and Ito (2012). * indicates statistically significant at the 1% (*), 5% (**) and 10% (+) levels.

of the five cases shown, there is a significant increase in the resort to macroprudential policies during the period of the GFC.²⁷ Changes in the policy rate appear to complement domestically oriented changes in the resort to macroprudential instruments. This variable was not included in the CM_FDP regression since policy rate changes are domestically determined.²⁸ Many of the other determinants are also seen to influence changes in the macroprudential instruments settings and financial repression. Thus, for example, higher regulatory quality reduces financial repression, as does more government effectiveness. Similarly, a rise in the size of the private financial sector increases financial repression. This is to be expected if a larger financial system is believed to raise the likelihood of financial instability. However, when the same variables are examined in the regressions where the intensity with which domestic- or foreign-oriented macroprudential instruments are used, it is found, perhaps surprisingly, that greater regulatory quality increases the incidence of macroprudential responses. Whether this is because a macroprudential approach stands to be relatively more successful when regulatory quality improves is unclear. Also, a larger financial system is seen as reducing the incidence of macroprudential instrument usage. The opposite result would be expected, unless one keeps in mind that these effects must be considered alongside policy rate changes, which, at least in the results presented here, complement the resort to macroprudential instruments. An increase in the central bank assets relative to GDP is also seen as increasing financial repression and the incidence of usage of macroprudential instruments. Perhaps this reflects the fact that UMPs act as a countervailing influence when the financial system is restrained in an effort to ensure financial system stability. Finally, central bank transparency appears to be a substitute for macroprudential instrument use. Whether this is because the public is better informed about financial stability risks is unclear, but it is an interesting possibility to consider.

Clearly, the simple specifications considered here can only begin to help us understand what drives financial repression and changes in the setting of macroprudential instruments.

²⁷ The definition of the period covered by the GFC follows that of Dominguez, Hashimoto and Ito (2012).

²⁸ Nevertheless, when the change in the policy rate is added to column 3 the coefficient is highly insignificant (results not shown).

The authors have also chosen to focus largely on institutional determinants because these are thought to be crucial for the success of any macroprudential framework. There is more work to be done in the future to more precisely pin down how macroprudential instruments are used and how they interact with monetary policy. In particular, many of the institutional determinants likely interact with each other in ways that may not easily be modelled.

Conclusions and Policy Recommendations

This paper has explained how macroprudential frameworks have spread globally and the implications of this development. The impression given by policy makers is that one of the principal lessons of the GFC has been learned: we can no longer rely solely on a combination of conventional or unconventional monetary policy and microprudential strategies to ensure that financial system stability is maintained. There is little doubt that this is a useful lesson learned.

Nevertheless, the shift in emphasis toward the usage of macroprudential instruments to prevent another “great” financial crisis comes at a potential cost that policy makers have yet to fully evaluate or understand. Maintaining financial stability via interventions comes at the price of more financial repression. There has, however, been too little discussion of whether the current levels of financial repression, which this paper has argued have risen considerably in recent years, are excessive. In other words, it is reasonable to ask whether the pendulum toward more regulation has swung too far in the direction of financial repression that potentially stunts economic growth. As this is written, there are already strong forces, admittedly of the political variety, to roll back the regulatory response to the GFC, notably in the United States. Even if one believes that the degree of financial repression today has gone too far, there continues to be too little understanding of the economic consequences of the shift to placing much greater importance on macroprudential regimes.

There is also a seeming convergence of macroprudential frameworks around the world as countries adopt the recommendations of the FSB. In principle this is a welcome development. After all, it appears to follow the script from monetary policy strategies that, over the past two decades or more, gave greater emphasis to inflation control. Nevertheless, there is the danger that this development also generates complacency, in particular as the global economy has not yet been tested with a major financial shock. Whether existing macroprudential frameworks are fit for purpose remains unclear. For example, little is known about the cross-border spillovers from a large financial shock under a regime where a large number of macroprudential instruments are in place.

Finally, while developments in the macroprudential sphere appear to have highlighted the advantages of moral suasion instead of formal rules in designing macroprudential frameworks, the result could be a reduction in transparency. This concern is strengthened by the fact that macroprudential frameworks, and the conditions under which macroprudential instruments are activated and deactivated, remain a work in progress and domestic authorities worldwide emphasize their use in retaining sovereignty over domestic economic policies.

At least four policy implications emerge from the authors' analysis. There is a need for a more extensive analysis of the level of financial repression required to maintain financial stability while not excessively suppressing potential economic activity. While existing analyses of the effectiveness of macroprudential frameworks have focused on their domestic impact, there is a need to consider more extensively the global spillovers from the adoption of these strategies. The existence of spillovers also raises the question of whether cross-border cooperation should be extended since current recommendations are meant to be guidelines and no enforcement mechanism is in place. Perhaps this is appropriate, but the test will come when there are global stresses in the financial system that will require a global response. Finally, there is a need to evaluate the transparency of existing macroprudential frameworks. Several instruments are in place but, unlike monetary policy, the level of knowledge about how instruments interact and how effectiveness is evaluated is unclear.

Authors' Note

This is a CIGI-sponsored research project. The opinions in the paper are those of the authors and not the institutions that supported this research. The authors are grateful to two reviewers for helpful comments.

Works Cited

- Ademuyiwa, Idris, Pierre Siklos and Samantha St. Amand. Forthcoming 2018. *Central Bank Balance Sheets and the Interaction between Monetary Policy and Financial Stability*. CIGI Paper.
- Aikman, David, Andreas Lehnert, Nellie Liang and Michele Modugno. 2017. "Credit, Financial Conditions, and Monetary Policy Transmission." Hutchins Center Working Paper No. 39. November.
- Aizenman, Joshua, Menzie D. Chinn and Hiro Ito. 2017. "Financial Spillovers and Macroprudential Policies." NBER Working Paper No. 24105. December.
- Anginand, Apanard P., Wanvimol Sawanggoenyuang and Clas Wihlborg. 2010. "Financial Liberalization and Banking Crises: A Cross-Country Analysis." *International Review of Finance* 10 (2): 263–92.
- Bach, G. L. 1949. "Bank Supervision, Monetary Policy, and Governmental Reorganization." *The Journal of Finance* 4 (4): 269–85.
- BIS. 2018. *Annual Report*. June.
- Barwell, Richard. 2013. *Macroprudential Policy: Taming the Wild Gyration of Credit Flows, Debt Stocks and Asset Prices*. New York, NY: Palgrave Macmillan.
- Basu, Suman, Marcos Chamon and Christopher W. Crowe. 2017. "A Model to Assess the Probabilities of Growth, Fiscal, and Financial Crises." IMF Working Paper 17/282, December.
- Blinder, Alan S. 2013. *After the Music Stopped: The Financial Crisis, the Response and the Work Ahead*. New York, NY: Penguin.
- Borio, Claudio. 2003. "Towards a Macroprudential Framework for Financial Supervision and Regulation?" BIS Working Paper No. 128. February.
- . 2012. "The Financial Cycle and Macroeconomics: What Have We Learnt?" BIS Working Paper No. 395. December.
- Borio, Claudio, Craig Furfine and Philip Lowe. 2001. "Procyclicality of the financial system and financial stability: issues and policy options." BIS Paper No. 1.
- Bordo, Michael D. 2017. "An Historical Perspective in the Quest for Financial Stability and the Monetary Policy Regime." NBER Working Paper No. 24154. December.
- Bordo, Michael D. and John S. Landon-Lane. 2010. "The Global Financial Crisis of 2007–08: Is It Unprecedented?" NBER Working Paper No. 16589.
- Broner, Fernando and Jaume Ventura. 2016. "Rethinking the Effects of Financial Globalization." *Quarterly Journal of Economics* 131 (3): 1497–1542.
- Budnik, Katarzyna and Johannes Kleibl. 2018. "Macroprudential Regulation and the European Union 1995–2014: Introducing a New Data Set on Policy Actions of a Macroprudential Nature." European Central Bank Working Paper No. 2123. January.
- Cerutti, Eugenio M., Stijn Claessens and Luc Laeven. 2017. "The Use and Effectiveness of Macroprudential Policies: New Evidence." *Journal of Financial Stability* 28: 203–24.
- Chari, V. V., Alessandro Dovis and Patrick J. Kehoe. 2016. "On the Optimality of Financial Repression." Federal Reserve Bank of Minneapolis Research Department Staff Report 10. October.
- Chinn, Menzie D. and Hiro Ito. 2006. "What Matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics* 81 (October): 163–92.
- Claessens, Stijn and Ayhan Kose. 2013. "Financial Crises: Explanations, Types and Implications." Centre for Applied Macroeconomic Analysis Working Paper No. 06/2013. February.
- Crockett, Andrew D. 2000. "Marrying the Micro- and Macroprudential Dimensions of Financial Stability." Speech given at the Eleventh International Conference of Banking Supervisors, Basel, Switzerland, September 20–21.

- Demirgüç-Kunt, Asli and Enrica Detragiache. 1998. "The Determinants of Banking Crises in Developing and Developed Countries." *IMF Staff Papers* 45 (1): 81-109.
- Dominguez, Kathryn M. E., Yuko Hashimoto and Takatoshi Ito. 2012. "International Reserves and the Global Financial Crisis." *Journal of International Economics* 88 (2): 388-406.
- Filardo, Andrew and Phurichai Rungcharoenkitkul. 2016. "A Quantitative Case for Leaning Against the Wind." BIS Working Paper No. 594. December.
- Gambacorta, Leonardo and Andrés Murcia Pabón. 2016. "The Impact of Macroprudential Policies and Their Interaction with Monetary Policy: An Empirical Analysis Using Credit Registry Data." Working Paper. June.
- Hamilton, James D. 2017. "Why You Should Never Use the Hodrick-Prescott Filter." NBER Working Paper No. 23429. May.
- Honohan, Pierre, Domenico Lombardi and Samantha St. Amand. Forthcoming 2019. "Managing Macrofinancial Crises: The Role of the Central Bank." In *The Oxford Handbook on the Economics of Central Banking*, edited by D. Mayes, P. Siklos and J.-E. Sturm.
- Jordà, Òscar, Moritz Schularik and Alan M. Taylor. 2016. "Macrofinancial History and the New Business Cycle Facts." Federal Reserve Bank of San Francisco Working Paper No. 2016-23. September.
- Levy-Yeyati, Eduardo and Tomas Williams. 2011. "Financial Globalization in Emerging Economies: Much Ado About Nothing?" Universidad Torcuato Di Tella Business School Working Paper No. 2011-01.
- Lim, C., A. Columba, P. Kongsamut, A. Otani, M. Saiyid, T. Wezel and X. Wu. 2011. "Macroprudential Policy: What Instruments and How to Use Them?" IMF Working Paper 11/238, October.
- Lombardi, Domenico and Pierre Siklos. 2016. "Benchmarking Macroprudential Policies: An Initial Assessment." *Journal of Financial Stability* 27 (December): 35-49.
- . 2017. "Resiliency of Macroprudential Frameworks: An International Comparison." VoxEU, November 7.
- Lombardi, Domenico, Pierre Siklos, and Samantha St. Amand. 2018. "A Survey of the International Evidence and Lessons Learned About Unconventional Monetary Policies: Is a 'New Normal' in our Future?" Unpublished working paper.
- Mayes, D. Forthcoming 2019. "The Changing Role of the Central Bank in Crisis Avoidance and Management." In *The Oxford Handbook on the Economics of Central Banking*, edited by D. Mayes, P. Siklos and J.-E. Sturm.
- McDonald, Chris. 2015. "When Is Macroprudential Policy Effective?" BIS Working Paper No. 496. March.
- McKinnon, Ronald I. 1973. *Money and Capital Markets in Economic Development*. Washington, DC: The Brookings Institution.
- Noy, Ilan. 2004. "Financial Liberalization, Prudential Supervision and the Onset of Banking Crises." *Emerging Markets Review* 5 (3): 341-59.
- Quarles, Randal K. 2018. "America's Vital Interest in Global Efforts to Promote Financial Stability." Speech to the Utah Bankers Association 110th Annual Convention, Sun Valley, Idaho, June 27.
- Reinhart, Carmen M. and M. Belen Sbrancia. 2015. "The Liquidation of Government Debt." IMF working paper 15/7, January.
- Reinhardt, Dennis and Rhiannon Sowerbutts. 2015. "Regulatory Arbitrage in Action: Evidence from Cross-Border Lending." VoxEU, September 27.
- Reinhart, Carmen M., Jacob F. Kirkegaard and M. Beleb Sbrancia. 2011. "Financial Repression Redux." *Finance & Development* 48 (1).
- Reinhart, Carmen M., Vincent Reinhart and Kenneth Rogoff. 2015. "Dealing with Debt." Kennedy School of Government Working Paper No. RWP 15-009. February.
- Reinhart, Carmen M. and Kenneth S. Rogoff. 2009. *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.

- Robinson, Roland I. 1950. "A New Supervisory View of Bank Capital." *The Journal of Finance* 5 (1): 95-109.
- Romer, Christina D. and David H. Romer. 2017. "New Evidence on the Aftermath of Financial Crises in Advanced Economies." *American Economic Review* 107 (10): 3072-118.
- Roubini, Nouriel and Xavier Sala-i-Martin. 1992. "Financial Repression and Economic Growth." *Journal of Development Economics* 39 (July): 5-30.
- Schwartz, Anna J. 1995. "Why Financial Stability Depends on Price Stability." *Economic Affairs* 15 (4): 21-25.
- Shafik, Minouche. 2016. "Think Global, Act Local." Speech given at the joint conference Monetary, Financial and Prudential Policy Interactions in the Post-Crisis World, with the International Monetary Fund and Hong Kong Monetary Authority. October 24.
- Shaw, Edward S. 1973. *Financial Deepening in Economic Development*. Oxford, UK: Oxford University Press.
- Siklos, Pierre. 2017. *Central Banks into the Breach: From Triumph to Crisis and the Road Ahead*. Oxford, UK: Oxford University Press.
- . 2018. *Monetary Policy, Financial Stability and the Macroprudential Illusion?* CIGI Paper No. 165. Waterloo, ON: CIGI. www.cigionline.org/publications/monetary-policy-financial-stability-and-macroprudential-illusion.
- Stein, Jeremy C. 2013. "Overheating in Credit Markets: Origins, Measurement, and Policy Responses." Speech given at the Restoring Household Financial Stability after the Great Recession: Why Household Balance Sheets Matter research symposium sponsored by the Federal Reserve Bank of St. Louis, St. Louis, MO, February 7.
- Summer, Lawrence. 2011. "The world must insist that Europe act." *Financial Times*, September 18. www.ft.com/content/5eaa83dc-dfca-11e0-b1db-00144feabdc0.
- Svensson, Lars E. O. 2017. "Leaning Against the Wind: The Role of Different Assumptions About the Costs." NBER Working Paper No. 23745. August.
- Wessel, David. 2009. *In Fed We Trust: Ben Bernanke's War on the Great Panic*. New York, NY: Crown Business Books.
- White, William R. 2006. "Is Price Stability Enough?" BIS Working Paper No. 205. April.

Appendix: Country List

| ISO Code | Country/Economy |
|----------|-----------------|
| ARG | Argentina |
| AUS | Australia |
| AUT | Austria |
| BEL | Belgium |
| BRA | Brazil |
| CAN | Canada |
| CHE | Switzerland |
| CHL | Chile |
| CHN | China |
| COL | Colombia |
| CZE | Czech Republic |
| DEU | Germany |
| DNK | Denmark |
| ESP | Spain |
| EST | Estonia |
| EUR | European Union |
| FIN | Finland |
| FRA | France |
| GBR | United Kingdom |
| HKG | Hong Kong |
| HUN | Hungary |
| ISL | Iceland |
| IND | India |
| IDN | Indonesia |
| IRL | Ireland |
| ISR | Israel |
| ITA | Italy |
| JPN | Japan |
| KOR | Korea |
| MEX | Mexico |
| MYS | Malaysia |
| NLD | Netherlands |
| NOR | Norway |
| NZL | New Zealand |
| PER | Peru |
| PHL | Philippines |

| ISO Code | Country/Economy |
|----------|-----------------|
| POL | Poland |
| PRT | Portugal |
| RUS | Russia |
| SGP | Singapore |
| SVK | Slovakia |
| SVN | Slovenia |
| SWE | Sweden |
| THA | Thailand |
| TUR | Turkey |
| USA | United States |
| ZAF | South Africa |

Note: The regressions in Table 3 do not include EUR.

■ EU countries/economy.

■ Emerging market economies.

The remaining are advanced economies.

■ 27 country sample.

■ 38 country sample additions.

About CIGI

We are the Centre for International Governance Innovation: an independent, non-partisan think tank with an objective and uniquely global perspective. Our research, opinions and public voice make a difference in today's world by bringing clarity and innovative thinking to global policy making. By working across disciplines and in partnership with the best peers and experts, we are the benchmark for influential research and trusted analysis.

Our research programs focus on governance of the global economy, global security and politics, and international law in collaboration with a range of strategic partners and support from the Government of Canada, the Government of Ontario, as well as founder Jim Balsillie.

À propos du CIGI

Au Centre pour l'innovation dans la gouvernance internationale (CIGI), nous formons un groupe de réflexion indépendant et non partisan doté d'un point de vue objectif et unique de portée mondiale. Nos recherches, nos avis et nos interventions publiques ont des effets réels sur le monde d'aujourd'hui car ils apportent de la clarté et une réflexion novatrice pour l'élaboration des politiques à l'échelle internationale. En raison des travaux accomplis en collaboration et en partenariat avec des pairs et des spécialistes interdisciplinaires des plus compétents, nous sommes devenus une référence grâce à l'influence de nos recherches et à la fiabilité de nos analyses.

Nos programmes de recherche ont trait à la gouvernance dans les domaines suivants : l'économie mondiale, la sécurité et les politiques mondiales, et le droit international, et nous les exécutons avec la collaboration de nombreux partenaires stratégiques et le soutien des gouvernements du Canada et de l'Ontario ainsi que du fondateur du CIGI, Jim Balsillie.

**Centre for International
Governance Innovation**

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
www.cigionline.org

 @cigionline

