

Re-evaluating Our Priorities: Improving the CMHC's Mortgage Insurance System

by

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Abstract

In Canada, government intervention in the housing markets and financial markets comes through several branches of the state. The Office of the Superintendent of Financial Institutions (OSFI) enacts laws concerning the regulation of mortgage lending and insurance, which in effect acts to increase or decrease accessibility to mortgages for home buyers. The Bank of Canada regulates interest rates, which modifies the cost of borrowing and thus also effects a buyer's ability to purchase a home. Although the Canada Mortgage and Housing Corporation (CMHC) operates under the supervision of OSFI, it still has a certain degree of autonomy and can choose to implement various housing construction projects, increasing the supply of housing or the quality of the existing stock. These government 'agents' have the ability to pursue three distinct types of policies: helping the poor obtain access to affordable and adequate housing, grow the housing sector as a whole and promote stability in the housing sector as well as in financial markets. The history of housing policy has been a messy one, with the federal government oftentimes lacking focus and unity in its decision making. However, the general trend has been to give growth in the housing sector priority over the other two potential policies. This was done primarily in the form of easing credit constraints in the sector by shifting the risk of default away from the mortgage originators. Applying modern macroeconomic theory, it can be demonstrated that these practices have been instrumental in the development of housing bubbles in Canada and have come at the cost of an ever more unstable financial system. Furthermore, using data from the Housing in Canada Online database, it becomes clear that overvaluation in the housing sector is a local phenomenon and that the regions most at risk are where housing supply elasticity is lowest, due to land scarcity and regulatory constraints. In order to rectify the situation, the federal government along with the Bank of Canada must recognize the adverse affects of credit easing. It must also understand that simply reversing the latest credit easing measures and further tightening mortgage lending standards across all of Canada, will have nefarious effects due to the heterogeneous nature of housing markets in the nation. A different approach where the CMHC would be allowed to vary the premiums on mortgage default insurance geographically, according to the level of overvaluation present in each housing market, would help to reduce boom-bust cycles in the sector. It would also foster greater confidence in Canadian financial institutions. The long-run savings obtained from the adoption of policies promoting stability in markets could eventually be used to implement housing projects directly targeted at relief for the lowest income households in the country.

Introduction

The Great Financial Crash (GFC) of 2007-08 was the worst financial crash since the Great Depression. Its economic cost was in excess of \$20 trillion for the United States alone (Better Markets, 2015). This collapse exposed the underlying instability in many developed nation's financial systems. The rapid recovery in housing prices and the absence of bank failures in Canada, has led to the belief that its regulatory framework is superior to its OECD counterparts (Kiff, Mennill, and Paulin, 2010; Crawford, Meh and Zhou, 2013). The reality is that the recovery was due to an expansion of growth policies of an unprecedented scale. This created even less stable conditions than those prior to the crisis (Walks, 2014; Kermani, 2012; Maggio and Kermani, 2014; Muellbauer, St-Amant and Williams, 2015). In an effort to regain stability, the Office of the Superintendent of Financial Institutions (OSFI) has been cautiously trying to reform regulations in the housing and financial sectors. However, the pursuit of economic growth in the housing sector is so engrained in Canadian history, that a concerted effort to create a stable system has yet to materialize.

This paper argues that stability must take precedence over growth in policy making. A holistic approach was taken by combining historical sources, modern economic theory and Canadian survey data. This synthesis also demonstrates the ineffectiveness of minimum eligibility requirements for mortgage default insurance as a stabilization tool. The Canadian housing market is heterogeneous in the elasticity of housing supply. Therefore, attempts to “cool down” markets, by tightening access to credit countrywide, will adversely affect areas that are not in a housing bubble. Important gains can be obtained by introducing geographically focused policy rules for mortgage default insurance. More specifically, variable insurance premiums would help to stabilize housing prices and promote confidence in the financial system. This new

approach would require the active involvement of the Canada Mortgage and Housing Corporation's (CMHC) research teams in assessing local risk factors. It also requires that the state cease its current mixed policy approach, which is causing bubbles in the housing sector and weakening market stability.

This paper is organized in four sections. The first, outlines the history of government involvement in the Canadian housing market. It serves to understand how precarious a position the state is in, and the forces that brought it to this point. The second section reviews and adapts Amir Kermani's theory regarding boom-bust cycles, which incorporates the effects of household debt and changing credit constraints. It explains why growth policies have caused bubbles in the housing sector as well as how changing credit constraints have heterogeneous effects on markets. The third, is the analysis of the Housing in Canada Online (HiCO) database. It exposes the localised nature of the housing bubbles in Canada, and how markets vary in housing supply elasticity. The fourth section uses the information from the previous three to recommend policy changes. It states that stability policies targeted on the local level should be applied to obtain the greatest economic and social benefits. It proposes a new variable premium system for mortgage default insurers and outlines the challenges that must be met to ensure its success.

History of federal housing policy

The federal government began playing a role in the housing market through a series of acts that came mostly as responses to crises. Its method of intervention would change through time as various options were tested. These interventions would generally revolve around three goals. Sometimes, the state would attempt to increase accessibility to housing for the poorest in society. These initiatives were normally small in scope, and relatively unsuccessful.

Alternatively, it would promote growth in the housing sector. Originally, these policies were limited, due to a stricter adherence to fiscal responsibility. Though these gained momenta over time. The third objective was to maintain stability in markets. This policy would often be neglected throughout Canadian history. A common method of increasing growth in the housing sector was to encourage lending on behalf of the financial institutions. One of the favored tools of the state to reach this objective, was to underwrite some of the default risk on mortgages being issued. This would continue until the GFC, where suddenly, the resulting instability in the system became apparent. Vast bailouts were required to prevent a collapse of the banks. The crash brought greater consciousness of housing bubbles in some of Canada's largest cities. In an effort to battle housing price inflation and to increase the stability of the financial system, OSFI reversed the changes that had been applied just two years prior.

[World War I and the War Measures Act](#)

The first ever federal housing program was instituted between 1918 and 1924. The need for federal involvement in the housing market arose when the veterans of World War I returned to Canada. The public complained that the existing housing stock was too low to accommodate everyone suitably, and that the private market was not responding fast enough to the large increase in housing demand. Consequently, rents were high and the quality of existing housing stock unsuitable. In response, the federal government (at the time known as the Dominion) organized a twenty-year loan of 25 million dollars, which would be administered to provinces in proportion to their population size. This was authorized under the War Measures Act of December 1918, and would provide funds for local housing projects. The loans would provide economic stimulus to alleviate the employment pressures brought on from the returning soldiers.

Although the program was ultimately deemed an administrative failure, it succeeded in quelling public unrest by providing additional jobs (Oberlander & Fallick, 1992).

The Great Depression

The War Measures Act allowed for the issuance of loans until 1924. However, the economic boom of the 1920s and a change from the Arthur Meighen administration to the more conservative Mackenzie King administration, led to an early disuse of the program by 1921. Even though the roaring twenties led to a growth in the middle class, slums nevertheless grew in certain urban centers like Montreal. When the great depression began in 1929, the rise in unemployment brought the lack of adequate housing for low income households to the forefront of public debate. Furthermore, the depression caused a decrease in property values, and a slowdown to the construction industry (Belec, 1997). The state, once again, intervened in the housing sector by passing the Dominion Housing Act (DHA). The current administration was reluctant to spend a large portion of the treasury fund, and so it opted to enact a joint-lending program instead of directly funding the amelioration of the slums. Though the poor would not receive direct relief, there was hope that the loans would allow them to obtain the financing necessary to leave the slums (Oberlander & Fallick, 1992).

At the time of the Great Depression, mortgage lenders¹ found it prudent to only allow a maximum loan-to-value ratio (LTV) of 60%. Joint-lending permitted the maximum LTV ratio to be increased to 80%, by having the state provide the additional 20% of the loan. The DHA loans would be paid back monthly instead of quarterly or bi-annually, like the conventional mortgages

¹ These were mostly insurance and trust companies. Banks were only allowed to enter the mortgage industry in 1992 with the Bank Act (BoC, 2010). Prior to the joint-lending program, the majority of credit actually came from peer-to-peer lending (Harris & Ragonetti, 1998).

at the time. Furthermore, the loans would be issued at subsidized interest rates. Instead of the typical 6% interest, the DHA loans could be done at 5%, since the Dominion only collected 3% on its portion of the loan. To further decrease mortgage payments, the government introduced the now common place 20-year amortization period. Previously, the typical mortgage had an amortization period of three to five years. The default risk would be shared between each party, proportionally to the equity that was put forth (Oberlander & Fallick, 1992).

The Dominion Housing Act

Ultimately, the DHA did not prompt credit institutions to lend outside their existing client base, composed of middle to high income buyers in already well established housing markets (Belec, 1997; Harris, 1986). Lenders still considered the risk of default to high for lower income individuals, despite the state's commitment to absorb 20% of potential losses. The DHA loans also required monitoring the construction of each dwelling, to ensure that more rigid standards were being followed. The combination of this additional cost, and the higher probability that low income borrowers would not comply with these standards, discouraged the issuance of DHA mortgages to low income households. As such, it was those with higher incomes that benefited the most from the new program. It was later found that most DHA loans were issued for the construction of housing that was above the average price, and that these homes were built in "Canada's most exclusive and wealthiest districts of the 1930s" (Belec, 1997).

Even though few loans were actually issued through the DHA, it set a precedent of the federal government acting as a primary agent in the shaping of mortgage finance practices. Another precedent that was set, albeit unintentionally, was the creation of the subprime mortgage market. In many cases, the minimum down payment for DHA mortgages was being borrowed

from elsewhere in the community. It is estimated that up to one quarter of all mortgages had the equity portion financed by informal arrangements (Harris & Ragonetti, 1998). Government interventions in the housing sector focusing on growth had thus already begun eroding stability in financial markets.

The National Housing Act

In 1938, the federal laws governing the mortgage industry were consolidated in the National Housing Act (NHA). Special provisions for low income households were introduced, by allowing for a lower down payment (10% instead of 20%) for mortgages below the value of \$2,500. Nevertheless, less than one fifth of the mortgages issued under the NHA went to low income households (Belec, 2015). The program was much more successful than its predecessor in encouraging overall lending by credit institutions. The resulting boom in construction eased unemployment pressures in the economy. Following the success of the initial National Housing Act, attempts were made to focus on aid to the poor. The first was supposed to ease credit constraints for low income households, by offering joint-lending at a lower interest rate of 2%. The second, was also aimed at easing accessibility to housing, by providing a tax incentive to municipalities who would build lots for \$50. Despite these incentives, given the investment climate of the 1930s, credit institutions still would not extend credit to low income groups. Also, the federal government was already spending money on various other economic stimulus programs, and thus failed to properly advertise this new bill. Furthermore, the regulations imposed on municipalities in order to access the tax incentive were too high of a compliance cost to incite local participation in the programs (Oberlander & Fallick, 1992). This would mark a recurrent trend in housing finance. Policies that specifically would help the poorest segments of

society served as announcements to garner public favor, yet would be organised to be under utilised.

World War II and Wartime Housing Limited

The beginning of the Second World War sparked a huge boom in the industrial sector. By 1943, more Canadians were employed in the war industry than in all other sectors combined. This prompted a rapid increase in urbanization, as 300,000 individuals moved to cities in order to participate in the war effort. The resulting housing shortages led to the creation of the Wartime Housing Limited (WHL) crown company. Although the company was under the administration of Joseph M. Piggott, the Minister of Munitions, it was left to operate for the most part independently, among its many decentralized offices. It was tasked with building low cost, semi-prefabricated, standard design housing for the new workers, families of soldiers and veterans. Once the war was over, the WHL began the process of selling these houses to its tenants. The WHL program lay the foundation for the Central Mortgage and Housing Corporation², a permanent company by which the state could continue along the path of direct involvement in the residential construction industry. However, further expansion in the sector was halted by the election of the Liberal party. It was “dedicated to private enterprise and would do almost anything to avoid getting into a policy of public housing” (Oberlander & Fallick, 1992). Once again, subsidizing the growth of the mortgage industry would take priority over the direct funding of housing projects for the poor.

² It would be renamed the Canada Mortgage and Housing Corporation in 1979 (CMHC, 2011).

The CMHC and mortgage default insurance

The CMHC was incorporated in December 1945. It would take up all post war responsibilities of housing programs under the National Housing Act (CMHC, 2011). The actions of WHL had helped to foster the view that housing was a public good. The mandate of the CMHC reflected this notion; it was to provide housing to the lowest income families in Canada. However, due to the broad nature of its mandate and its status as a crown corporation, individual presidents would influence its policies to a large degree. Depending on who held its presidency, the emphasis could still be put on the growth of the housing market at large (Oberlander & Fallick, 1992). This policy was legitimized using the same argument from sixteen years earlier, during the Great Depression. Others believed that the CMHC should administer housing projects directly, from its financing, to construction and sale. This second approach gained momentum during the early fifties. WHL had shown that it was the best policy to directly increase accessibility to affordable, and adequate housing for low income individuals. However, many complained that the CMHC alone, could not provide enough housing supply. The post-war baby boom and the surge in immigration had greatly increased demand. Furthermore, in 1951, there was reportedly a 25% annual decrease in housing starts, and only 30% of Canadians could afford to buy a home under the current lending terms (Oberlander & Fallick, 1992).

The CMHC would respond, once again, by attempting to ease credit to households. This time, it would take the drastic measure of replacing joint-lending outright with mortgage default insurance. While previously, the default risk was shared between the federal government and the private lenders, credit institutions would now provide all the capital and purchase insurance from the CMHC. This insurance would guarantee that the lender would recover 98% of the principal owed and 100% of the interest due in case of default. The fee for this insurance would be

between 1.75 to 2% of the total loan for owner-occupied homes, and 2.25 to 2.5% for rental housing. The maximum LTV ratio allowed for CMHC insured mortgages was 75%. This new practice was very successful in prompting credit institutions to lend more. Providing a means for lenders to rid themselves of the vast majority of the default risk was much more enticing than assistance in providing capital. However, it did not succeed in getting credit institutions to lower their minimum down payment requirements. Thus, many low income households still could not afford to apply for a mortgage (Oberlander & Fallick, 1992).

The reinvention of the CMHC as a mortgage insurer meant a dramatic increase in its role in market stability. It is unclear, if at the time, regulators understood the full implications of their new position in the finance sector. If they charged premiums below the actuarially fair price, this would subsidize the banks, since they typically pass on the cost of the insurance to the borrower (Allen, 2011). Such a practice would also lead them to underwrite more risk than their reserves could justify. The issuance of an under-reserved insurance product might cause a loss of consumer confidence in the ability of the CMHC to repay in the event of large scale defaults. This would decrease stability in the financial sector, by contributing to the systemic risk of failure in the mortgage market. Furthermore, providing such low insurance premiums would prevent well capitalized private mortgage insurers from entering the market (Blood, 2009). Private mortgage insurance issuers were eventually allowed through federal legislation in order to foster competition in the industry. They initially obtained roughly two-thirds of the mortgage insurance market by the mid-1970s. However, by 1981, they had all been consolidated under the Mortgage Insurance Company of Canada, and their market share had dropped to 20% (Oberlander & Fallick, 1992). This strongly hints that the CMHC's insurance premiums were below that of the fair market value at the time.

Peak inflation and mortgage securitization

In 1969, the federal government abandoned the policy of fixed interest rates for NHA mortgages. It instead chose to restrict the maximum rate to no more than 2.25% above the long-term government bond rate. It also reduced the minimum term of NHA mortgages to five years, while maintaining the original 25 years as a maximum bound. The timing of this change was unfortunate, as the late 1970s and early 1980s was a period of unprecedented price inflation, which increased bond rates tremendously³ (Oberlander & Fallick, 1992).

The resulting increase in the cost of borrowing endangered the continued growth of the housing market. The state consequently took measures to further expand credit access. In 1985, credit institutions were allowed to package mortgages which met the minimum criteria for default insurance into Mortgage-backed securities (MBS). The National Housing Act Mortgage-backed Securities program (NHAMBS) was modelled according to the U.S. Ginnie Mae (Government National Mortgage Association) securitization program. Setting itself apart from its American counterpart, the NHAMBS offered an unconditional guarantee by the government of Canada that the principal and interest would be paid on time. This new type of insurance would be funded by premiums charged to the issuers of the MBS (Witherspoon, 1999). This was yet another way to help increase mortgage lending by shifting risk away from private institutions to the CMHC.

Two years later, the Office of the Superintendent of Financial Institutions (OSFI) was created, which would bring the regulation of federally chartered banks, insurance companies, trust and loan companies, as well as cooperative credit associations under a single supervisory agency.

³ See Appendix, Figure 1.

OSFI's mandate would be to ensure that the financial system did not expose itself to excessive risk, while at the same time promoting competitiveness in the industry (OSFI, 2015).

Pre-crisis credit easing

Despite OSFI's mandate to foster stability in the financial market, it would aggressively pursue the expansion of the financial industry in Canada. It gradually lowered the minimum down payment for an NHA insured mortgage to 5%⁴. In 1997, it also extended a 90% guarantee to mortgage insurance issued by Genworth, the only private competitor to the CMHC at the time. In 2001, shadow banking was allowed in Canada, through the entrance of U.S. financial firms and global hedge funds. These would issue subprime mortgage loans as well as offer zero percent cash down (Baragar, 2009). Thankfully, Canadian banks and other traditional lenders were reluctant to purchase derivatives backed by these products, as they could not be insured under OSFI's standards. This lasted until 2006, when following further lobbying from U.S. firms, the maximum LTV ratio required for CMHC insurance was increased to 100% (Traclet, 2006). The additional fees associated with high LTV ratio mortgages were also removed (Walks, 2014). This effectively meant that the state was subsidizing the increase in subprime lending. Furthermore, the maximum amortization period was for the first time increased to 40 years. New private competitors to the CMHC were allowed to enter Canada, including AIG United Guaranty⁵, the Canadian counterpart of the insurance company at the heart of the U.S. financial crisis. These new competitors were also extended the 90% federal guarantee for all mortgage insurance issued (Baragar, 2009).

⁴ The 95% maximum LTV ratio for NHA insured mortgages was first introduced in 1992 as a pilot program and was formalized in the 1999 revision of the NHA act (CMHC, 2011, Traclet, 2006).

⁵ AIG United Guaranty would continue to operate in Canada after the GFC by changing its name to Canada Guaranty.

Even though a Mortgage-backed securities (MBS) program had been put in place in the 1980s, the issuance of Canadian MBS had failed to gain momentum over the next decade, as a series of recessions and crises kept reducing confidence in such investment vehicles⁶. Thus, in June of 2001, the state instituted the Canada Mortgage Bond (CMB) program. This allowed the CMHC to sell MBS on its own account, instead of merely providing the insurance for the timely payments of privately issued MBS. The proceeds from these CMBs were used to purchase MBS directly from private issuers under the Canada Housing Trust (CHT). In essence, the CMCH would act as a special-purposed vehicle, removing these assets from lenders' balance sheets (Walks, 2012). This allowed private lenders to issue a greater amount of mortgages by reducing their debt to equity ratio. Furthermore, all mortgages that were insured by the CMHC would be assigned a risk weight of zero under the Basel II international standards, meaning that no equity would be required by the banks against those debts (Mohindra, 2010). This gave Canadian banks the incentive to issue as many mortgages as possible, while charging the borrower the additional cost of default insurance.

The Great Financial Crash

By early 2008, thanks to numerous credit easing policies, the federal government's contingent liabilities to the private sector had grown rapidly. In fact, the CMHC gained 90% of the mortgage insurance market in that year, up from its share of 57% just a few years prior (Dmitrieva, 2015). The displacement of the private insurers during this period indicates that the public corporation was still underpricing its insurance. As the crisis developed, the over issuance of subprime and interest-only mortgages, in the United States and other countries, was revealed as the root of the GFC. The lower occurrence of these types of risky mortgages in Canada was

⁶ 1987 U.S. savings and loan crisis, 1990s and early 2000s recessions.

not due to the country's superior regulatory framework, as many maintain. Rather, it was because it adopted the loose lending practices and mortgages securitization much later than the U.S. and U.K. (Walks, 2012, Macdonald, 2012).

Despite subprime and interest-only mortgages representing less than 5% of new originations (Kiff et al., 2010) in 2006, Canadian banks and trusts had accumulated a large amount of U.S. MBS. As the crisis developed, their values declined rapidly. Consequently, some of the largest Canadian banks were found to have lower capital ratios than Citigroup and Washington Mutual, which had to be bailed out and failed respectively. Drastic measures were undertaken to prevent a widespread crisis akin to that happening in the U.S. and elsewhere. Through the Term Loan Facility (TLF) and the Term Purchase and Resale Agreement (PRA), over \$44 billion in emergency loans infused liquidity into Canadian banks. Another \$4 billion in mortgages were bought outright by the Canadian Pension Plan. The CMHC also played a large role in the bailout through the Insured Mortgage Purchase Program (IMPP), which operated alongside the already existing CMB program. This would allow the purchase of even more MBS from Canada's financial institutions. By the end of the program in 2010, \$69 billion worth of MBS had been bought through the IMPP (Macdonald, 2012; Walks, 2014).

The unofficial bailouts cost the tax payer \$137.55 billion in the form of purchases of MBS from private banks, between the fall of 2008 and the end of 2009 (Walks, 2012). Although the housing market in Canada had seen prices falter, a series of tax cuts and stimulus programs ensured a rapid recovery⁷. The Bank of Canada (BoC) also reacted to the decrease in housing prices by following suit with the U.S. Federal Reserve's decision to decrease the bank rate

⁷ See Walks (2014) for a detailed explanation of the various tax incentives set in place to increase housing demand.

dramatically⁸ (Baragar, 2009). The subsequent rise in housing prices however meant record levels of households' indebtedness⁹. The state grew worried about the financial stability of the country, and the presence of speculative bubbles in the housing market (Schembri, 2015).

The Great Reversal

Quite out of character considering its history, OSFI finally made the decision to increase the minimum requirements for mortgage default insurance. This « macroprudential tightening » would both decrease the maximum amortization period for insured mortgages and the maximum LTV ratio¹⁰ (Schembri, 2015). The measures would come in effect in steps. The maximum amortization period would be decreased by 5 years in 2008, 2011 and 2012, bringing it back to the original standard of 25 years. The LTV limit for new mortgages was decreased to 95% in 2008, with no further changes. The LTV limit for mortgage refinancing was decreased to 80% over four years (Crawford & al., 2013). The decision was also made to only insure mortgages with a purchase price below \$1 million (Bank of Canada, 2012).

Throughout the history of federal involvement in the housing market and housing finance, there has been a tug of war between the promotion of growth or stability¹¹. The first normally took the forefront. These measures benefited the richer segments of the population involved in the housing sector. Joint-lending and mortgage default insurance would reduce the risk to banks, but the cost of this benefit would be passed on to the borrower. Mortgage purchasing programs for securitization further shifted credit risk away from banks to the social

⁸ See Appendix, Figure 3.

⁹ See Appendix, Figure 2.

¹⁰ These changes affect the credit constraint of many households as 43% of mortgages outstanding in 2010 were insured (Mohindra, 2010).

¹¹ See Appendix, Figure 4: Timeline of Major Events and Interventions in the Canadian Housing Market.

sector, leading to what is now known as the “high taxpayer vulnerability model” in Canadian mortgage finance (Mohindra, 2010). The adoption of such a system cost the tax payer billions during the last GFC.

Consequently, a long overdue shift towards the promotion of a financially stable economy has begun. Although OSFI has taken measures to increase stability¹², the BoC and other branches of the federal government, have continued to pursue aggressive growth policies in the form of tax breaks and artificially low interest rates. OSFI’s macroprudential policies, although cautious, could be negatively impacting regions that aren’t experiencing housing bubbles.

Theoretical Framework

Amir Kermani has devised a macroeconomic model that provides valuable insights concerning the forces behind the creation and the subsequent bust of housing bubbles. Although his theory was constructed around the American financial system, he identifies several key features that are relevant to the housing market in Canada. Using data from before and after the bursting of the housing bubble in the United States, Kermani found that credit easing measures, introduced by the government, resulted in unsustainably high home prices. Restrictive credit policies, in turn, contributed to a decrease in housing prices, completing the boom-bust cycle. It was found that the intensity of the cycle was highly dependent on the elasticity of housing supply in local markets.

¹² OSFI has revised the CMHC’s mandate in 2012 to include the contribution to the stability of the financial system and the housing market (Crawford & al., 2013).

Setup

The model is set up as follows. Firstly, households are assumed to have a time discount rate higher than the credit interest rate. This leads to them to borrow in order to frontload their consumption. Secondly, part of the credit available to households comes from borrowing against the equity on their houses. Thirdly, income obtained from credit will be used to increase both housing and non-housing consumption. For example, some households will refinance their mortgages to buy a car, while others will use the additional income to renovate their homes.

Causes of the boom-bust cycle

The dynamics of this model lead to a boom and bust cycle that is closely linked to credit constraints. If the central bank decreases interest rates for instance, there will be an increase in borrowing from households. A portion of this income will be spent on housing renovations or to finance the purchase of another home. In either case, this will lead to a rise in housing prices (*ceteris paribus*) by increasing the value of existing homes or housing demand. The higher home prices will provide yet even more equity from which households can borrow against. This will lead to a feedback loop, upon which housing prices will continue to increase¹³. In the absence of further government action, there will eventually be a reversal of the cycle, as households reach the maximum amount of debt that they are capable of accumulating. They will then have to decrease their consumption of both housing and non-housing goods in order to pay back their loans. In reality, this means having to downsize their houses or sell “extra” housing. This will cause a reversal of the boom, which will decrease housing prices until a new equilibrium is

¹³ See Appendix, Figure 5.

reached¹⁴. If the government introduces policies that restrict access to credit, the reversal of the boom phase will be hastened and the new equilibrium price will be even lower¹⁵.

Heterogeneous effects based on housing price elasticity

The magnitude of credit constraint changes will partially explain the length and intensity of the boom or bust. Another factor is the elasticity of housing supply. During the boom phase, a market where the housing supply reacts quickly to increases in demand will experience less inflation in housing prices. This will decrease the importance of the endogenous process, by which households use their home's increased equity to finance additional consumption.

Effect of an unexpected change in interest rates

Kermani's model incorporates dynamics between changes in various credit constraints and housing prices. Decreasing the interest rate unexpectedly will have heterogeneous effects depending on housing supply elasticity. Such a decrease in elastic markets will cause both an increase in consumption (both housing and non-housing) and prices initially. Over time, the value for both variables will decline as households maximize their borrowing capacity, leading them to have no choice but to decrease their consumption in order to repay their debts. The model therefore predicts an eventual decrease in home prices. The new steady state will be higher for both house prices and consumption. In elastic housing markets, the model predicts a different impact. A decrease in interest rates will free up some resources for households in the form of decreased loan payments for those already in debt. This additional income will be used on both higher non-housing consumptions as well as to purchase more expensive housing.

¹⁴ Note that the new equilibrium value for the price of housing after the bust will be higher than the original value prior to the decrease in the household's credit constraint (Kermani, 2012).

¹⁵ See Appendix, Figure 6.

However, the increased demand for housing will not lead to an increase in prices. Instead, it will lead to more construction of housing to meet demand¹⁶.

Effect of an unexpected change in collateral requirements

With respect to decreases in the maximum LTV ratio, Kermani's model predicts that inelastic regions will experience an initial decline in house prices and housing and non-housing consumption. This will be followed by a gradual increase the variables. The new steady state will be lower than the original one. This transition path is caused by the necessity of households to sell a fraction of their housing stock in order to meet the new collateral constraint. Other investors will buy the now cheaper housing stock, in anticipation that housing prices will eventually increase. As households increase their savings, due to the higher down payment constraint, they will ultimately buy back the housing stock from the investors. In the case of elastic regions, the model predicts that a decrease in the maximum loan-to value ratio will have a similar effect on housing and non-housing consumption as in inelastic markets. However, due to supply adjustments, the equilibrium price will be unchanged¹⁷.

Relevance of the model in Canada

The heterogeneous effect of government policies according to the elasticity of housing supply is crucial to understanding modern boom-bust cycles. Kermani identifies the availability of land and regulatory restrictions as the two most important factors affecting this variable. Consequently, areas with high population densities and complex regulations for contractors, will be the most sensitive to changes in interest rates, maximum LTV ratios and

¹⁶ See Appendix, Figure 7.

¹⁷ See Appendix, Table 1.

amortization periods. It is in these areas that housing bubbles are most likely to develop as a result of state interventions in housing finance.

Although Kermani was focused on the American housing market, the basic principles of his model can be applied to other similar markets¹⁸. Muellbauer, St-Amant and Williams (2005) found many parallels with the Canadian housing market. Although they don't seem to have been aware of Kermani's work, they too incorporated credit conditions and asset prices in a theoretical framework using lessons learned from the GFC. This led them to find that negative shocks to the household's credit constraint would raise house prices, debt and consumption (Muellbauer et al., 2015). They neglected however to take into account the heterogeneous effects of credit linked to the elasticity of housing supply. They neither distinguished between housing and non-housing consumption. This may have been instrumental in their inability to find evidence of the feedback loop described by Kermani, where higher housing prices lead to increased housing consumption through the channel of home equity loans. They did note that since the 2000s, mortgage refinancing has become much easier. This increases the likelihood that Kermani's feedback loop is now present in the Canadian housing sector.

Shortcoming of the model

One aspect of the model which requires some adjustment is the notion that in elastic housing markets, decreases in housing consumption do not affect prices. It is reasonable to assume that when housing demand increases, contractors can build new homes relatively quickly, especially in the absence of land and regulatory restrictions. When housing demand

¹⁸ The OECD economic forecast for Canada in 2016 supports the application of Kermani's findings in Canada by stating that lower borrowing rates have encouraged the rapid rise in housing prices particularly in Vancouver and Toronto.

decreases, adjusting the supply cannot be done so easily. This can only be achieved by demolishing older homes or converting residential neighborhoods to commercial ones. Neither one of these options would typically be done with haste. Thus, it can be postulated that although decreases in credit constraints do not add much upward pressure to home prices in elastic regions, the opposite would lead to significant decreases in home values¹⁹.

Expected effects of recent policy changes in Canada

Beginning in 2008, the federal government applied several changes to the eligibility requirements for insured mortgages. The first change was an interest rate decrease, which would stimulate the housing market. The other two were decreases in the maximum loan-to-value ratio and the amortization period, which would have the opposite effect.

Using the theoretical framework of Kermani, one would expect the decrease in interest rates to have heterogeneous impacts, based on the elasticity of housing supply of each local market. In inelastic regions, a long-run increase in both housing prices and consumption would be anticipated. In elastic markets, there should be little effect on housing prices and a gradual increase in housing and non-housing consumption.

Since both the changes to the maximum LTV ratio and the amortization period act as increases in the borrowing constraints of households, they should affect the market in a similar fashion. Inelastic regions should experience a long-run decline in housing prices. Housing and non-housing consumption should also follow this pattern. Kermani's model predicts that the effect of tightening the CMHC's eligibility requirements should have a similar effect on consumption in elastic markets, while housing prices remain constant. However, it is likely that

¹⁹ See Appendix, Table 2.

even in elastic markets, there would be a lag before supply can decrease. This would lead to lower housing prices, at least in the short to medium-run.

Since these changes were done during an overlapping timeframe and have opposing effects in inelastic regions, it is difficult to tell theoretically which direction the overall effect should be. What is clear is that elastic markets' housing prices will be pushed down to a lower equilibrium value²⁰.

The Housing in Canada Online database

Description of the dataset

In order to see if Kermani's model is applicable within the Canadian economy, sources of heterogeneity in its housing markets, which can demonstrate variations in the elasticity of housing supply, must be identified. The Housing in Canada Online dataset, which has been made available to the public by the CMHC, is one of the most comprehensive databases regarding the Canadian housing market. It contains census data starting, from 1991 to 2011, on hundreds of cities and towns across Canada. It tracks several key variables across time: household count, average household income, average housing cost and the shelter to income ratio (STIR) in each city²¹.

²⁰ See Appendix, Table 3.

²¹ For more in depth studies, the HiCO dataset also has a wealth of demographic data such as the number of households whose owner is within a certain age bracket, the number of each type of household such as families, couples, lone parent households etc. It contains information on how many owners versus renters there are for each city and how many households are in core need. Households that are in core need are those which fall below either one of the three standards set by the CMHC: adequacy, suitability and affordability. Housing which falls below the adequacy standard means that major repairs are required. The suitability standard is set by the National Occupancy Standard (NOS) requirements. This has to do with whether or not there are enough bedrooms in the house for the number of residents. Affordability is determined based on whether or not the housing costs less than 30% of the before-tax household income.

The dataset can be used to see if the STIR, an indicator of housing affordability, is elevated nationwide, or if there are cities or regions which represent pockets of elevated prices. If indeed housing prices have formed a bubble across the nation, then federal policies that apply to all Canadian cities may be effective. However, if the problem is a local or regional issue, more targeted policies would be preferable.

Major Findings

The analysis of this dataset reveals that there are important sources of heterogeneity between housing markets in Canada. Firstly, the household count distribution has a strong positive skewness²². The vast majority of Canadian cities and towns have less than 250,000 households. The mean household count is only 29,361. Out of a total sample of 377 observations in 2011, 96% of them fall below the 250,000 household count. Furthermore, out of the 361 cities below 250,000 households, 339 of them have less than 100,000 households²³. Toronto, Montreal and Greater Vancouver appear as outliers, as the only observations that have more than 500,000 households. Canada's housing market is therefore characterised by three large urban centers, a modest number of medium sized cities and a large majority of small towns with a household count below 30,000.

When the average household income of cities is considered, only a few are above the \$100,000 average household income mark²⁴. The majority of these observations represent small towns with less than 25,000 households. This group represents the areas where industries are dominated by the exploitation of natural resources such as; mining, forestry, fisheries, oil & gas.

²² See Appendix, Figure 9.

²³ See Appendix, Figure 10.

²⁴ See Appendix, Figure 11.

A few of these high income towns are tourist destinations and military bases. Many of these cities are located in Canada's territories and Alberta, along with a few in British Columbia and Saskatchewan. These same cities typically have the highest average shelter cost, even higher still than those of the large urban centers. Nonetheless, this group's STIR is concentrated in the lower tail of the distribution²⁵. It seems that although the shelter cost is very high in these remote areas, households there are well compensated for their work which accounts for the very low STIR in these areas²⁶.

The rightmost tail of the STIR distribution represents cities where incomes are failing to keep up with housing prices²⁷. These cities should be of concern to regulators, as average household income is the most important fundamental explaining equilibrium housing prices²⁸. As the STIR increases, so does the likelihood of that city being in a housing bubble²⁹. The observations with a STIR of 24 or higher in 2011 include: Vancouver, Greater Vancouver, Victoria, Nanaimo, Squamish & Penticton in British Columbia, and Toronto, Barrie, Peel, Orillia, Hawkesbury & Collingwood in Ontario. The regions most likely in a housing bubble in 2011, were thus the Vancouver Island & Coast as well as the Lower Mainland/Southwest in British Columbia, and southern Ontario, especially near the great lakes. Montreal seems to be the

²⁵ See Appendix, Figure 13.

²⁶ The group of cities with the lowest STIR are those in the following regions: Kitikmeot, Keewating & Baffin Island in Nunavut, Minganie & Le Golfe du Saint-Laurent as well as the Nord du Québec regions in Québec and Region 2 & 3 of the Northwest Territories.

²⁷ See Appendix, Figure 15. Figure 1

²⁸ Other important fundamentals are credit conditions and population density.

²⁹ The STIR is a useful measure which takes the shelter cost to income ratios of individual households and produces an average for each city/town. Although using this single measure in order to determine whether or not the housing market in a given city is overvalued is a gross oversimplification, higher STIRs can be used as red flags that there may be potential problems within these markets.

only city outside of Ontario and British Columbia where the STIR is indicative of unsustainable housing price levels.

Kermani's model predict exactly what is reflected in the HiCO database. Toronto, Vancouver and Montreal, and their nearby cities, are where housing bubbles have formed, since they have the lowest housing supply elasticity. Not only do they have the highest population densities in Canada³⁰, they are also the cities with the strictest regulations regarding new construction³¹. The fact that Toronto, the city with the highest population density, also had the highest STIR among the three lends credence to Kermani's model. The low population of the average town in Canadian implies that most markets have high elasticities of housing supply. It is thus unlikely that they would experience booms in housing prices as a result of credit easing policies.

Policy implications

Replacing growth with stability

The history of federal housing policy is of various institutions trying to follow three distinct goals. One is the original mandate of the CMHC; to help the poorest in society obtain access to adequate housing. The second, is the growth of the construction and housing sectors, as a means of increasing employment and GDP. The third, is ensuring that the financial system as a whole, or any of its sub-sectors, do not take on too many risks.

The Canadian economy stands to benefit greatly in the long-run by abandoning growth policies and instead focusing on market stability. Historically, growth policies have benefited the

³⁰ See Appendix, Table 6: Top 10 Most Densely Populated Cities in Canada, 2011.

³¹ See Appendix, Figure 14: Comparison of cities by price-to-income ratio and land-use regulations in 2014.

middle and higher classes the most. The ever increasing housing prices in urban centers, which are the direct result of these policies, decrease access to housing for the poor. Furthermore, fueling growth by easing credit constraints, leads to boom-bust cycles. This implies the need for even greater spending for the eventual bailouts once the inevitable downturn occurs. Both history and modern economic theory show the benefits of stable markets, where organic growth becomes possible. Stable markets save the treasury huge sums of money in unspent stimulus. Once stability is achieved for a meaningful period of time, there would be the possibility of sustained tax surpluses. These additional funds could be used by the CMHC to oversee public housing projects, which have been proven over time to be the most effective means of helping the poor have access to affordable and adequate housing.

OSFI, to its credit, seems to have given up the pursuit of growth in the housing sector after the GFC, and has made stability in markets a priority³². As prices have continued to rise around Vancouver, Toronto and Montreal, it has embraced further restrictions as means to prevent excessive lending in these risky areas³³. This pattern of easing and tightening the minimum requirements for mortgage default insurance, on a national scale, represents an oversimplified solution.

Concentrating on problematic regions

The housing booms which were exacerbated by continuously easing access to credit, are currently restricted to a few regions of British Columbia, Ontario and Montreal. By universally

³² This reversal however may have come too late since there is evidence that once banks got a taste of subprime lending in 2006 that they have since found several ways to skirt the new stricter regulations. Many banks as well as realtors have devised ways to enable the home buyer to essentially borrow his down payment using informal credit, akin to those doing so all the way back in the 1930s when NHA joint lending was the trend.

³³ In 2016, the Finance Minister of Canada announced that a down payment of 10% would be required on the portion over \$500,000 of any mortgage insured mortgage.

tightening requirements for insured mortgages, both housing and non-housing consumption for households, and housing prices will fall across the nation. These types of restrictions would, in effect, act as negative shocks to housing prices in the bubble regions. However, the impact in the rest of Canada would likely outweigh the benefits of such a policy.

The current system, where insurance premiums are determined solely on mortgage LTV ratios (Crawford & al., 2013), ignores the higher risk of lending in cities like Vancouver and Toronto. This implies one of two scenarios. Either, buyers in these cities are charged below the actuarially fair insurance premium, or those in stable markets are overcharged. The first scenario would mean that the CMHC and the other private insurers, are presently underwriting more risk than what their reserves justify. A potential outcome of such a practice is an eventual loss in confidence in the solvency of the mortgage insurers. In the event of a rapid increase in default rates, the insurers would be unable to honor all their obligations and a greater crisis would ensue. The second possibility is that the mortgage insurers have sufficient reserves. This would however mean that home buyers in low risk markets are being charged too much and those in high risk markets too little. Effectively, this scenario implies a wealth transfer from stable markets to a few “bubble” cities. Because these cities have higher average household incomes, this also implies that poorer home buyers are subsidizing the richer ones.

Given Canada’s mostly rural housing markets, it is reasonable to assert that most settlements have relatively high elasticities of housing supply. This implies that OSFI’s efforts to stabilize prices in the largest urban centers would come at the cost of depressing housing markets all over the rest of Canada. The result would be that prices would fall below their equilibrium values in most cities and towns. The treatment of the housing market as if it were homogeneous regarding default risk also has negative social impacts. Narrowing the scope of policy to the

problematic areas would stop the growth in Canada's housing bubbles while leave the majority of its cities unharmed.

Variable insurance premiums

The implementation of regionally variable mortgage insurance requirements would be difficult. Judging the proper maximum LTV ratio and amortization period for every market would pose a serious challenge. Potential borrowers and credit institutions would likely resist such large changes to regulations. A simpler alternative would be to adjust the premiums paid for mortgage default insurance by city, according to the level of perceived "riskiness" of each housing market. The CMHC already has offices across the nation where teams of economists do this type of work. They track indicators such as housing starts, prices, resales and listings, in order to anticipate trends and identify which markets are most overvalued. Quarterly reports are produced for 31 Canadian cities in addition to the national report. With this framework already in place, it should be relatively easy to create a more efficient system. Prospective home buyers would be charged an insurance premium that reflects the risk of downside corrections in housing prices in their area. Deviations from the average rate, set by the CMHC, would be an easy to understand indicator of the level of overvaluation for uninformed buyers. Areas with lower premiums would incentivize individuals to purchase homes in the least risky markets. This framework would thus serve as a corrective mechanism for housing prices.

Challenges regarding the new system

Using the CMHC's already existing research to determine insurance premiums would be a good first step. Their analytical framework is comprehensive as it relies on four broad signals

in order to assess market conditions and determine whether a significant price correction is looming. These are: overheating, price acceleration, overvaluation and overbuilding.

Overheating is an indicator that reflects when demand is significantly outpacing supply. Price acceleration reflects higher price growth that may indicate speculative activity in the housing market. Overvaluation tracks whether the average house price is significantly higher than market fundamentals can justify. Overbuilding indicates that supply for housing is significantly running ahead of demand. The CMHC are aware of the interplay between these risk factors and can therefore identify the early sign of bubbles forming in each housing market (CMHC, 2014).

In order to accurately measure the default risk of a housing market, a more sophisticated analysis would be required. The CMHC would have to track several other local factors closely. Besides the elasticity of supply for each market, the status of a city as an international housing market versus a local market must be recognized.

To illustrate, Vancouver and Toronto have a long history of being favorite housing markets for wealthy investors from China and the Pacific Tigers (Ley, 2010; Dymski & Isenberg, 2002). Over the past decades, improvements in communication technology and decreases in the cost of international transportation have led to what is sometimes referred to as “time-space compression”. This, has led to the growth of transnationalism, whereby individuals can choose to live in several different countries during a year. Furthermore, immigration reforms in 1967 sought to attract more business immigrants. These factors have led to a surge in foreign direct investing in Canada’s largest cities (Ley, 2010). As such, these cities should be treated as international markets. This changes the fundamentals determining what should be considered sustainable housing prices.

Toronto had a STIR of 25.8 in 2011, well above the nationwide average of 20.03. Following the adoption of the variable insurance premium system, the CMHC would be inclined to increase insurance premiums in that city. However, those involved in this market are not only people living in Toronto, but also the foreigners who have bought into this market. Many of them are wealthy men who work abroad while their wives and children enjoy the higher standard of living in Canada (Ley, 2010). These so called “astronaut husbands” income may not have been gathered by the Canadian statistical agency. Using the average household income would then introduce an upward bias to the STIR in that city³⁴.

Conclusion

Federal intervention in the housing market has often been done under the pretext that having access to adequate housing was a right to all Canadians. The reality is that policies promoting economic growth often took precedence of this goal. This has left the share of public housing to around 6% of the total housing stock and funding for relief to low-income households low (Tractlet, 2006). The measures that were undertaken to expand the housing sector over the decades have contributed to the dramatic rise of housing prices, especially in Canada’s largest urban centers. These policies are counterproductive to the original mandate of the CMHC, since the poor spend a larger percentage of their income on basic needs like food, clothing and shelter. These measures have also gone against the mandate of OSFI to maintain a stable financial system. Since growth in the housing sector was given priority, the Canadian system has become one where risk is shifted to the common taxpayer instead of ensuring that our system as a whole

³⁴ With regards to the rapid price inflation in Vancouver, charging higher mortgage default premiums instead of a tax on foreign direct investment for housing would likely be more successful in stabilizing housing prices. Historically, policies that target foreign investors, especially from Asia, have caused rapid capital flights as they are very sensitive to increases in regulation (Ley, 2010).

does not produce too much lending. In order to ensure stability in the future, changes must be made to the way the federal government prioritizes its goals. It must also modernize its method of intervention, taking advantage of improvements in data collection to better manage its mortgage default insurance system.

Making decisions based on nation-wide averages is no longer practical nor is it necessary, especially after all that has been learned from the GFC. Canada's housing market is not a single homogeneous sector but rather as diverse as its population, with each city having a range of housing supply elasticity and a reliance on different sectors as sources of income for its households. These variables, which jointly determine the sustainable average cost of housing, vary not only geographically but also temporally. The CMHC, as a mortgage insurer, is already well suited to begin pricing its product according to the actual risk it is underwriting so that Canadians and investors worldwide can maintain their confidence in our system as a whole.

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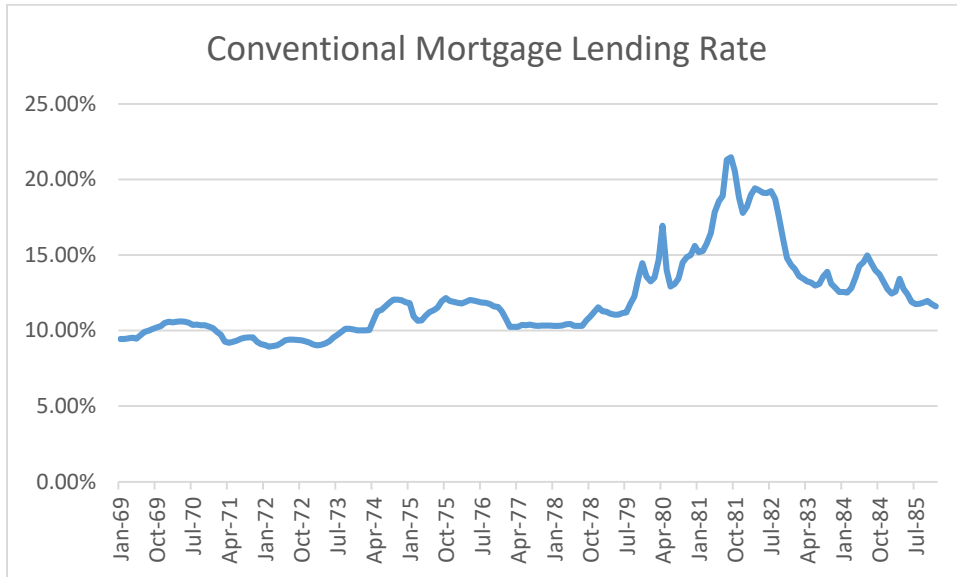
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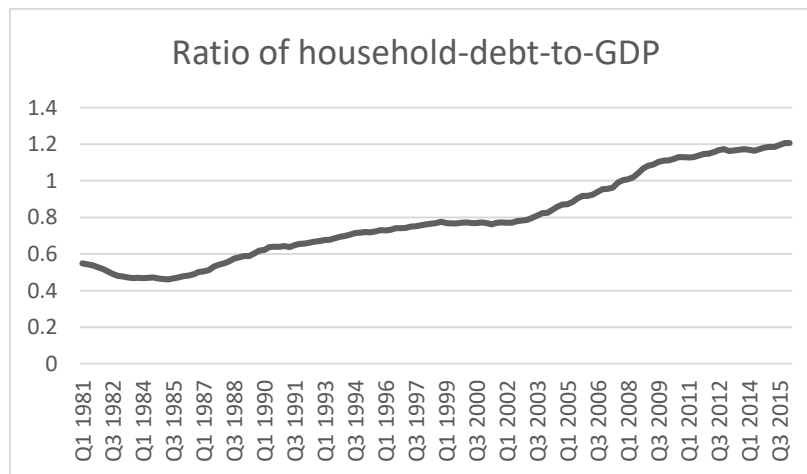
Appendix

Figure 1: Conventional Mortgage Lending Rate, Canada from 1969 to 1985



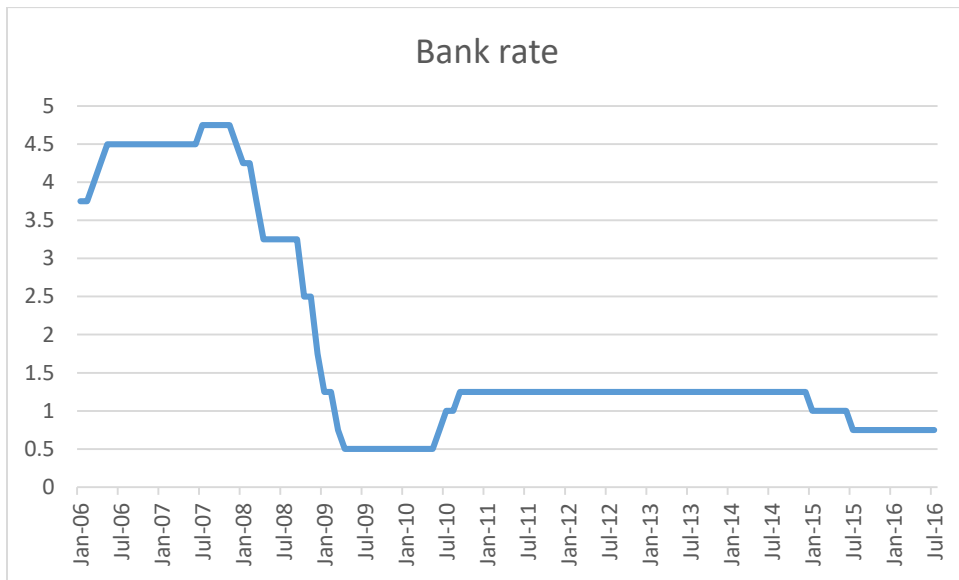
Source: CANSIM database Table 027-0015

Figure 2: Ratio of household-debt-to-GDP in Canada 1981 to 2015



Source: Statistics Canada

Figure 3: Bank rate in Canada from 2006 to 2016



Source: CANSIM database Table 176-0043

Figure 4: Timeline of Major Events and Interventions in the Canadian Housing Market

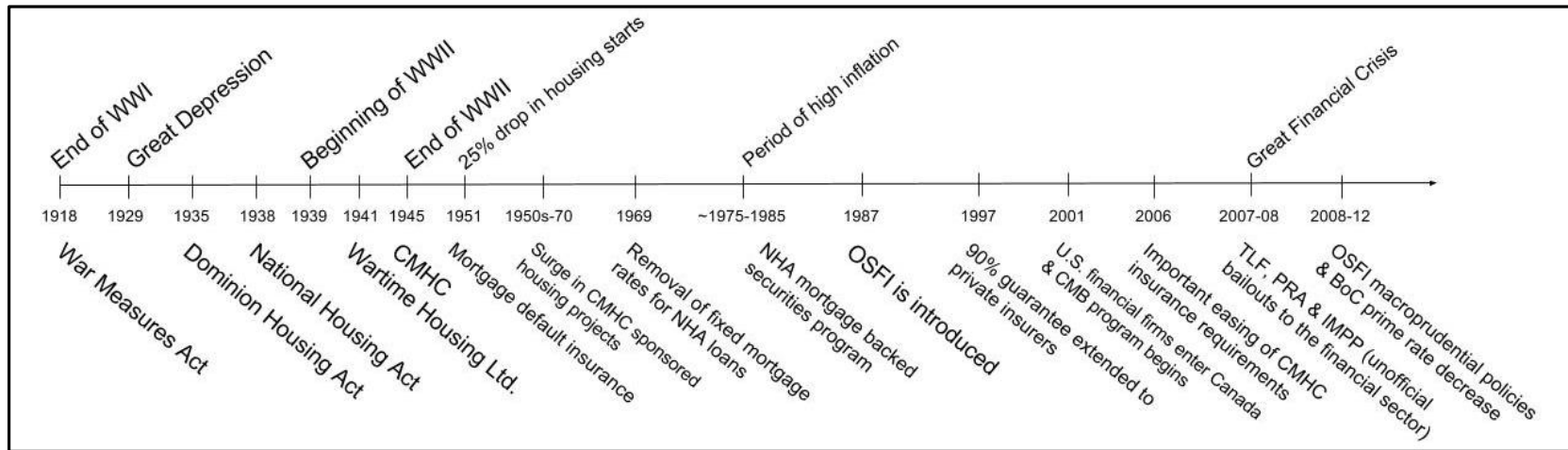


Figure 5: Effect of credit easing in inelastic regions

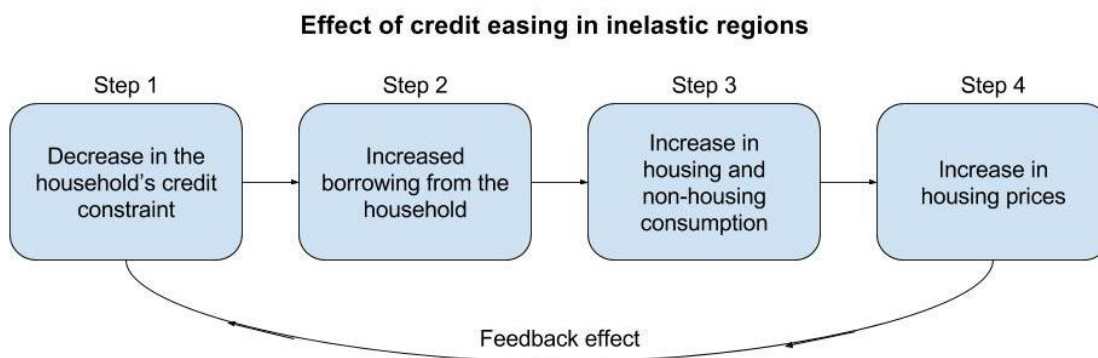


Figure 6: Effect of a credit crunch in inelastic regions

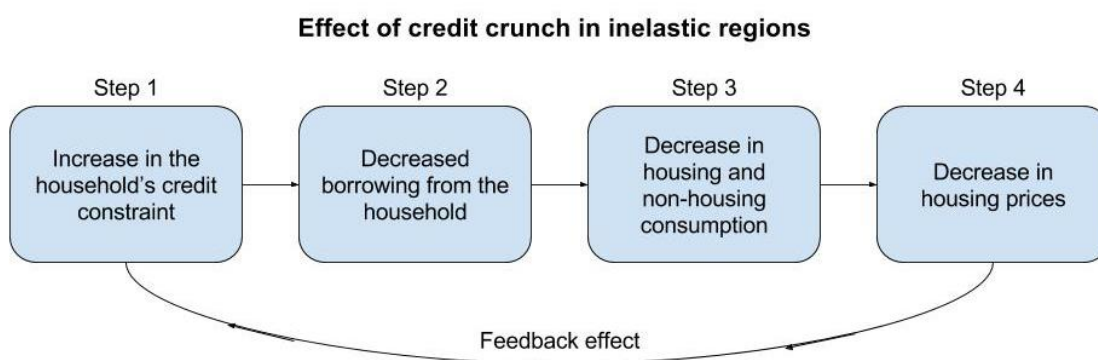


Figure 7: Effect of credit easing in elastic regions

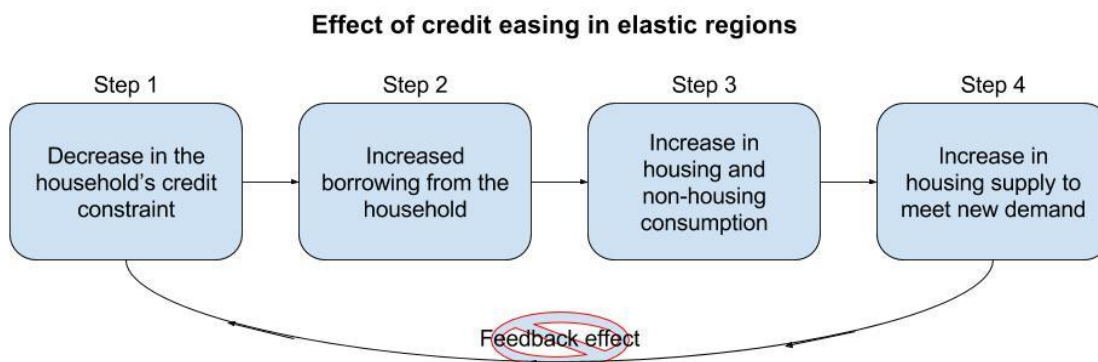


Figure 8: Effect of a credit crunch in elastic regions

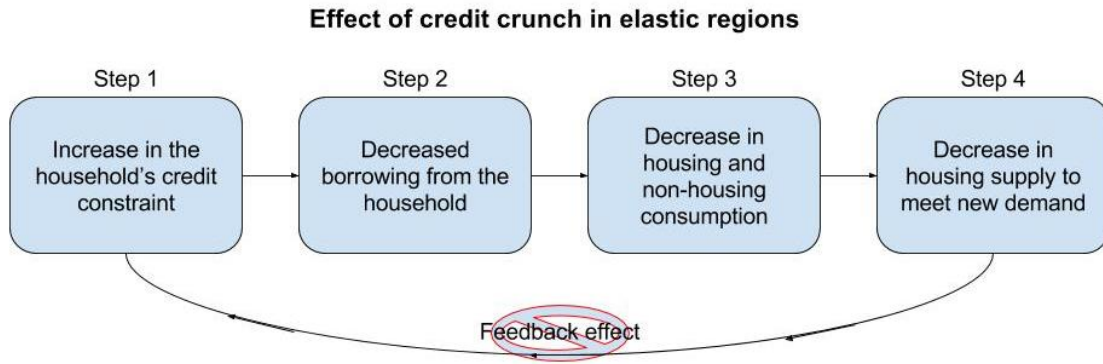


Table 1: Long-run Effect of Policy Changes Based on Kermani's Model:

Policy Change	Elastic Regions		Inelastic Regions	
	Housing Prices	Consumption	Housing Prices	Consumption
↓ Interest rate	---	↑	↑	↑
↑ Interest rate	---	↓	↓	↓
↑ Max LTV	---	↑	↑	↑
↓ Max LTV	---	↓	↓	↓

Table 2: Long-run effect of policy changes: alternative model

Policy Change	Elastic Regions		Inelastic Regions	
	Housing Prices	Consumption	Housing Prices	Consumption
↓ Interest rate	---	↑	↑	↑
↑ Interest rate	↓	↓	↓	↓
↑ Max LTV	---	↑	↑	↑
↓ Max LTV	↓	↓	↓	↓

Table 3: Effect of a decrease in interest rates and a tightening in requirements for mortgage insurance on housing prices

	↓ Interest rate	Tighter requirements	Net effect
Inelastic regions (cities)	↑	↓	?
Elastic regions (towns)	-----	↓	↓

Figure 9: Household Count Distribution in Canada, 2011

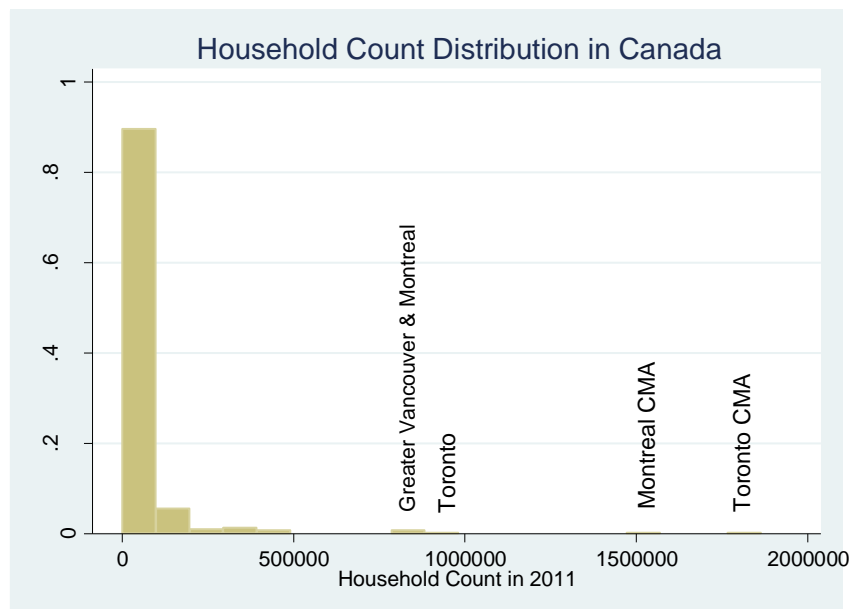


Figure 10: Household Count Distribution, less than 250,000 households, 2011

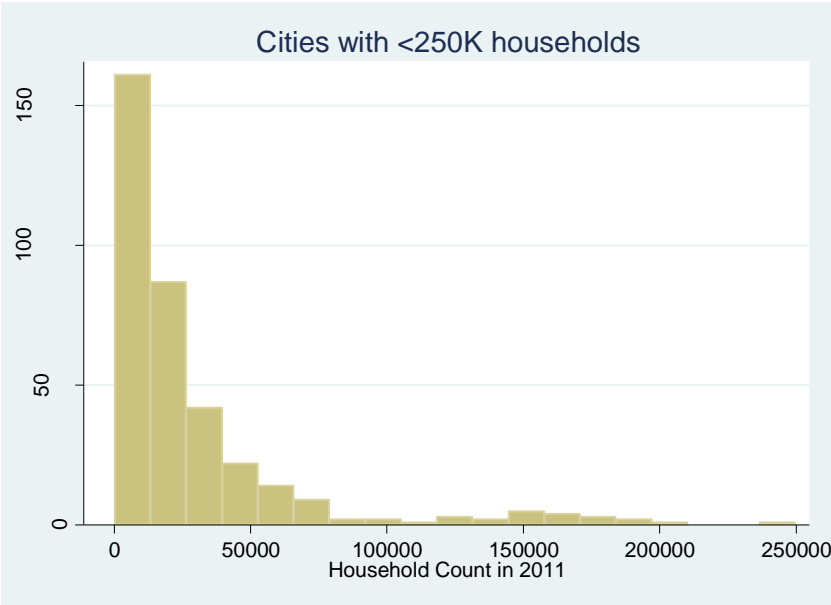


Figure 11: Nationwide average household income distribution

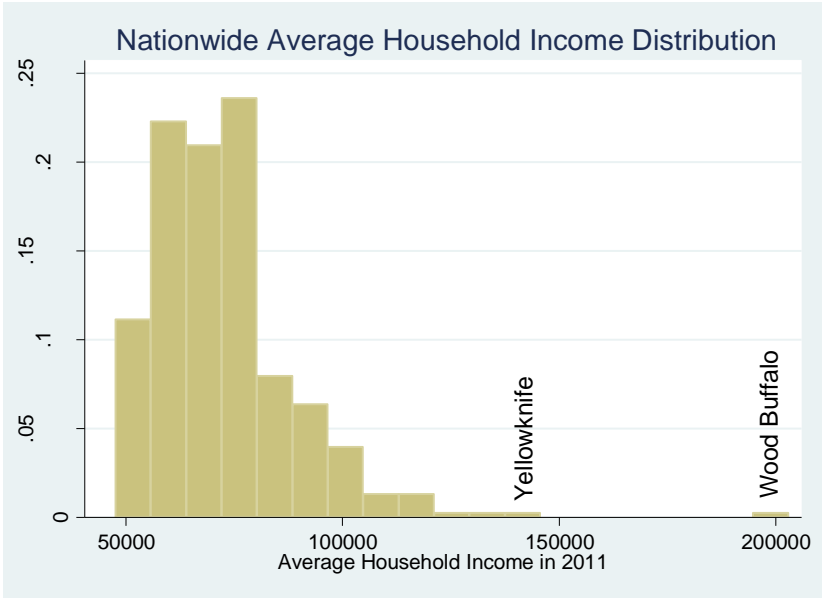


Figure 12: Nationwide Average Shelter Cost Distribution, 2011

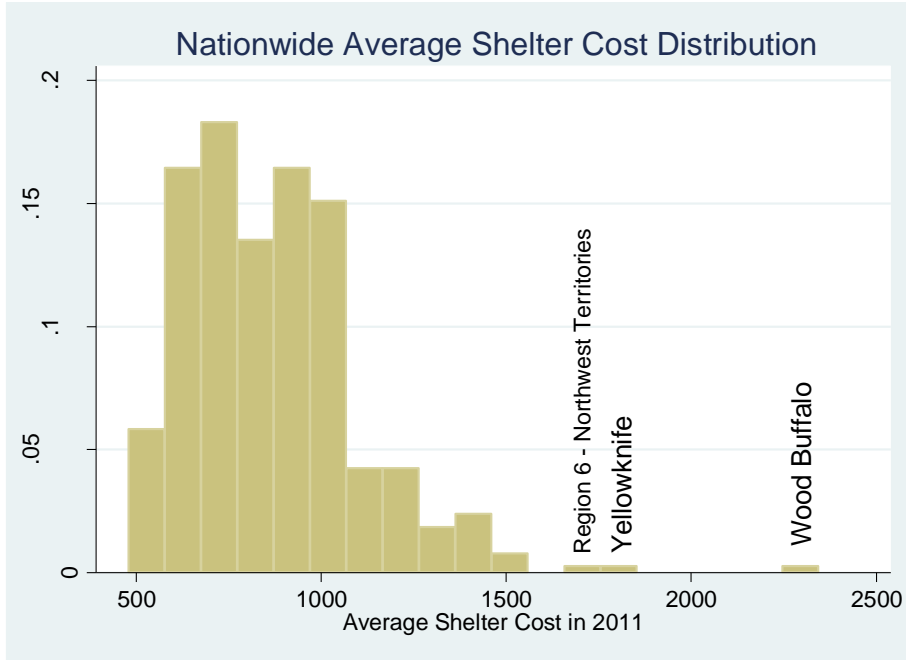


Figure 13: Nationwide STIR distribution, 2011

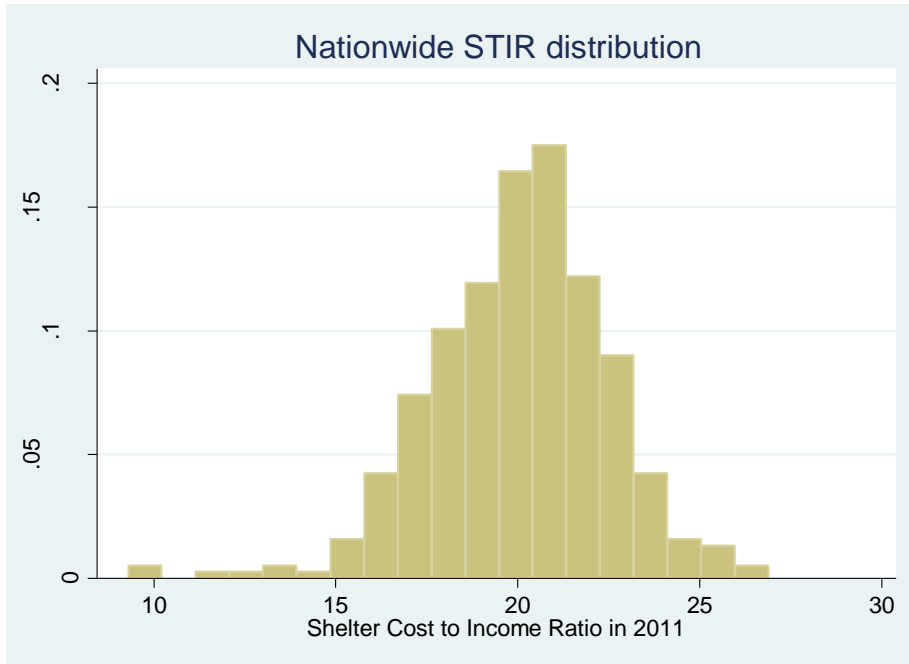


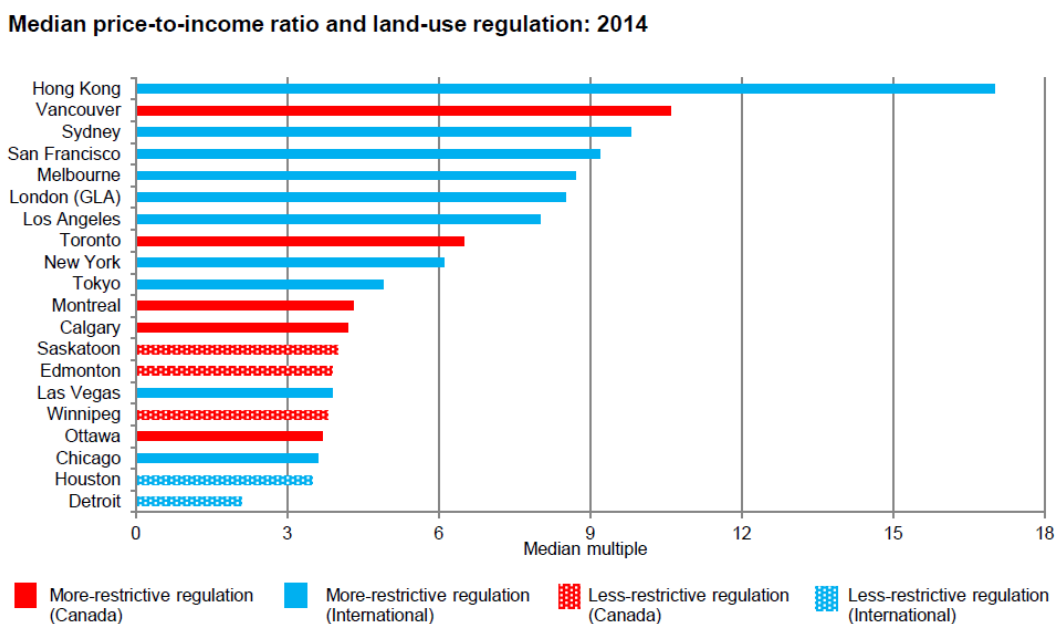
Table 4: Characteristics of cities with the highest STIR

Geography	Household count	Average household income	Average shelter cost	Shelter to income ratio
Vancouver - CMA	815405	90257	1274	24.7
Greater Vancouver	815405	90257	1274	24.7
Toronto - CMA	1864775	101095	1359	24.7
Hawkesbury - CA (Total)	5460	52464	776	25.1
Collingwood - CA	8015	75482	1076	25.3
Montréal	789865	68356	915	25.6
Hawkesbury - CA (Ontario Part)	4775	52323	791	25.7
Toronto	970900	93381	1246	25.8
Squamish - Lillooet	12700	89546	1410	26.1
Squamish - CA	6160	85343	1411	26.9

Table 5: Summary of the three groups identified and the national averages

Variable	Whole Sample	Metropolitan	Average Town	Remote Areas
Household Count	55662.1	1130530	39772.78	7168.53
Average Household Income	72648.61	86211.83	70279.85	117187.6
Average Shelter Cost	865.32	1168.17	837.94	1328.41
Shelter Cost to Income Ratio (STIR)	20.03	24.78	20.027	18.54

Figure 14: Comparison of cities by price-to-income ratio and land-use regulations in 2014



Source: Schembri, 2015

Table 6: Top 10 Most Densely Populated Cities in Canada, 2011

Geographic name	Population density per square kilometre, 2011
Toronto (Ont.)	945.3677
Montréal (Que.)	898.06
Vancouver (B.C.)	802.5292
Ottawa - Gatineau (Ont./Que.)	196.6466
Calgary (Alta.)	237.8516
Edmonton (Alta.)	123.0405
Québec (Que.)	228.6289
Winnipeg (Man.)	137.659
Hamilton (Ont.)	525.606
Kitchener - Cambridge - Waterloo (Ont.)	576.6796

Source: Statistics Canada, 2011 Census of Population

Figure 15: Relationship between household income and shelter cost

