

**A New Approach to Preserving Financial Stability:  
Evaluating Macroprudential Policies in Canada**

**by**

**Benjamin Swan**

**for Economics 481**

**Queen's University Economics Department**

**Supervisor: John Murray**

***Year 2016 Winner of the Douglas D. Purvis Prize in Economics***

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## I. Introduction: Canada's Housing Market

With the US housing crash of '07-'08 and the global financial crisis fresh on the minds of many, Canadian and international observers have paid close attention to the steep upward trends in mortgage debt levels and house prices in Canada (see figure 1). The IMF has repeatedly "sound[ed] the alarm" (McMahon, 2015) on the Canadian housing market and many have raised concern that Canada has not done enough in response to these build ups. For one, given that Canada has kept its target interest rates near zero in the aftermath of the crisis, much speculation has been made about how the Bank of Canada's monetary policy approach has contributed to these trends in the housing market. This concern is far from unique to Canada; since the 1990s or earlier, economists have debated the merits of "leaning against the wind<sup>1</sup>," and a point of consensus is that monetary and financial stability concerns are intertwined. More recently, countries have turned to the use of a range of macroprudential policies in recognition of their potential to target specific aspects of financial stability risk, although the long term effects of these measures remain murky. Macroprudential policies have been integral to Canadian efforts to cool the housing market, and most argue that they have had the intended effect. As a result, Canada presents an intriguing lens for viewing global post-crisis policy debates on the national level. Firstly, this paper will weigh insights from the literature on how to counter financial instability, particularly how macroprudential policies have emerged in place of a monetary "leaning against the wind" framework. Secondly, the work will examine how housing markets respond to macroprudential policies. Finally, this paper will assess the suitability of Canada's institutional structure for handling financial stability responsibilities moving forward. I argue that the macroprudential tools Canada has used to date have been effective but not sufficient in cooling the housing market. Furthermore, Canada

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<sup>1</sup> "Leaning against the wind" refers to the practice of using interest rates to address financial stability concerns at the expense of short run price stability objectives. Central banks may feel an inclination to raise rates when asset bubbles are believed to be forming, even if the economic growth is not pushing capacity.

should be more proactive in assigning a “macroprudential mandate” to an institutional body and clarifying the relationship between this body and the Bank of Canada.

**a. Procyclicality in the Financial System**

The focus on Canada’s persistently low interest rate environment amidst an accelerating housing market stems from the view that credit growth is procyclical to economic growth (Lowe, 2002). During expansionary periods when interest rates are low, lenders are often urged to increase their leverage and be looser in extending credit under the guise that the economy will continue to improve in the foreseeable future. However, this intuition may understate the level of systemic risk in the economy and cause financial intermediaries to fuel bubbles in asset prices and credit markets. Concurrently, during bust times, collateral tends to have lower values and lenders are inefficiently restrictive in offering credit to rejuvenate the economy; this mechanism was observed in the recent US financial crisis (Mizen, 2008). Galati and Moessner point out (2010) that the condition of procyclicality reflects the “endogenous cycle view of financial instability” forwarded by Minsky and later Kindleberger. Empirical support for the phenomenon of procyclicality can be found in recently developed models that predict financial crises based on asset price and credit growth based indicators even in “out-of-sample” historical data (ibid., Borio and Lowe, 2002). This recent knowledge reveals major risks to stability in Canada; as shown in figure 1, mortgage credit growth has consistently outpaced Canadian GDP growth after the financial crisis, which and personal debt-to-income ratios rising to 164.6% in mid-2015 (Reuters, 2015). Policymakers in Canada have shown willingness to heed warnings about financial stability, and we will consider two of the main approaches countries have taken to address financial instability from a macro perspective, monetary leaning and macroprudential regulation.

**II. Explanation 1: Limitations of Monetary “Leaning”**

When a housing boom is coupled with exceptionally low interest rates, some have hypothesized that rate tightening can be used to reverse excesses in the market, but strong cautions have also been raised about this course of action and its undermining of the price stability mandate. According to William White (2009), steps to address procyclicality in credit markets should focus on the “underlying cause” of the problem, low interest rates, as opposed to symptoms such as high asset prices. Wadhvani, in turn, emphasizes the signalling effect of incorporating financial concerns into monetary policy setting, stressing that asset bubbles are less likely to inflate in conditions where the policy rates are primed to respond (2008). With regard to housing, a number of potentially destabilizing mechanisms prompt calls to “lean against the wind.” One such mechanism is the “financial accelerator” Bernanke and Gertler (1999) refer to in describing the uncertainty surrounding the extent of housing wealth effects on consumption and personal debt, given that it’s common for households to borrow against home equity. Another source of instability Wadhvani cites lies within the dangers of over-construction in misleadingly robust housing markets. The potential job losses associated with a sharp fall in the construction sector would amplify the already significant economic effects of a housing price drop (2008). Moreover, if financial instability is viewed as an endogenous cycle, a risk of skyrocketing inflation is embedded in the probability of a rare financial crisis induced by a housing crash, and Wadhvani argues that this justifies monetary leaning. For proponents of monetary leaning, integrating a financial stability element into monetary policy should more than outweigh the costs of foregoing price stability in the short run; however the empirical literature on this contention is mixed.

Although recent modelling work on “leaning against the wind” has provided support for the approach, evidence suggests that an efficiently calibrated leaning solution is not feasible in practice, and macroprudential policies have instead been propelled to the forefront of the financial stability debate. In support of monetary leaning, Kannan, Rabanal, and Scott’s (2012) model shows that their “augmented Taylor rule” maximizes welfare when factoring in financial variables, suggesting that

recalibrating interest rates is a surefire way to preserve stability in lieu of more untested options. Similarly, Gambacorta and Signoretti (2013) incorporate household debt levels into simulations of “leaning against the wind” and suggest that highly indebted households will respond most strongly to measures that directly impact borrowing costs. With this knowledge in hand, much attention has been paid to the outcomes of Sweden, one of the few prominent countries to put monetary leaning into practice in response to perceived imbalances in its housing market. Lars Svensson has argued that monetary leaning in Sweden has been a failure, with supposed benefits of the policy only comprising 0.4% of the costs of inducing deflation and lowering growth (2014). Additionally, Svensson upends Gambacorta and Signoretti’s (2013) contention that high levels of household debt constitute an argument for leaning. In practice, Svensson argues that lowering inflation only leads to Fisherian debt deflation, raising the real value of household debt and reducing its serviceability (2013). The failure of leaning in Sweden hints to possible deficiencies in leaning against the wind literature, and Ajello et al. (2015) adopt a renewed approach in using historical correlations between credit conditions in financial crises. After accounting for this evidence, they find that the optimal policy rate response to financial unease is negligible in the vast majority of cases.

Furthermore, a recent IMF paper by Laseen, Pescatori, and Turunen (2015) has aimed to consolidate the leaning debate with burgeoning research on macroprudential policies, and their analysis favours the latter. Even after trying to incorporate the gains of a systemic, fully anticipated leaning approach hypothesized by Wadhvani (2009) and others, they find that macroprudential policies lead to better outcomes. Despite theoretical evidence that interest rate adjustments may be wieldier than narrow prudential policies in combatting procyclicality, countries have been hesitant to fall victim to the same results that Sweden experienced. As a result, policymakers have gravitated toward the alternative, macroprudential approach. To return to considerations of Canada, a discussion of Canada’s housing

market policies should start by analyzing perhaps the most intuitive solution available, monetary leaning, and highlighting the shortcomings that drive them toward alternative approaches.

### **III. Explanation 2: Economic Effects of Macroprudential Policies in the Housing Market**

After consideration of the trade-offs associated with raising interest rates in response to an overheating housing market, we discuss targeted macroprudential policies in preserving financial stability. Housing markets have naturally been a domain for macroprudential policies, which is a broad term referring to measures aimed at lessening systemic risk in the “time series” and “cross-sectional” dimensions. For the former, a wide range of investors hold housing wealth, making the economy as a whole relatively more sensitive to movements in a housing market characterized by credit buildups over time. To pose an example, if house prices suddenly drop, mortgage holders may decrease their consumption to compensate for the risk that they may need to sell their house at a loss (OECD, 2015). In a “cross-sectional” sense, mortgage credit comprises a large share of banking system assets, and competing financial institutions have common exposure to this sector. In Canada specifically, the fact that the government both guarantees mortgage insurance and owns the dominant mortgage insurer in the market illustrates the stake Canadians as a whole have in the housing sector; taxpayers would be liable if the borrowers start to default en masse (Poschmann, 2011). Housing markets are ideal for macroprudential tools to perform in and of themselves, but one of their main attractions is their robustness with regard to a major criticism levied at macroprudential policies. Tightening of certain banking regulations may result in credit leaking to international, less regulated institutions, but mortgages can only be offered by domestic providers, eliminating the risk of borrowers looking across the border for better deals.

Like with monetary leaning, there has been much scrutiny on the economic costs of implementing macroprudential policies, especially when anaemic labour markets and low inflation justify loose

monetary policy. In terms of research done on measuring the effects of specific macroprudential tools, Kuttner and Shim (2013) and Lim et al. (2011) single out caps on Debt-Service-to-Income ratios and Loan-to-Value (LTV) ratios as being particularly effective in restraining mortgage credit and house price growth. Arregui et al. (2013) support these findings, but add reserve requirements and higher risk weights on capital to the mix of policies to consider. For LTV caps specifically, Nier et al. (2013) find evidence that these policies impede output growth, but the mechanism through which they do so may present an additional buffer to financial stability in the housing market. Nier et al. observe that LTV caps reduce construction investment, which may correct for the distortion in that sector and reduce the likelihood of excess supply exacerbating a price drop initiated by a sudden reduction in demand.

However, looking more broadly, the argument for macroprudential policies hinges on certain metrics serving as satisfactory indicators for financial instability (Galati and Moesner, 2013). Otherwise, overzealous macroprudential tightening is prone to restraining market activity without discernably decreasing the probability of a crisis or potential losses associated with one. In this regard, macroprudential policy faces the same criticism as “leaning against the wind,” yet the targeted nature of the former suggests that market losses will be more minor in comparison. Arregui et al. provide evidence confirming this possibility, showing that in the US, output losses of only 0.2% accompanied a 1% loss of credit growth (2013). Furthermore, Borio and Lowe’s (2002) study establishes relatively robust indicators of looming financial crises, lending support to the notion that macroprudential policies aimed at stemming these indicators can be feasibly calibrated; whenever policies are employed, their benefits would be realized. Overall, much is still to be learned about the effects of macroprudential policies, but the literature to date has established a basis for their use, strongly so in the housing market, as well as preliminary testaments to their efficacy.

#### **IV. Have Canada’s Macroprudential Policies Been Effective?**



Like many countries that have seen overheated housing markets in recent years, Canada has turned to the use of macroprudential policies with the objectives of slowing growth in mortgage credit and house prices as well as redistributing insurance risk. Canada's approach to date has comprised of four major rounds of tightening of mortgage insurance rules starting in 2010 (see figure 4, Krznar and Morsink (2014) for reference), with some microprudential<sup>2</sup> policies mixed in to a spread of macroprudential measures. Specifically, Canada chose multiple measures to counteract the procyclicality of credit markets, such as incrementally lowering maximum amortization periods to 25 years, LTV ratios to 80%, and debt-to-income ratios to approximately 44%. Each of these tools serves to increase borrowing costs for prospective homeowners, as their calculated monthly payments will be increased and costs of insuring the loan will be passed down to them from the lender. These rises in monthly costs coupled with caps on debt-to-income ratios also preclude highly leveraged borrowers, who may be riskier, from entering the mortgage market. In addition, Canada used discretion in targeting mortgages that were likely used for investment rather than occupation purposes. This was done through requiring a higher down payment on non-owner occupied mortgages and removing the option of purchasing insurance from HELOCs. Similarly, Canada decided to stop offering insurance on homes valued at over \$1 million, suggesting that policymakers were cognizant of the tendency of prior rules to allow undesirable levels of risk to be held by the government. In short, Canada has taken measures to address the accumulation and composition of credit in the housing market, with the goal of slowing price increases by extension.

#### **b. Benefits of Macroprudential Policies in Canada**

Canada's macroprudential actions have been at least moderately successful on a number of fronts. In an extensive study focused on Canada only, Krznar and Morsink (2014) were able to extract the

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<sup>2</sup> Microprudential policies refer to measures aimed at promoting resiliency and safe banking practices at the firm level.

effects of each individual round of tightening on mortgage credit growth on a Canada-wide scale by controlling for demand-side fundamentals such as wage growth, house price growth, the interest rate, and unemployment. They find significance in the final three rounds of tightening studied and show a near unitary relationship between mortgage credit growth and house price growth, indicating that the measures have addressed both of these ends. In terms of minimizing exposure the Canadian government's exposure to the housing market, Farugee and Pescatori (2015) show in Figure 5 that the growth of insured mortgages in the marketplace has consistently trended downwards and even fallen below zero in the latter part of the 2014. The use of LTV and debt to income caps has been well documented on a cross-country level, and Canada's experience using macroprudential tools has mostly aligned with expectations. Although the Canadian government's involvement in guaranteeing mortgage insurance is relatively uncommon globally, trends in insured mortgage growth broadly attest to the efficacy of policies tailored at managing the distribution of housing risk in the economy. Before delving into areas where Canada may falter in offering a robust approach to preserving financial stability, we can acknowledge the solid base the use of macroprudential tools to date has provided.

#### **b. Shortcomings of Canada's Approach**

Although many acknowledge that the macroprudential tools used in Canada have had their intended effect (Krznar and Morsink, 2014), making the stronger argument that Canada's approach has been sufficient in tackling the economic liabilities associated with Canada's housing sector is more difficult. Firstly, as shown in Figure 5, the fall in insured mortgages in Canada has been coupled with a growth in uninsured mortgages, and this may reflect troubling leakages within policies targeted at mortgage insurance rules. The latest IMF country report (International Monetary Fund, 2015) on Canada raised concerns that mortgage candidates were borrowing their down payments to avoid the restrictions tied to mortgage insurance, and that this practice is may be enabled by persistently low interest rates.

Leaving the problem of Canada lacking data on borrowed down payments aside, this avenue of attaining mortgage credit fuels the notion that targeted macroprudential policies are insufficient for stemming credit growth when interest rates are incongruously low. Although low LTV ratios offer a significant capital buffer that protects homeowner from going underwater on their loans when house prices drop, the notion that down payments may be borrowed raises an additional default risk should the homeowner lose their source of income. The growth in uninsured mortgages may highlight an obstacle for a purely macroprudential approach to regulation, but it is only one negative factor to consider in evaluating Canada's policies to date.

Secondly, when taking a holistic look at the forces driving housing markets in Canada, the effects of the macroprudential policies chosen may be subject to limitations. In a recent speech, Min Zhu references these confines, noting that macroprudential policy falters when faced with "shortage[s] of housing or... increased housing demand from foreign cash inflows that bypass domestic credit intermediation" that are contributing to an overheated housing market (2014). An earlier study by Allen et al. (2006) showed that the Canadian housing price movements are asymmetric across different regions, which leaves the possibility that some areas may be subject to the supply focused critiques Zhu alluded to as well as other outside effects. In particular, Figure 3 provides evidence of asymmetry within Canadian urban housing markets, with Vancouver and Toronto price gains significantly outpacing the country as a whole. As a point of comparison for how macroprudential policies operate amidst supply side constraints, a study by Hemmings (2011) looks at the experience of Israel and surmises that demand focused macroprudential policies could not eliminate the downside risks associated with price increases approaching 50% over three years. While lessons from Israel's housing market are not directly applicable to Canada, Israel's experience provides a precedent for expanding the means of preserving financial stability beyond macroprudential policies per se. Furthermore, evidence has arisen in the literature suggesting that housing policy cannot be self-contained within a macroprudential framework,

and that attention could be trained onto forces impacting supply, a finding that is consistent with Hemmings' appraisal of Israel. Kuttner and Shim (2013) lend support to this notion in their study of US housing data; they contend that housing related tax policy can be seen as the most consistent instrument in preventing over-exuberant house price appreciation. Overall, Canada has not yet eliminated concerns surrounding its housing market, and evidence suggests that the macroprudential tools used are not sufficient in attaining this end.

### **c. A Look at the Regional Level**

To further assess the notion that Canada's macroprudential policies have had asymmetric impacts befitting its asymmetric housing market, I partially adapted the methodology used by Krznar and Morsink (2014) to look directly at how rounds of macroprudential tightening have impacted house prices in five major cities: Vancouver, Calgary, Toronto, Montreal, and Halifax (see Appendix 1). Although I use similar control variables to the Krznar and Morsink (ibid.) study, benchmark lending rates, unemployment, and growth, I also include a fifth round of macroprudential tightening into my analysis because Canada tinkered further with rules surrounding investor mortgages in 2014 (Naamani, 2014). My methods also differ from Krznar and Morsink's in that I chose house prices to be the dependent variable in my regression. Compared to mortgage credit growth, the effect of macroprudential policies on house prices are more indirect, but Krznar and Morsink establish strong linkages between build ups in prices and credit. Furthermore, rapid house price growth signals financial unease when it is not viewed to be the product of fundamental economic improvements (Schembri, 2015), so tempering price appreciation can be seen as an end in itself for macroprudential policies. Upon testing coefficients of the policy variables, I found that for most rounds, I can reject the null hypothesis that tightening effects were consistent across regions. These results could be expected because it is commonly known that house price trends in different cities are widely diverse, but variation persists even after controlling for

provincial employment and output trends. The aim of this exercise is not to determine optimal levels of LTV ratios, DTSI caps, and other macroprudential measures, nor is it to re-evaluate the findings of Krznar and Morsink (2014), but to establish whether macroprudential policies in fact have different effects on house prices in different regions.

Since evidence suggests there is significant variation in macroprudential policy effects across regions, this necessarily feeds into a discussion of the ramifications of future policy choices. If a sharp decline is experienced at the local level, Cheung (2014) offers that this could have spill-over effects that impact financial stability, suggesting that introducing measures – macroprudential or otherwise – specific to problematic regions should in fact be on the table. The macroprudential tools themselves are generally robust for supporting financial stability by targeting marginally risky borrowers, but there is uncertainty regarding the criteria for macroprudential tightening; if some cities are no longer seeing abnormal house price or mortgage credit growth, what financial instability risk then necessitates tightening in their area specifically? According to Nier et al (2013) among others, macroprudential policy must necessarily be calibrated to account for benefits and costs, and it follows that there may be rapidly diminishing returns to a national policy adjusted to mortgage credit growth indicators that are upwardly skewed to account for a few cities. In the worst – admittedly unlikely – case, overly tight calibration of macroprudential policy could spark the financial downturns it aims to avoid. Also, this critique links to a broader call for transparency in macroprudential actions; regulators have left little clue as to if/how a change in conditions might merit loosening or further tightening (Jenkins and Longworth 2015). After consideration of Canada’s macroprudential actions in context, many significant issues remain within the housing sector, indicating that Canada should continue to study the impacts of policies that have been enacted while being open-minded toward alternatives.

#### **V. Addressing the Shortcomings: Does Canada Need a Macroprudential Mandate?**

### **a. Canada's Institutional Layout**

A comprehensive look at macroprudential policies in Canada would consider not only their content, the specific tools employed by policymakers, but also their context, i.e., who has been responsible for making decisions on macroprudential policy and how their activities have fit into a multifaceted approach to dealing with financial instability. Before delving into an analysis of Canada's institutional layout and how recent changes have fit into global trends, some background is required. Jenkins and Thiessen (2012), Jenkins and Longworth (2014), and Poloz (2015) colloquially refer to the Canadian approach to handling systemic risk as having "four lines of defense," with the first threshold being the personal interaction between borrower and lender, the second being microprudential policies, then macroprudential policies, and finally monetary policies. The latter three lines of defense are most important for the purposes of evaluating Canada's institutional framework, as recent developments in the literature on financial stability have zeroed in on the overlapping nature of macroprudential and monetary policy, as well as microprudential policy to an extent. For microprudential policy, OSFI takes a supervisory role over banks and financial institutions and develops regulatory legislation such as the strengthened underwriting standards attached to a major round of housing policy changes. For monetary policy, the Bank of Canada operates with an inflation targeting mandate, but they also work to "promote" financial stability. The ownership of macroprudential policy is much murkier, as the Government of Canada technically announced measures to be implemented through CMHC, but applying to all government-backed mortgage insurance. To provide some context, governing bodies in Canada collaborate informally in different fashions; as an example, regulators such as OSFI are able to use "moral suasion" to rein in banks they believe are operating against the interests of financial stability, even if they are not breaching any regulations. Also, the FISC is a coordination body created for the purposes of sharing expertise and adopting approaches to managing risk, and it includes heads of the Bank of Canada, OSFI, and the Minister of Finance among other representatives. Canada's institutional

arrangement has historically been a fine harbourer of financial stability; many credit the strength of Canada's banks and the robustness of financial supervision for smoothly steering Canada through the US mortgage meltdown and financial crisis. However, there remains room for criticism of Canada's institutional structure in light of developments undergone by some of Canada's international peers, especially in reference to their lack of a defined macroprudential mandate.

#### **b. Macroprudential Mandates Inside and Outside the Central Bank**

In analyzing whether Canada would benefit from assigning a "macroprudential mandate" to a specific institution, most of the argument against taking this course of action rests in broader scepticism about the efficacy of macroprudential policies in meeting financial stability goals and the notion that Canada's framework as a whole would not stand to gain from disruptive regulatory changes. The latter contentions can be given some weight because Canada has a comparatively strong banking system and supervisory capabilities (Jenkins and Longworth 2015), but the former is less convincing. Indicators such as credit growth relative to GDP growth have been established in the literature as reliable predictors of financial instability (Borio and Lowe 2002), and Canada's macroprudential tightening has been promising in affecting these indicators. Given this, consideration of how an explicit macroprudential mandate can support the policies themselves is due. Two of the foremost concerns expressed with regard to Canada's macroprudential tightening are that it has not encompassed uninsured mortgages (International Monetary Fund, 2015; Farugee and Pescatori, 2015) and that markets are left uncertain on whether to expect further tightening or loosening (Longworth, 2015.) Establishing a macroprudential mandate would have bearing on both of these concerns; the governing body would be given both access to a wider variety of regulatory tools that extend beyond the housing market and a framework adherent to a balance between rules and discretion guiding the use of these tools. Longworth and Jenkins argue that these conditions would assuage uncertainties in the mortgage market (2015.) Although other criteria

would have to be satisfied for a macroprudential mandate to work within Canada's wider approach to financial stability, such a mandate has the potential of being greatly beneficial.

If Canada were to assign macroprudential responsibilities to a specific institution, there is debate surrounding the optimal proximity of this institution to the central bank. For context, Martin Hellwig (2014) expresses reservations at the Central Bank being too involved with macroprudential policy, noting the disconnection between giving an agent both banking and regulatory functions and the moral hazard of one being privileged over the other. Additionally, assigning macroprudential tools and a mandate for their use to the central bank would be unwelcomed in the sense that shortcomings in fulfilling this new mandate would hurt the central bank's credibility in financial markets (Nier et al., 2011). Acharya (2015), however, posits that giving an explicit financial stability mandate to the central bank would delineate policy responses, providing guidance for navigating the constraints alluded to by Hellwig. For this explicit mandate, designing risk indicators that give a compulsion to either actively tighten or give reasoning not to tighten would lend transparency to the central bank, which incentivizes balancing the multiple objectives Hellwig described. Moreover, placing macroprudential tools under the jurisdiction of the central bank presents certain advantages. For one, the central bank is usually insulated from political influence and empowered to act promptly and robustly within the context of their mandate (Nier et al., 2011). This condition affords regulators the ability to take unpopular courses of action to address financial imbalances. Secondly, placing a macroprudential authority under the central bank could force information to flow smoothly to decision making bodies, eliminating the risk of an uncoordinated response among institutions and improving the time-sensitivity of macroprudential actions (ibid.). Although the risk of moral hazard in central bank handling of macroprudential policies presents a serious obstacle, macroprudential policy should at least work in close cohorts with, if not directly under the supervision of the central bank.



In terms of gauging where Canada stands with respect to these insights, we can start by reviewing how the Bank of Canada currently incorporates financial stability into their mandate. Beyond their general “promotion” of financial stability, they produce biannual reports on the matter. These reports feed into the wider practice of information sharing among Canada’s institutions; however the channel transmitting Bank of Canada guidance to the political body that has tabled macroprudential measures over the past few years is informal. Also, since monetary policy is dependent on a working financial system (Kryvtsov, Molico, and Tomlin, 2015), the Bank of Canada and Canadians as a whole would benefit from a governing body dedicated solely to upholding macroprudential policies and ensuring insights from the biannual report are being addressed. However, to provide international context, the Bank of England and Reserve Bank of New Zealand have gravitated toward owning their countries’ macroprudential mandates, and early evidence from each bank attests to the potential of their setups. In England, the Financial Policy Committee warned that they would tighten housing market tools should indicators reach a pre-determined threshold, and this communication perhaps contributed to more efficient self-correction in the markets (Cunliffe, 2015). New Zealand, in turn, went as far as to vary LTV ratios for different cities (Reserve Bank of New Zealand, 2015), and while it is far too early to determine the impact of these actions, the RBNZ exhibited a laudable transparency and initiative in bringing them forth. While neither of these situations constitutes a compelling argument for Canada to follow suit, they provide inklings of what a macroprudential mandate under the central bank would entail. At this junction, assigning a macroprudential framework to a competent Canadian government institution with the ability to work in conjunction with the Bank of Canada would be a welcome improvement.

## **VI. Conclusion**

Amidst the ongoing debate of the relative merits of using monetary and macroprudential policies for financial stability purposes, the Canadian government’s battle with an overheated housing market offers

an instructive view on how a macroprudential approach fares when put into practice. Fifteen years after Andrew Crockett spoke about the need to integrate a macroprudential element in combatting systemic risk (cited from Cunliffe, 2015), Canada's experience fits within the global movement toward adopting these measures. On looking more closely, however, use of macroprudential tools has been imperfect in Canada, bringing up a related international debate weighing the merits of a macroprudential mandate and its placement within systems of governance. In a sense, macroprudential policies absolve central banks from pressure to lean against the wind through monetary means, but as long as monetary policies are transmitted through the financial system and as long as macroprudential policies present economic trade-offs, central banks will have to be invested in the macroprudential governing body's actions. How countries such as Canada address this condition in the future remains to be seen, but formalizing links between the central bank and macroprudential authorities should be desirable.

In this paper, I first tracked the debate surrounding the optimal approach to preserving financial stability, specifically on how "leaning against the wind" comes with significant costs and macroprudential policies suffice in place of it. Secondly, I considered the extent to which macroprudential policies preserved financial stability in Canada. While attesting to research done on how macroprudential policy has benefitted financial stability in Canada, I showed that Canada could gain from clarifying the approach used to calibrate macroprudential tools and perhaps extending their reach beyond insured mortgages. Finally, I assessed the ramifications of a model in which Canada assigned a macroprudential mandate to a specific institution rather than relying on informal coordination facilitated by the FISC. I concluded that Canada would benefit from keeping macroprudential policy within arms-length of the central bank, as this arrangement would acknowledge the central bank's shared interest in financial stability without compromising their price stability mandate.

## References

- Acharya, V. 2015. "Financial Stability in the Broader Mandate for Central Banks: A Political Economy Perspective," *Brookings*, Hutchins Center Working Paper #11.
- Ajello, A., et al. 2015. "Financial Stability and Optimal Interest-Rate Policy," Federal Reserve Board.
- Allen, J., et al. 2006. "Canadian City Housing Prices and Urban Market Segmentation" Bank of Canada Working Paper 2006-49.
- Arregui, N., et al. 2013. "Evaluating the Net Benefits of Macroprudential Policy: A Cookbook" IMF Working Paper 13/167.
- Bernanke, B. and Gertler. 1999. "Monetary Policy and Asset Price Volatility," *Economic Review - Federal Reserve Bank of Kansas City*, Fourth Quarter 1999, pp. 17-51.
- Borio, C. and Lowe. 2002. "Asset prices, financial and monetary stability: exploring the nexus" BIS Working Papers No 114
- Cheung, C. 2014. "Deconstructing Canada's Housing Markets," OECD Economics Department Working Papers No. 1145.
- Cunliffe, J. 2015. "Macroprudential policy: from Tiberius to Crockett and beyond," Speech given at the CityUK, London, 28 July.
- Farugee, H. and Pescatori. 2015. "Canada's Financial Sector: How to Enhance its Resilience," iMFdirect <http://blog-imfdirect.imf.org/2015/03/09/canadas-financial-sector-how-to-enhance-its-resilience/>
- Galati, G. and Moessner. 2013. "Macroprudential Policy- A Literature Review," *Journal of Economic Surveys* 27:5, 846-78.
- Gambacorta, L. and Signoretti. 2013. "Should monetary policy lean against the wind? An analysis based on a DSGE model with banking" *Temi di discussione (Working papers)* No. 921.
- Hellwig, M. 2014. "Financial Stability, Monetary Policy, Banking Supervision, and Central Banking," *Max Planck Institute for Research on Collective Goods*, Bonn, September.
- Hemmings, P. (2011), "How to Improve the Economic Policy Framework for the Housing Market in Israel", OECD Economics Department Working Papers, No. 912.
- International Monetary Fund. 2014. IMF Country Report No. 15/22.
- Jenkins, P and Longworth. 2015. "Securing Monetary and Financial Stability: Why Canada Needs a Macroprudential Policy Framework" CD Howe Commentary No. 429.
- Jenkins, P and Thiessen. 2012. "Reducing the Potential for Future Financial Crises: A Framework for Macro-Prudential Policy in Canada" CD Howe Commentary No. 351.

- Kannan, P., Rabanal, and Scott (2012) "Monetary and Macroprudential Policy Rules in a Model with House Price Booms," *The B.E. Journal of Macroeconomics*: Vol. 12: Iss. 1 (Contributions), Article 16.
- Kryvtsov, O., Molico, and Tomlin. 2015. "On the Nexus of Monetary Policy and Financial Stability: Recent Developments and Research," Bank of Canada Discussion Paper 2015-7.
- Krznar, I and Morsink. 2014. "With Great Power Comes Great Responsibility: Macroprudential Tools at Work in Canada" IMF Working Paper 14/83
- Kuttner, K. and Shim. 2013. "Can non-interest rate policies stabilise housing markets? Evidence from a panel of 57 economies," BIS Working Papers No 433.
- Laseen, S., Pescatori, and Turunen. 2015. "Systemic Risk: A New Trade-off for Monetary Policy?" IMF Working Paper 15/142.
- Lim, C., et al. "Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences" IMF Working Paper 11/238.
- Lowe, P. 2002. "Credit risk measurement and procyclicality," BIS Working Papers No. 116.
- McMahon, T. 2015. "IMF sounds fresh alarm over Canadian housing market," *Globe & Mail*, 9 March.
- Mizen, P. 2008. "The Credit Crunch of 2007-2008: A Discussion of the Background, Market Reactions, and Policy Responses," *Federal Reserve Bank of St. Louis Review*, 90(5), pp. 531-67
- Naamani, A. 2014. "CMHC Tightens Mortgage Rules; An Interactive Timeline of the Corporation's History" *Resider*. <http://resider.ca/blog/2014/04/26/cmhc-tightens-mortgage-rules-an-interactive-timeline-of-the-corporations-history/>
- Nier, E, et al. 2011. "Towards Effective Macroprudential Policy Frameworks: An Assessment of Stylized Institutional Models" IMF Working Paper 11/250.
- OECD. 2015. *OECD Economic Surveys: Belgium 2015*, OECD Publishing
- Poschmann, F. 2011. *What Governments Should Do in Mortgage Markets*. CD Howe Commentary No. 318
- Poloz, S. 2015. "Integrating Financial Stability into Monetary Policy" Remarks for the National Association for Business Economics, Washington, D.C., 12 October.
- Reserve Bank of New Zealand. 2015. "Reserve Bank announces new LVR restrictions on Auckland housing" <http://www.rbnz.govt.nz/news/2015/fsr-13-may-2015.html>
- Reuters. "Household debt levels rise to record high in Canada" <http://www.theglobeandmail.com/report-on-business/economy/canadas-household-debt-ratio-hits-record-high/article26327110/>
- Schembri, L. 2015. "The Long-Term Evolution of House Prices: An International Perspective," Remarks at the Canadian Association for Business Economics, Kingston ON, 25 August.
- Svensson, L. 2013. "'Leaning against the wind', debt deflation, and the Riksbank," *VoxEU*, 10 October.

Svensson, L. 2014. "Why leaning against the wind is the wrong monetary policy for Sweden," VoxEU, 5 July.

Wadhvani, S. 2008. "Should Monetary Policy Respond to Asset Price Bubbles? Revisiting the Debate," FMG Special Papers sp180, Financial Markets Group.

White, W. 2009. "Should Monetary Policy "Lean or Clean"?" Federal Reserve Bank of Dallas Globalization and Monetary Policy Institute Working Paper No. 34

Zhu, M. 2014. "Housing Markets, Financial Stability and the Economy" Opening Remarks at the Bundesbank/German Research Foundation/IMF Conference, 5 June.

### Tables and Figures

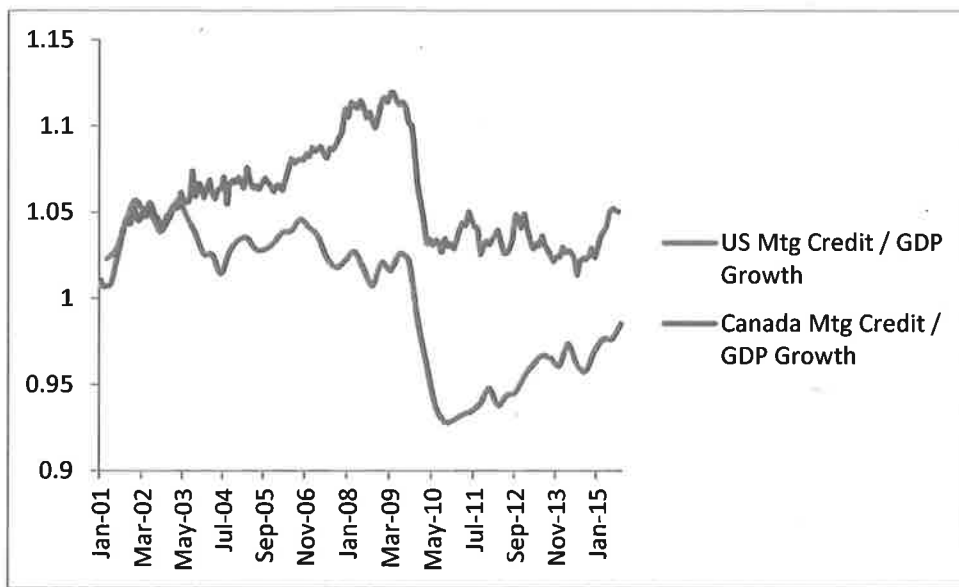


Figure 1. Sources: Stats Canada, FRED (Federal Reserve Economic Data)

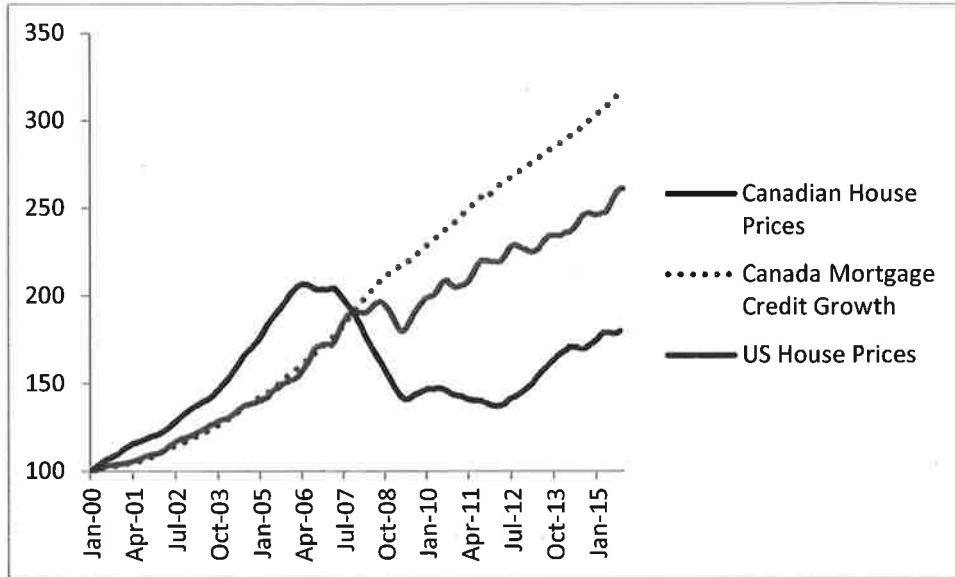
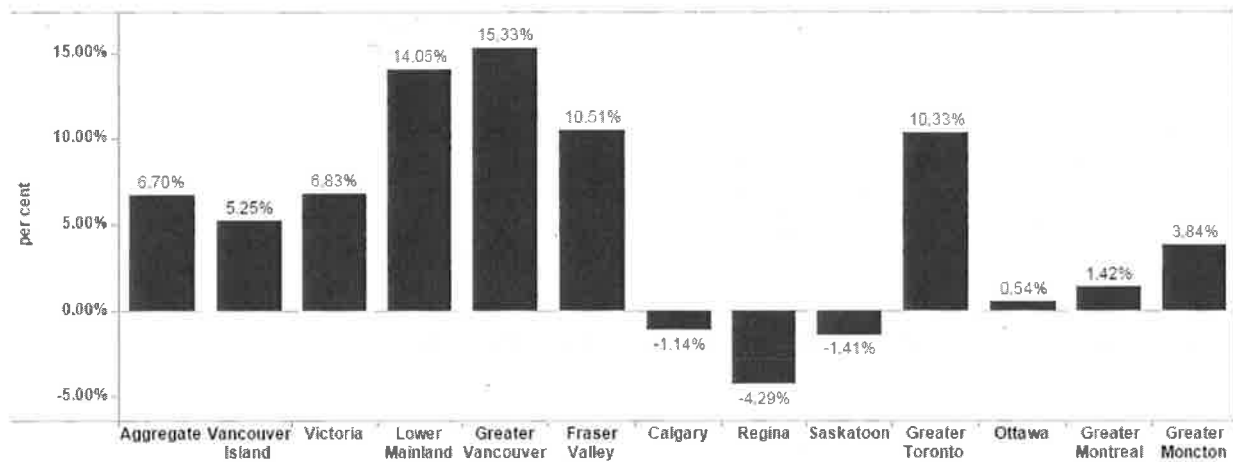


Figure 2. Sources: Stats Canada, Teranet – National Bank House Price Index™, S&P/Case-Shiller 20-City Composite Home Price Index©



Note: Aggregate MLS® HPI series include data for all participating boards, and are revised back to January 2005 as additional boards join the MLS® HPI. Some MLS® HPI series may follow a seasonal pattern.  
Source: The Canadian Real Estate Association

Figure 3. Source: CREA. Data shows year-over-year appreciation for October 2015.

**Table 2. Canada: Tightening Mortgage Insurance Rules Since 2008**

<p><i>October 2008 (announced in July)</i></p>	<p>Maximum amortization for new government backed insured mortgages was lowered (from 40 to 35 years)</p> <p>Maximum LTV for new mortgages was reduced (from 100 percent to 95 percent)</p> <p>Minimum credit score requirement (of 620) was introduced.</p> <p>Maximum of 45 per cent total debt service ratio was introduced (the amount of gross income that is spent on servicing debt and housing-related expenses such as heat or condo fees).</p> <p>Loan documentation standards strengthened to ensure reasonableness of property value and of the borrower's sources and level of income</p>
<p><i>April 2010 (announced in February)</i></p>	<p>Maximum LTV for insured refinanced mortgages was lowered (from 95 percent to 90 percent)</p> <p>Minimum down payment on properties not occupied by owner was raised (from 5 percent to 20 percent)</p> <p>More stringent eligibility criteria were introduced (all borrowers are required to meet the standards for a five-year fixed-rate mortgage, even if they choose a mortgage with a variable interest rate and shorter term)</p>
<p><i>March 2011 (announced in January)</i></p>	<p>Maximum amortization for new government backed insured mortgages was lowered (from 35 to 30 years)</p> <p>Maximum LTV for refinanced mortgages was lowered (from 90 percent to 85 percent)</p> <p>Government-backed insurance on non-amortizing lines of credit secured by houses (HELOCs) withdrawn in April</p>
<p><i>July 2012 (announced in June)</i></p>	<p>Maximum amortization for new government backed insured mortgages was lowered (from 30 to 25 years)</p> <p>Maximum LTV for refinanced mortgages was lowered (from 85 percent to 80 percent)</p> <p>Maximum gross debt service ratio and maximum total debt service ratios were capped at 39 percent and 44 percent, respectively</p> <p>Government-backed insured mortgages limited to homes with a purchase price of less than Can\$1 million.</p>

Source: Bank of Canada.

Figure 4. Source: Krznar and Morsink (2014)

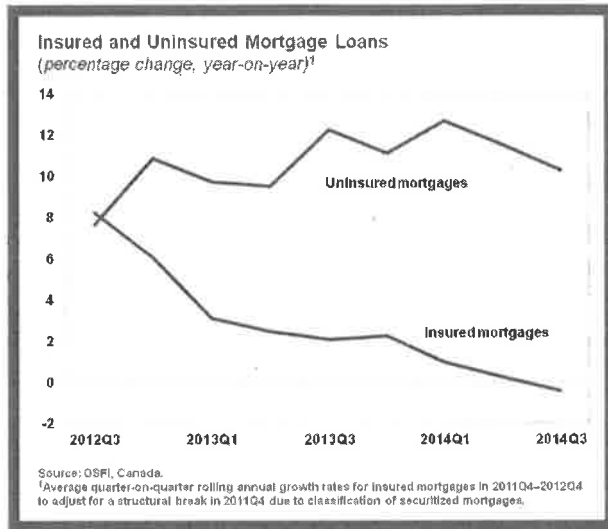


Figure 5. Source: IMFdirect <http://blog-imfdirect.imf.org/2015/03/09/canadas-financial-sector-how-to-enhance-its-resilience/>

## Appendix A

To examine whether macroprudential policies have heterogeneous effects across the country, I borrowed from Krznar and Morsink's (2014) example and built a model to predict house price growth based on policy tightening and regional control variables. I make efforts to control for regional output growth and unemployment trends by using the relevant provincial data that applies to each of the cities observed: Vancouver, Calgary, Toronto, Montreal, and Halifax. I also looked at national data as a point of comparison for each city. In a departure from Krznar and Morsink, I also include a fifth round of macroprudential tightening that was brought to the table in 2014. Since tightening rounds were used in response to observed heat in the housing market and shocks that mainly impact prices rather than mortgage credit are a legitimate stability risk, house prices serve as an appropriate explanatory variable. In the following equation, house price appreciation year-over-year is the left hand side variable  $y$ ,  $r$  is the prime lending rate,  $g$  is territorial GDP growth year-over-year,  $u$  is territorial unemployment,  $D$  refers to the 5 policy dummy variables, and  $\beta$  is the coefficient on each regressor.



$$y_i = \beta_1 r_i + \beta_2 g_i + \beta_3 u_i + \sum_{j=4}^8 \beta_j D_i^j$$

The tightening rounds each took a value of 1 from when they were enacted until the end of the sample. For testing, I ran multiple regression analyses to determine the partial effects of each round of policy tightening. I then used a “seemingly unrelated estimation” in STATA to compare coefficients across the different groups of data and test the null hypotheses that individual city coefficients were equal to country-wide coefficients. For the first, second, and fifth round of tightening, I could strongly reject the null hypothesis that coefficients were equal in all regions. For the second round of tightening, I could reject the null hypothesis with 90% significance. Aside from the third round of tightening, in which effects seemed to be correlated across regions, there is ample evidence that macroprudential policy effects vary by city. More research could be done on whether the composition of the respective tightening rounds influenced the results; what made the third round of policy tightening an outlier in that its effects were seemingly consistent among regions? Other points of curiosity include the presence of significant positive coefficients in some of the policy variables, which seem to show a counterintuitive effect. This may be the result of allowing the testing period to last until too long after major policy changes were undertaken, potentially crowding out effects of the policy signals.

### Do Macroprudential Policies Have Similar Effects in Each Region?

Round of Tightening	Null Hypothesis (all coefficients are equal)
First Round	Reject*
Second Round	P = 0.0717
Third Round	P = 0.3045
Fourth Round	Reject
Fifth Round	Reject

\*'Reject' indicates we can reject the null hypothesis with 95% confidence

### Comparison of Regional Effects to National Effects

	First Round	Second Round	Third Round	Fourth Round	Fifth Round
Vancouver vs.	Reject*	Reject	P = 0.0532	Reject	Reject

Canada					
Calgary vs. Canada	Reject	P = 0.0684	P = 0.1090	Reject	P = 0.4894
Toronto vs. Canada	Reject	P = 0.0512	P = 0.5106	Reject	P = 0.4067
Montreal vs. Canada	Reject	P = 0.3477	P = 0.2272	Reject	P = 0.2876
Halifax vs. Canada	Reject	P = 0.3976	P = 0.3016	Reject	P = 0.1593

\*'Reject' indicates we can reject the null hypothesis with 95% confidence

### Effects of Policy Rounds and Control Variables in Each Region

	Canada	Vancouver	Calgary	Toronto	Montreal	Halifax
1 <sup>st</sup> Round	-.1915** (.0239)	-.0673** (.0172)	-.0251 (.0300)	-.0640** (.0151)	-.0637** (.0071)	-.0535** (.0079)
2 <sup>nd</sup> Round	-.0031 (.0277)	.0735** (.0158)	.0687* (.0340)	.0779** (.0155)	.0252** (.0075)	.0223** (.0080)
3 <sup>rd</sup> Round	.0043 (.0217)	-.0420** (.0146)	-.0475 (.0312)	-.0128 (.0127)	-.0175** (.0070)	-.0146 (.0082)
4 <sup>th</sup> Round	.2043** (.0192)	-.0662** (.0122)	.0434 (.0259)	-.0212* (.0103)	-.0267** (.0064)	-.0123 (.0066)
5 <sup>th</sup> Round	.0038 (.0196)	.0480** (.0132)	.0165 (.0270)	.0178 (.0116)	-.0136** (.0062)	-.0221** (.0070)
Wages (y-o-y)	.0313** (.0041)	.0133** (.0016)	.0006 (.0023)	.0028 (.0018)	.0051** (.0010)	.0011 (.0013)
Unemployment (y-o-y)	.1265** (.0119)	-.0103** (.0031)	-.0180 (.0117)	.0050 (.0074)	.0073** (.0027)	.0003 (.0022)
Prime Business Rate	-.0109** (.0076)	-.0152* (.0049)	.0474** (.0099)	-.0074 (.0042)	-.0124** (.0022)	-.0061** (.0023)

\* indicates significance at the 5% level, \*\* indicates significance at the 1% level, standard errors are in parentheses. Data on wages and unemployment were gathered from Stats Can, prime business rates were gathered from Bank of Canada.