

REINTERMEDIATION IN THE FACE OF BASEL II:
THE PERFECT STORM?

by
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1 Introduction

Although the dramatic developments in the field of banking over the past twenty years have gone on largely unnoticed by most members of the general public, they have had a profound impact on everyday life for many of these people. Regulating such a dynamic and complicated industry is not easy at the best of times – a notion which the recent financial crisis has cemented. Despite this, regulators at The Bank for International Settlements (BIS) have attempted to craft legislation that will result in more stable, secure, resilient and forward-looking banking and financial systems worldwide. This regulation, known as The Basel II Capital Accord, was published and implemented at a time just before the global banking system underwent its most turbulent and remarkable period of the modern era.

The fact that regulation can contribute to the momentum of the business cycle, known as procyclical regulation or ‘procyclicality’, is something that regulators have been attempting to prevent as long as financial regulation has been necessary. Indeed, the principle role of regulatory bodies is often to dampen the economic cycle in one way or another. For instance, it is often said that the job of an inflation fighting central bank is to: ‘remove the punch bowl, just when the party is getting started.’ Considering this, when Basel II was introduced, the inherent procyclicality and its potential implications did not go unnoticed by the BIS - but with the Great Recession of 2008/2009, these potential implications became reality.

The financial crisis, which began in 2007 with the breakdown of North American asset-backed commercial paper markets, spread contagion around the world leaving casualties in its wake – many of whom were completely ignorant to the vagaries of international finance. With the global economic system unable to function without lending and credit, the lubricants of the modern world’s economy, institutions and governments had to step up and replace the void left by the capital markets.

According to evidence on credit markets in the United States, as a result of the collapse in the capital and structured product markets, traditional banks in the US began to play a more important role at the expense of Wall Street by ‘reintermediating’ credit that was formerly being raised directly in capital markets, largely by investment banks. Conventional bank lending, long dwindling in importance, started to see a re-emergence as US firms were unable to issue commercial paper and banks were forced to keep loans on their balance sheets because market participants were unwilling to buy asset-backed products. Under other circumstances this forced reintermediation may not have had serious implications, but with banks operating under the new capital accord and with structured product markets completely seized, banks were unable to shrink their balance sheets and had to hold more capital to backstop their assets. This led to severe undercapitalization and government intervention was required to purchase assets and inject banks with capital.

Although it has been accepted by many banking experts that reintermediation did occur in the US, the situation in Canada is not as obvious and has received less attention. The financial woes were far less severe north of the border and hence banks were not forced to receive the same kind of emergency capital as their US counterparts. This paper will examine credit and lending data to see if, despite the much less severe financial woes here, reintermediation occurred in Canada as it did in the US.

This paper will also examine the new banking legislation introduced by the Basel Committee to determine what effects it played in mitigating or amplifying the credit and economic contraction of 2008/2009. There is significant evidence that material flaws exist within the Basel II regulation, particularly surrounding procyclicality. These flaws were highlighted as US banks were forced to reintermediate credit which, itself, was a far more painful process because banks were under the jurisdiction of the Basel II Accord. It will be the goal of this paper to expound on the procyclicality issues in Basel II which came to the forefront with reintermediation, and to present some potential solutions using existing literature as an aid.

The paper will be structured as follows: section 2 will provide an overview of the Basel II Accord, section 3 a review of the literature on procyclicality in the new regulation. Section 4 will examine Basel II and its implications during the financial crisis, as well as a quantitative analysis of Basel II's effect on reintermediation. Section 5 will provide empirical evidence of reintermediation in US credit markets during the financial crisis and an analysis of Canadian markets to see if the same occurred. Section 6 reviews suggestions to improve procyclicality in Basel II and section 7 concludes.

2 The Basel II Accord

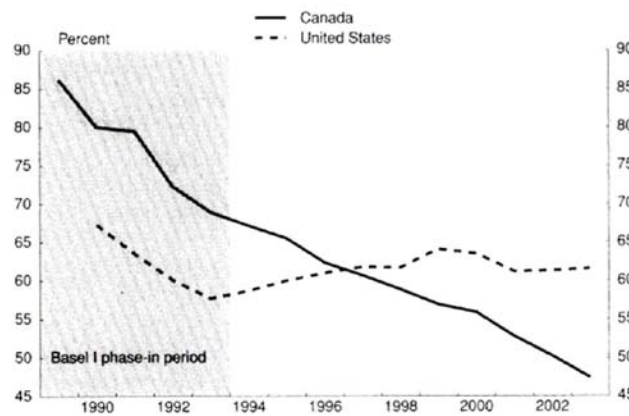
The Basel II Capital Accord was first published in June 2004 by the Basel Committee on Banking Supervision (BCBS), with its principle measure being to further facilitate the creation of an international standard for banking regulators to determine capital requirements. Basel II replaced the aged Basel I Capital Accord, created in 1988 by the BCBS and implemented by the Group of Ten countries in 1992¹.

With the rapid development and advancements made in the field of banking during the 1990's and 2000's, the Basel I Accord became outdated. Banks, which have an incentive to hold less capital (holding capital is costly), began to circumvent the capital requirements outlined in Basel I through 'capital arbitrage'. In Basel I, different assets were assigned to different risk classes that have different risk-weightings. The safest assets (government bonds, T-bills etc.) went into a low risk class and received a risk-weighting of 0%, which meant no capital had to be held to backstop the asset. In the case of a relatively risky loan, such as a commercial and industrial loan (risk-weighting 100%), a bank would have to hold a certain amount of capital to backstop the asset. Banks were then mandated to hold 8% of their risk-weighted assets as capital.

¹ Group of Ten includes: Belgium, Canada, France, Italy, Japan, the Netherlands, the United Kingdom, United States, Germany and Sweden.

Holding capital is costly because the funds cannot be lent out to earn a return, which means, under Basel I, banks had an incentive to hold assets that could be placed in lower risk categories. Furthermore, different kinds of assets were categorized together despite potentially having very different credit risk profiles. Thus, many banks were able to reduce their capital requirements through capital arbitrage, although their actual exposure to credit risk may not have diminished. With the complex advancements made in bank products it became more and more difficult to accurately categorize assets. The proliferation of off-balance sheet activity and securitizations only served to exacerbate problems and in fact many banking pundits maintain that Basel I was a principle driver in the growth of off balance sheet activity².

Implied Average Risk Weight of Bank's Assets (risk-weighted assets/total assets)



Source: Illing and Paulin, 2005, pg. 163

To address these issues the BCBS created Basel II, which took a different approach to calculating capital requirements. Instead of placing assets into risk-weighted categories, Basel II used the actual probability of default (PD) and loss given default (LGD) of assets to calculate their capital requirement, which according to the BCBS serves to more closely align banks' capital requirements with the risk they face. In the Basel Committee's own words: "the Basel II Framework is intended to promote a more forward-looking approach to capital supervision, one

² For more on this see Illing and Paulin (2005) p. 166.

that encourages banks to identify the risks they may face, today and in the future, and to develop or improve their ability to manage those risks” (BCBS, BIS website, 2009).

Another principle goal of Basel II was to more accurately align banks economic capital (that which the bank actually has) and their regulatory capital (that mandated by regulation). Under Basel I, these two measures often widely diverged as the regulatory calculation of banks’ risk-weighted assets may not have accurately represented their credit risk. Banks could lower their risk-weighted assets through securitizations and capital arbitrage and would hold more securities with lower risk-weightings (mainly government securities). This would free up capital to make more loans or invest in more financial products, largely due to the fact that banks’ capital requirements may not have been consistent with their actual risk exposure.

The Basel II accord is based on three ‘pillars,’ which are respectively: capital requirements, supervisory review and market discipline. Pillar 1 forms the foundation for the accord outlining capital requirements for the three main components of risk a bank faces: credit risk (most important), market risk and operational risk.

Financial institutions have three choices for managing credit risk, which vary in sophistication; the standardized approach, the foundation internal ratings based approach (IRB) and advanced IRB approach. The standardized approach relies on ratings generated by external assessments and sets out specific risk-weights for different types of credit risk, which are the same as the weights used in Basel I: 0% for short-term governments, 20% for exposures to OECD Banks, 50% for residential mortgages and 100% weighting for commercial loans. For borrowers with poor-credit ratings (e.g. sub-prime mortgages) the weighting is 150%³. The overall capital requirement is then 8% of risk-weighted assets, as in Basel I. The standardized approach will typically be the method of choice for smaller banks, although in some countries, such as the US, regulators have mandated against the standardized approach.

³ This list is meant to be a summary and is hence not exhaustive. For the full list consult the Basel Accord.

The foundation IRB and advanced IRB approaches exemplify one of the main innovations of Basel II, whereby banks internal systems are used to calculate capital requirements. Only banks that have received supervisory approval, at the outset and on an ongoing basis, will be permitted to use their own internal estimates of risk to determine capital requirements. The difference between the foundational and advanced approaches is that under the foundational approaches banks typically only compute the PD, while under the advanced all the risk components are calculated⁴. Further, some banks may use a mixture of the standardized, foundational IRB and advanced IRB approaches across different asset classes, although typically this structure will only be temporary. As of the time of writing, all the major banks in North America had opted for, or intend to opt, the advanced IRB approach.

Also contained within the credit risk section of the Basel Accord, is a section devoted specifically to capital requirements of securitizations. Specific requirements for capital to backstop securitized assets are particularly important because securitization accounted for much of the credit growth during the mid 2000's. The accord outlines the operational requirements that a securitization must embody before a bank does not have to hold capital against the assets of the securitization and makes specific provisions for synthetic securitizations⁵. Like the other forms of credit risk, banks have the option of adopting the standardized approach, or the IRB approach with regards to exposure to securitizations.

The other two kinds of risk dealt with in Pillar 1, operational and market risk, despite being vital parts of the accord, are not central to understanding this paper. Considering this, the reader is invited to explore them further by consulting the Basel II Accord directly.

Pillar 2 of the Basel Accord, supervisory review, involves the regulatory response to Pillar 1. Pillar 2 attempts to provide regulators with better tools to deal with banks than under Basel I. In

⁴ Other risk components include: the loss given default (LGD); the exposure at default (ED); the effective maturity (M); the asset-value correlation (ρ), which is parameterizes the correlation across borrowers; and the target one-year solvency of the bank (q).

⁵ Synthetic securitizations are securitizations in which the bank securitizes assets but retains some exposure to the credit risk of those assets.

addition to ensuring adequate capital, supervisory review is intended to “encourage banks to develop and use better risk management techniques in monitoring and managing their risks” (BCBS, 2006, p.204). Supervisors are expected to evaluate banks’ capital levels and to intervene where necessary. Pillar 2 attempts to capture risks that are not explicitly accounted for in Pillar 1 and also the importance of compliance with the minimum standards outlined in the more advanced methods (IRB approaches) of Pillar 1.

Market discipline, the subject of Pillar 3 is meant to compliment the first two by “developing a set of disclosure requirements which will allow market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, and hence the capital adequacy of the institution” (BCBS 2006, p.226). This will allow financial markets to play a sort of ‘automatic-stabilizer’ role. If disclosures allow markets to accurately depict the financial position of a bank, then they will provide a regulatory role (i.e. if they are out of line, their risk premium will rise or the value of their equity will fall).

One of the main differences for the capital requirements with Basel I and Basel II is that Basel II requirements are dynamic – they depend on estimates of the PD and LGD (among other parameters) of an asset, which change with the business cycle⁶. As the broader economy enters recession or long-term growth prospects deteriorate, risk parameters rise and ceteris paribus banks could have to restrict lending more than under Basel I. Likewise, in the expansion phase banks could find themselves with lower capital requirements and amplify the expansion through increased lending.

This ‘procyclicality’ of the new bank regulation contrasts with many other regulatory efforts, which attempt to dampen the business cycle (such as an inflation fighting central bank) and is one of the main obstacles to the implementation of Basel II.

⁶ This is assuming banks use point-in-time ratings systems for their capital requirement parameters, see explanation on footnote of page 10 or in section 6 on page 44.

3 Literature Review

Considering how important financial markets and credit are in the expansion and development of the broader economy, the procyclicality issues associated with them have been well documented and studied.

There have been many events in history, such as the credit crunch of the early 1990s, and the Russian and Asian financial crises, where occurrences largely concentrated in financial markets had procyclical effects on the broader economy. In fact, according to Berger and Udell (January 2003, p.1) many theories look towards changes in the supply of bank credit over the business cycle to explain two stylized facts. Firstly, credit expansion and economic expansion are highly correlated. In developed nations, credit tends to grow at a faster rate than the economy while, typically, the only contractions in credit occur during economic downturns. Secondly, measures of loan performance also follow a consistent pattern over the business cycle: very low proportions of failed and delinquent loans in expansions, rising at the end of an expansion and then surging higher during the downturn. This implies banks are more apt to take risks during the expansions, and these risks are only realized later when enough time has been given for performance problems to become apparent.

Considering all the above, when Basel II (and the associated risk-based capital requirements) was introduced, the potential procyclicality issues associated with it did not go unnoticed. Subsequent to the regulation framework being published in June 2004, there was a rash of papers that explored the procyclicality potentially inherent to the regulation. Some papers examined it quantitatively through parameterizations that attempted to pinpoint numbers associated with the procyclicality in Basel II, such as Repullo and Suarez (2008) and Haibin Zhu (2008), while others also took into account the politics and policy (qualitative) aspects, such as Jordon et. al (2003).

With scholars and regulators generally accepting the hypothesis that bank lending is already procyclical in its own right, the relevant question associated with procyclicality in Basel II

becomes: is it marginally more procyclical than the flat rate rules contained in Basel I? And if so, are the benefits of an updated and modernized regulatory framework outweighed by the increased procyclicality?

The first question in the previous paragraph is the easier of two to answer. A vast array of literature supports the statement that the risk-sensitive capital requirements of Basel II are more procyclical than the flat-rate rule in Basel I.

In Repullo and Suarez's *The Procyclical Effects of Basel II (PEB)*, the cyclical effects of moving from Basel I to Basel II capital requirements on equilibrium loan rates and capital holdings are modeled. The authors show that although risk-based capital requirements do increase equilibrium loan interest rates slightly, they have an ambiguous effect on capital holdings⁷.

Contrasting the opinion of many Basel II proponents, this paper shows that risk-based capital requirements result in banks holding more capital than flat rate rules. Like Zhu's paper (later reviewed) capital buffers are forefront, although the results differ: "[under Basel II] capital buffers are insufficient to neutralize the effects of the arrival of a recession" (p.2), which may cause banks to significantly reduce lending and lead to a reduction in the supply of credit. The reduction in credit does not occur under a flat-rate capital rule. Despite the procyclical effects of a Basel II type capital regulation, bank failures are far less likely to occur than under a flat-rate rule⁸.

In Illing and Paulin's "*Basel II and the Cyclicity of Bank Capital*," the authors conduct sensitivity analysis, encompassing different bank loan portfolio and credit risk spreads, which indicate that the volatility of bank capital requirements will increase relative to under Basel I. The increase in volatility is greatest in banks' portfolios with lower credit ratings. The authors

⁷ "The model predicts buffers that range from 2% of assets in recessions to 6% in expansions" (p. 4). The intuition being: banks foresee economic malaise ahead and plan for it, although their measures are in general insufficient.

⁸ "The effective long-run average of the bank failure rate under Basel II is barely one tenth of the nominal 0.1% per year bound targeted in the IRB approach" (p.4).

incorporate both through-the-cycle and point-in-time methods to track the evolution of credit risk over time⁹.

Illing and Paulin note that in 1997, near the top of the business cycle, capital requirements under Basel II would have been about 4% of assets and that by 2002, at the bottom of the cycle, those requirements would have climbed to around 9%. Also, with regards to the volatility of capital requirements, it is found that under point-in-time measures the standard deviation of capital requirements is two to three times higher compared to under Basel I. Volatility under through-the-cycle methods are found to be similar for both the first and second accord. The authors also find that the correlation between the actual level of capital and GDP in Canada between the 1984–2003 period was -24%, which is actually roughly equivalent to the predicted correlations that would have occurred under Basel II in the authors' model¹⁰. The salient information provided by this statistic is that there is a great degree of cyclicity in the banking and financial system that is not due to regulation.

A third publication, which goes a step further, is Ayuso et. al. "*Are Capital Buffers Pro-cyclical?*" In most papers examining the procyclicality question associated with Basel II, capital buffers are the principle defense combating procyclicality. Considering this, the authors attempt to estimate the procyclicality of capital buffers. The authors' findings show that capital buffers are negatively related to the business cycle and an increase in GDP growth of 1% implies that capital buffers decline by 17%. This indicates that procyclicality is a serious issue in Basel II, and that closer monitoring of banks behavior, particularly in the upswing of the business cycle, is extremely important.

⁹ Through-the-cycle measures are the method used by major international rating agencies. They are meant to smooth out the impacts of the business cycle and thus a rating should be largely independent of the current state of the overall economy. Point-in-time (PIT) measures are the opposite and rate the entities absolute current level of credit risk. PIT measures are significantly more volatile since they are adjusted as a company moves through the business cycle whereas TTC measures smooth this out.

¹⁰ Illing and Paulin use Canadian bank data on corporate and sovereign exposures over the 1984 to 2003 period.

As for the second part of the question: do the benefits of the new regulation outweigh the consequences of the increased procyclicality, the literature is more divided. However, it is in this author's opinion that the balance of the evidence and support would agree that the benefits of Basel II and the risk-based requirements do outweigh the consequences.

Haibin Zhu's "*Capital Regulation and Bank's Financial Decisions*," is one such paper that supports this notion. Zhu develops a model to examine the impact of capital regulation on banks' decision making. More specifically, it examines how bank lending will be altered under Basel II, compared to Basel I and to no regulation. The results of the paper indicate that under a Basel II type capital rule, capital requirements are higher for small banks than for large ones due to the diversification effects of large banks' assets. The net effect is that overall capital requirements are lower under the risk-based rule, which the authors maintain is consistent with empirical evidence¹¹. In general it is deemed that risk-based capital requirements are superior to both no regulation and flat rate capital regulation: "the adoption of a more risk-sensitive capital regime can be welfare improving from a regulator's perspective, in that it causes less distortion in loan decisions and achieves a better balance between safety and efficiency" (Zhu, 2008, p. 1).

Capital buffers play a prominent role in this paper and have the effect of reducing the relevance of capital regulations. While procyclicality of bank lending is present and relevant in this model, its severity is diminished due to banks holding capital buffers, i.e. actual capital is often higher than regulatory capital.

A second paper that compares the tradeoffs associated with risk and flat-based capital requirements is Jordan et. al. "*Credit Risk Modeling and the Cyclicity of Capital*." In this paper the authors conclude that, while risk-sensitive capital requirements are procyclical, they have potential benefits over risk-insensitive rules. Primarily, the authors argue risk-based rules require

¹¹ Ervin and Wilde find that minimum capital requirements could drop from 8% to 6.8%. A Bond Market Association et. al (2002) study finds that on average capital requirements would drop on average by 12.5% with a median reduction being 24%. Across banks it is reductions in capital charges range from -50% to 70%.

banks to recognize a deterioration in loan quality (typically occurs during an economic downturn) earlier in the business cycle, which makes large, discrete changes in bank capital below minimum requirements less probable.

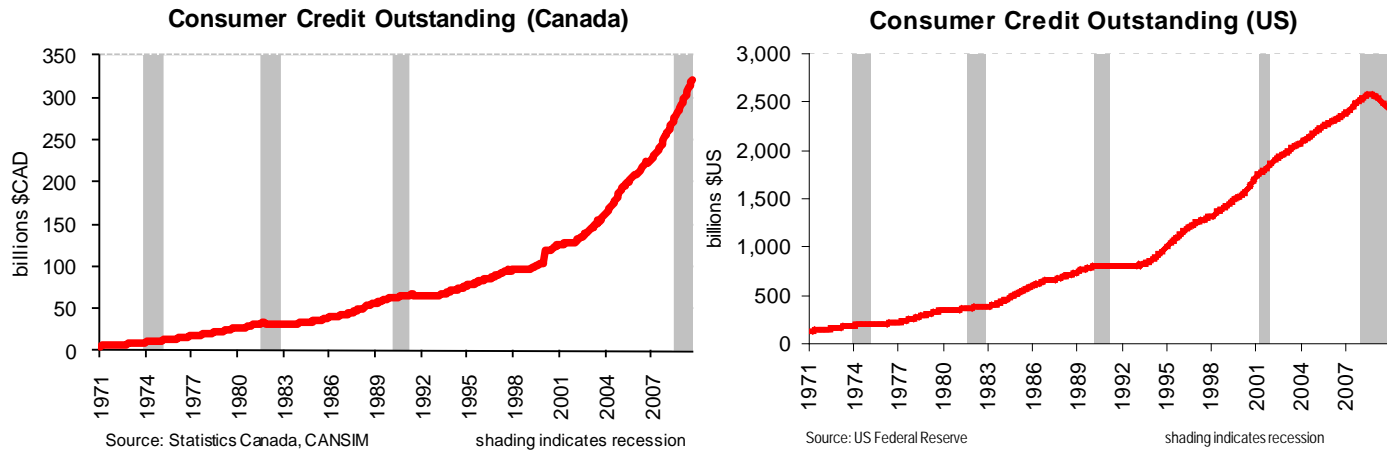
The authors draw on examples from the early 1990s recession that risk insensitive capital requirements can result in large abrupt changes in capital and outstanding loans. Specifically, banks do not act until regulators force them to, which typically does not occur until loan quality issues are clearly identifiable and thus more advanced. Specifically, the authors note that in the span of one year during the early 1990s recession, capital ratios at many banks experienced a decline of more than 4 percentage points.

The previous two examples mostly dealt with the superiority of Basel II in the context of Pillar 1. Many of the added benefits of Basel II are contained in Pillars 2 and 3, which do not contribute to procyclicality but do provide regulators with superior legislation to oversee financial institutions.

When procyclicality of financial markets and banking systems is spoken of, the mechanism by which they exacerbate the economic cycle is through the expansion and contraction of credit. Thus in order to gauge the effects on the financial system of the introduction of Basel II, an analysis of the credit markets is required. Fortunately, at the time of writing this paper not only was Basel II newly implemented throughout the developed world, but global financial markets were undergoing an extraordinary adjustment, combined with a synchronous global recession. This provides an ideal empirical scenario to examine credit and lending levels, because if Basel II is indeed procyclical that would be the time it would show up.

4.1 Basal II, Bank Lending and the 2008/2009 Recession

Looking back over the past thirty years it is clear the level of aggregate credit in the Canadian and US economies has grown steadily, with the majority of disruptions to this growth occurring primarily during recessions (particularly in the US).



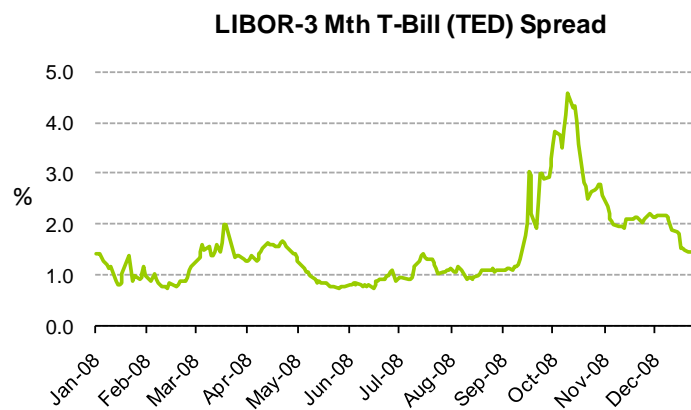
Considering this, the 2008/2009 recession provides a very unique and interesting case study into bank lending in an economic downturn - possibly even more so than other recessions because the root causes of the 2008/2009 recession were much more intertwined with the banking and financial sector.

Given the correlation between aggregate credit and GDP growth, a contraction or, at the very least, below average growth in credit can be expected as a result of the recession. Also, given that the major North American financial institutions were all Basel II compliant prior to 2008, and it has been argued that risk-based capital requirements are more procyclical than flat-rate rules, it is possible that the contraction in credit (still unfolding at the time of writing) could be particularly severe. Indeed evidence on U.S. credit markets, presented later, supports this notion.

It is important to note that this recessionary contraction in credit is due to both supply and demand side effects. The demand side effects stem from the deterioration in the economy causing

there to be fewer positive net-present-value projects, with firms demanding less credit as a result. This is typical of recessions, and this kind of contraction in credit is expected at any time of economic stagnation. However, the difference with the 2008/2009 recession concerns the supply side of the credit outstanding equation. If Basel II's risk-based capital requirements are contributing to procyclicality over and above what would normally occur in a recession then there would be a more pronounced contraction in credit and bank lending, with trickledown effects on the broader economy. Indeed this is what appears to have happened in the United States, with consumer credit falling by over 5% between July 2008 and December 2009 – the largest contraction since World War II. In Canada however, the same situation has not occurred.¹²

The 2008/2009 recession was different in the regard that financial markets experienced much larger dislocations than during most other recessions (the early 1990's may be one exception). Specifically, the structured product markets completely seized up, commercial paper issued and outstanding fell off, and revolving consumer credit shrunk as banks reduced credit card and HELOC limits. Individuals and companies then took their cash and invested in government bonds. This dynamic caused commercial paper, LIBOR and various other short-term interest rate spreads to widen to historical highs.



Source: British Bankers Association and US FED

¹² Notice that Canadian consumer credit (see preceding graph) shows little reduction in growth, despite the recession beginning in earnest the fourth quarter of 2008. This is in sharp contrast to the United States, where total credit has shrunk significantly; this could be an indication that the strong Canadian banking system was well positioned to handle the recession.

But this dislocation was more than just a short-lived phenomenon, raising the cost of capital for a few months - with the collapse in securitization and the structured product markets, the troubles were structural in nature. As a result of both the structural dislocations and the short-term surge in the cost of capital, some pundits began to speak of a 'reintermediation' wave hitting financial markets, whereby corporations would have to go back to traditional bank-intermediated credit, since the securitization and structured product markets became so defunct. For instance, Richard Berner¹³ stated in a June 2008 presentation that disruptions in the non-agency mortgage-backed securities market, the asset-backed commercial paper market, and the offshore LIBOR funding market "promoted a forced 'reintermediation' of the global banking system. Issuers unable to roll over maturing ABCP called on their bank sponsors to absorb the commitments they made to back up CP in just such circumstances. In turn, that has produced a pro-cyclical contraction in credit and an increase in its cost; both have tightened financial conditions" (Berner, 2008).

This 'reintermediation' would have the effect of offsetting (if only partially) the general decline in demand and supply for bank loans, resulting from the procyclicality of Basel II and decline in the number of positive NPV projects. What could be observed is a contraction in the total supply of credit but growth in relative proportion of bank intermediated credit as corporations drew down on established bank lines and sought to obtain new loans to make up for the dearth of short-term capital available from the markets.

Furthermore, these dislocations in the credit markets were happening at a time when many firms required capital. Beyond financial firms requiring huge influxes of cash, the North American economy was entering a recession and many non-financial firms may have needed a buffer of funds. In normal times this would have been no problem, companies would just issue bonds or commercial paper, or do an equity offering, but with spreads on debt products

¹³ Managing Director, Co-Head of Global Economics and Chief U.S. Economist at Morgan Stanley.

prohibitively high and equity prices extremely depressed¹⁴, it was not an easy decision to raise capital.

If financial firms, who already required large capital injections from asset write-downs, were also forced to reintermediate credit because securitization markets fell apart and borrowers needed to draw down on bank lines (and request new ones), then substantial capital would need to be raised at prohibitive prices. Furthermore, if the assets they were required to reintermediate were of the very poor-quality (e.g. sub-prime mortgages), then reintermediating these products under Basel I would not be a problem. But with Basel II risk-based capital requirements in place additional capital, over and above that already required, would be needed to backstop the risky assets.

Under the Basel I Accord, assets were placed into categories with corresponding capital requirements. In the event of a recession an asset's category does not change and hence the capital required to backstop that asset does not change. But under Basel II, capital requirements are based on the PD and LGD; with many of the existing assets being downgraded and having their PD and LGD estimates revised upwards, banks would have to hold more capital against these assets. Furthermore, in addition to holding more capital for the structured products on their balance sheets, if banks were then forced to reintermediate additional structured-product type assets, because of the collapse in the secondary mortgage markets, then they would need even more capital.

In fact Basel II and reintermediation may have reinforced each other - firms were forced to reintermediate credit subsequent to the collapse in the structured product markets in 2007 and then, as the recession gathered steam, more capital was required to backstop the assets because their risk estimates (PD, LGD etc.) rose. Then, because of the reintermediation, banks could not contract or adjust their balance sheets – they were stuck holding these assets which caused severe undercapitalization. If banks were forced to hold more capital solely because risk estimates were

¹⁴ From peak to trough the S&P TSX index declined by 48% in 2008.

revised upwards, then a crisis may not have materialized – banks could have just securitized assets and shrunk their balance sheets. But because there was this reintermediation of credit occurring, reducing their capital requirements by shrinking their balance sheets was not an option; government intervention was necessary.

Financial institutions don't like to shrink their lending portfolios, mainly because they then have to turn away positive NPV projects¹⁵. In order to mitigate this, banks usually hold capital buffers (as discussed in the literature review). It is this equity that bears the initial brunt of any loan losses, balance sheet expansion, or any other action that requires capital. But, holding capital reserves is costly and thus banks try to minimize the amount of buffers as much as possible. However general literature, as well as empirical evidence, confirms that banks do choose to hold some level of capital buffers and in doing so must reject potentially positive NPV loans.

Banks have the ability to deal with the procyclicality issue associated with adjusting their capital bases and loan portfolios by just holding appropriate capital buffers. But, capital buffers come with costs: trend lending will always be lower than without capital buffers. The more capital buffers financial institutions hold, the lower is trend lending for a given economy. The smaller the capital buffers a financial institution holds, the more procyclical is lending. An extension of this is regulation and capital requirements. These two factors will have a similar trade-off regarding trend lending and procyclicality: the more regulation banks are required to oblige by, the lower trend lending (and, potentially, economic growth) will be, but the less regulation, the more procyclical lending will be and the more prone the economy will be to booms, busts and external shocks. It is clear that some regulation is necessary, but there are associated costs.

This is precisely where securitization played such an important role - and why banks began to use it so extensively. Done properly, it allowed banks to increase trend lending while at the same time it could free-up capital for when banks need it i.e. higher lending without more

¹⁵ For detailed literature on this see Freixas and Rochet “*Micro Economics of Banking*,” (2008).

procyclicality. As well, securitization served to diversify risk by making mortgage debt accessible to a wider variety of market participants (individual investors etc.) and throughout broader geographies, by having securitizations made up of domestic mortgages trade on international secondary markets. All this diversification should in theory reduce the procyclicality of bank lending, by diversifying risk.

4.2 A Quantitative Analysis of Reintermediation and Basel II

The preceding paragraphs have examined potential effects of Basel II related to the reintermediation of credit in a largely qualitative fashion. In the following, a mathematical model, which is contained in Repullo and Suarez's *The Procyclical Effects of Basel II* (PEB) and further examined in the "*Procyclical Effects of Bank Capital Regulation*" (same authors), will be used to provide some quantitative analysis on the effects of risk-based capital requirements and reintermediation.

Repullo and Suarez create a dynamic equilibrium model to simulate the effects of moving from a risk-insensitive (Basel I) to a risk sensitive (Basel II) regulation regime. Because the two-period banking model in PEB contains a loan demand parameter (μ), it provides a method to see what theoretical literature says would happen in the case of a reintermediation of loans on equilibrium interest rates, capital requirements and the level of bank lending (the economy) under Basel I and Basel II type regulation. Furthermore PEB incorporates many real-world phenomena, some of which are particularly applicable in the context of the 2008/2009 recession.

Specifically, we examine the behavior of the supply of bank lending in a dynamic setup in which banks anticipate that shocks to their earnings, as well as the cyclical position of the economy (modeled as a two-state Markov switching process), can impair their capacity to lend in the future and, as a precautionary measure, may hold capital in excess of the regulatory requirements. The explicit consideration of endogenous capital buffers allows us to assess whether the precautions that banks will take in response

to the new regulatory environment will be sufficient to neutralize its potential procyclicality—an argument frequently made by the advocates of Basel II.
(p.2)

Another key attribute of the model, which fits nicely in the context of a recession, is that the real world difficulties associated with raising capital and issuing equity are incorporated. Banks are only able to access equity markets every other period, which means emergency capital injections are not always an option for a bank - a feature that is particularly applicable to the 2008/2009 recession given the dislocations in financial markets that occurred.

Since the specific details associated with Repullo and Suarez's model are outlined in their paper, they will not be reprinted here. However, considering it is difficult to glean information from the following analysis without some background knowledge, a brief overview will be presented; in order to obtain a complete understanding of the following analysis, the reader is encouraged to review Repullo and Suarez's publication.

In the PEB model there are banks, entrepreneurs and investors, all who live for three periods denoted $t=0,1,2$. Entrepreneurs have the opportunity to engage in investment projects and require funds; banks act as intermediaries, channeling funds from investors to entrepreneurs; and investors provide funds to the banks. Entrepreneurs who engage in investment projects borrow money in period 0 and are either successful in their endeavors and receive a return over and above what they must pay to the bank at $t=1$, or they go bankrupt and the bank seizes their assets and receives something less than their original loan (the LGD). Entrepreneurs who are successful in their period 0 endeavor can then opt to receive additional funds from the bank, denoted μ , at $t=1$. Entrepreneurs can then engage in investment opportunities again, in which they will either be successful or unsuccessful. At $t=2$, all the projects are finished and the loans are wrapped up.

In PEB there are high and low states for the economy, which manifests through the success rate of entrepreneur's projects. In the high economic state more projects are successful and the probability of default is lower, vice versa for the low state. The probabilities are such that if the

economy is in the high default state in period 1, it is more likely to be in the high default state in period 2; likewise with the low state. Further to this there are ‘switching’ probabilities. These provide the probabilities that the economy will be in a certain state in the second period given where it was in the first. When the probability of switching is higher, the economy is considered to be more volatile.

The authors present the comparative statics of all the variables in their model, which show that an increase in μ (the second period loan demand parameter, which is being used to model reintermediation) unambiguously decreases equilibrium interest rates and increases capital holdings. The reason for this is that an increase in μ implies more period 1 projects were successful and banks were thus more profitable and will loan funds at lower rates of interest for the second period. Higher profitability and more loans also induces the bank to hold higher capital buffers, which means equilibrium capital holdings are also higher.

The percentage of continuation (second period) loans that cannot be undertaken by the bank due to insufficient lending is called ‘credit rationing’.¹⁶ Because lending results in economic activity, an increase in credit rationing can be interpreted as lower economic output. Thus, the impact of the two regulatory regimes on the economy can be determined by the amount of credit rationing under each.¹⁷

An increase in the amount of continuation loans has the effect of actually reducing credit rationing under Basel II. This is again because the increase in μ implies that more period one projects were successful, banks were more profitable, there is more capital to be loaned and ultimately less credit rationing (Repullo and Suarez, 2009).

¹⁶ Credit rationing is aptly described by the following quote: “Lending in any given period is made up of initial loans, whose quantity is always one, and continuation loans, whose quantity varies with the lending capacity of the banks that are unable to issue equity in that period. We denote by credit rationing the expected percentage of continuation projects that cannot be undertaken because of banks’ insufficient lending capacity” (P. 23).

¹⁷ “In our simple model, investment and hence expected gross output (the returns from the funded investment projects) are linearly related to total credit, given the state of the economy, so we can use credit rationing as a summary statistic of aggregate economic activity” (P. 23).

However, comparing this to what happened during the financial crisis it is obvious that an increase in the amount of loans being demanded from business by banks did not imply that banks were more profitable previously and had more funds to loan out. If in PEB an increase in μ happens, *ceteris paribus* (i.e. does not imply increased profitability in the first period) more banks would have insufficient lending capacity for the second period and credit rationing would increase. Furthermore, because under Basel II banks anticipate the economy will shift in the future and capital requirements will rise or fall (depending on whether the economy moves from high default to low default or vice versa), total overall credit rationing is higher under Basel II than under Basel I¹⁸ in Repullo and Suarez's model.

In general the difference to the economy on whether Basel II type requirements or Basel I type are implemented only seems to matter at extreme times, such as when the economy moves into a recession. In PEB, the only time interest rates and capital holdings are materially different in the two regimes is when the economy is more volatile and is in the high default state. These effects on capital also result in significantly more procyclicality than under Basel I, but only under the extreme conditions. Credit rationing under Basel I and Basel II is largely the same for the low volatility scenario and when the economy is in normal growth times. But when the economy goes from boom to bust, and is in the high volatility scenario, credit rationing increases significantly under Basel II as compared to under Basel I.

Thus, according to Repullo and Suarez's model, Basel II leads to significantly more credit rationing when the economy deteriorates quickly (as it did during the 2008/2009 recession), but reintermediation will not exacerbate the situation. However this is entirely because, by definition, if second period loan demand is higher in the model it means more firms were successful in the first period. If this were not the case, i.e. if there was an exogenous increase in demand for loans,

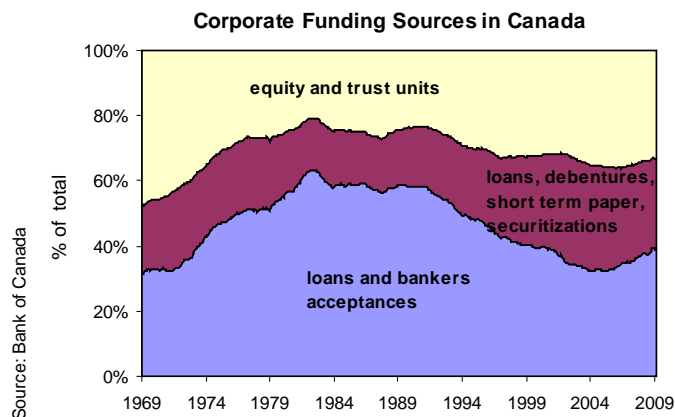
¹⁸ This is because the shift from the low default state to the high default state dominates the shift from the high default to the low default.

the amount of credit rationing would increase, more banks would have insufficient lending capacity and the impact on the economy would be negative.

5 Reintermediation

5.1 History

Since the early 1980s the Canadian financial system, as with those in most developed nations, has been characterized by a continuous trend of disintermediation. The amount of financing conducted by financial intermediaries compared to the amount done by the securities markets has been declining for over twenty-five years. Since the early 1980s the share of total financing done through bank loans has dropped from 60% to below 40%; traditional bank loans have become relatively less important, while bond and equity markets have become relatively more important.¹⁹



¹⁹ Unless otherwise indicated all data contained in the graphs of this section have been seasonally adjusted.

One of the most important steps in the trend towards disintermediation has been the rise of securitization. Although securitization first began in the late 1970s, it was not until the 1990s when the procedure became mainstream, particularly so in the United States. Securitization is the process of transforming illiquid loans, normally held on bank balance sheets, into tradable securities; hence the literal term ‘securitization.’²⁰

Securitization was a critical development and greatly expanded the capability of banks. Through securitization banks were able to transfer assets on and off their balance sheets, which added flexibility to their capital reserve requirements; if capital was scarce they could shrink their balance sheet by securitizing assets and reduce their capital requirement. Bank clientele would receive mortgages and loans in exactly the same way; it made no difference to a loanee whether the bank securitized their loan. After the loan was originated by the financial institution, it would ‘package’ a wide variety of similar loans together, group them into risk classes called tranches, and sell them into the financial markets. These newly created ‘securities’ would then be traded, just the same as a corporate bond would, in the secondary markets. Often the bank would still service the mortgage (i.e. ensure the original borrowers make their payments) but the annuities would go to an investor who purchased the ‘package’ of securitized loans.

A critical aspect of the securitization process was that the largest securitizations received ratings by a rating agency, much the same as a corporate bond issue would. The highest quality loans went into the top tranches and received investment grade credit ratings, while lower quality ones went into other tranches to receive lower ratings. Much like with the introduction of Basel II (standardized approach)²¹, the role of rating agencies became more critical. This was necessary since securitizations were so complicated and opaque, which meant investors needed to trust the due diligence done by the rating agencies.

²⁰ For a good explanation of the securitization process, consult the Bond Market Association et. al (2002).

²¹ However, many countries, including the U.S., have chose to not implement the standardized approach.

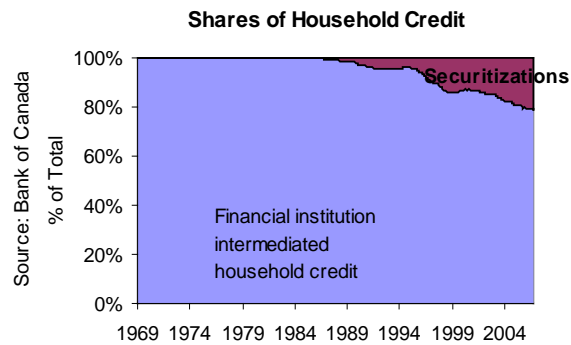
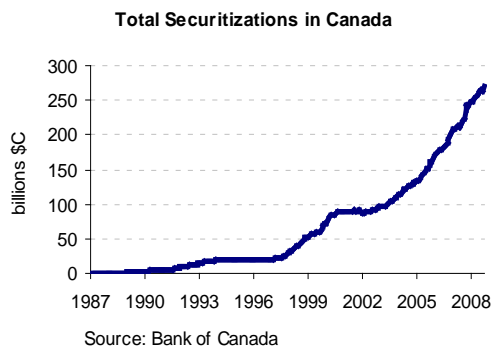
The advances in the securitization process were one of the primary drivers of the trend towards disintermediation. The key being that it provided flexibility in banks balance sheets, and it freed up capital so that a bank could lend more money. It also provided investors with a means to invest in, often, high quality assets that returned more than government bonds. The advantages of securitization were also substantial to households – with banks able to expand lending, aggregate credit available to the economy increased substantially. It eventually made loans and mortgages cheaper and more available, particularly to individuals with lower credit ratings.

An analysis of the securitization process reveals potential problems. There is adverse selection and moral hazard issues associated with having a bank originate a loan and also decide whether to keep it on their balance sheet or sell it into the secondary markets. The bank that originated the loan would know more about the borrowers' credit worthiness than investors in the secondary markets who purchased the securitized 'package' of loans. Due to this, one would expect a bank to originate loans, keep the high quality ones, and sell the inferior loans into the financial markets. To mitigate this, banks were often required to show 'good faith' by purchasing one of the lowest tranches of a securitization. This served to align the incentives of the financial institution with those of the investors in the securitized assets. In addition to the aforementioned problem, banks may employ more lenient lending practices and be less inclined to conduct proper due diligence and credit checks if they are expecting to unload the loans and associated risk into the market place. These are just two possible examples of a wide range of potential problems associated with securitization.

5.2 Current Financial Crisis

In the years leading up to the current financial crisis, which officially began in late August 2007, some financial institutions had begun to embrace the 'originate to distribute' model. Some financial institutions made loans to individuals with the intention of securitizing them and removing the associated risk from their balance sheets. They would earn fees from the origination

of the loan, always intending to unload the risk on investors. The amount of securitized assets and the aggregate level of credit in the economy began to expand at an unprecedented pace. Between the years of 2002 and 2008, securitizations in Canada increased by over \$200 billion. This compares with an increase of only \$80 billion between 1990 and 2002. Total household and business and credit increased by an annual average of 7.3% in the 2002–2008 period compared to 6.0% between 1990 and 2002.



Another result of the torrid pace of financial innovation was the rise of the sub-prime mortgage, which grew particularly fast in the US starting in 2002. From 2004–2006 the subprime share of mortgage originations was around 20%, almost triple the 7–8% share from 2001–2003 (Joint Center for Housing Studies of Harvard University, 2008). The aggregate level of risk in the economy began to rise as lower income individuals used the innovative new financing to purchase homes. This phenomenon was buoyed, first by the unprecedented amount of credit available; second, by low interest rates brought about by the US Federal Reserve to combat the 2001 recession; and third, by banks willingness to lend, arguably partly as a result of ‘originate to distribute’ models. With the economy booming and more Americans now able to purchase homes, a spectacular rise in housing prices ensued. Lenders then used this increase in home values and home equity to justify increasingly risky lending practices.

As is apparent after the fact, it all had to come to an end. Which it did - bringing down some of Wall Street’s (and the world’s) largest and historically most successful firms in the process.

The 'originate to distribute' model that so many banks had employed in the boom years became exposed as a very short-term, and ultimately destructive, propellant to the economy. Financial institutions did not want to purchase securitized loans anymore since it became clear that many of the underlying loans were provided to consumers based on weak fundamentals and false pretenses. Financial institutions lost the ability to shrink their balance sheets through securitization, and this combined with severe asset write downs meant that they needed massive injections of cash from investors to maintain their capital ratios above required minimums. Financial institutions began to hoard cash in an effort to stay solvent.

After years of trending towards financial market based corporate financing, financial institutions began having difficulty selling securitized loans into secondary markets. This meant that banks have had to hold these assets on their balance sheets for longer periods of time, if not indefinitely. In addition to the disruptions in the financial markets, large firms were less able raise capital through commercial paper and bond issuance, resulting in some being forced to draw on their bank lines of credit or apply for new business loans. This process can be thought of as credit reintermediation by financial institutions.

Credit reintermediation is not a new concept; there have other credit reintermediations in the past. But considering the degree of disintermediation that occurred between 1980-present, it is possible the recent reintermediation will be unprecedented. If this reintermediation is indeed actually occurring it should be detectable in financial market data. With the bursting of the credit bubble one would expect to see aggregate credit levels to contract, or increase less rapidly. The amount of securitized assets being sold into the market place should show drastic signs of contraction, and this should be coupled with a relative expansion in banks balance sheets since firms are less able to tap directly into financial markets for capital²².

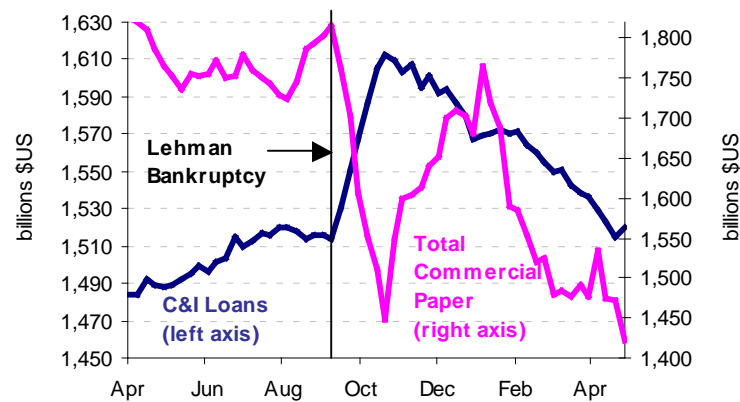
²² It is important to note that as of the time of writing the financial crisis was still unfolding and hence, the process of reintermediation was potentially still in an early stage. Furthermore aggregate data is produced with a time lag and thus this assessment is meant to search for signs of a break in a trend as opposed to give final results as to the amount of reintermediation.

5.3 Analysis

5.3.1 Reintermediation in the United States

United States financial markets were the epicenter of the 2007/2008 financial turmoil. Credit markets began to slow after the credit crisis began in late August 2007 and then froze with the bankruptcies/bailouts/takeovers of Lehman Brothers, AIG, Bear Sterns, Wachovia, Washington Mutual, and Merrill Lynch.

There has been a reasonable amount of evidence that the above proposed reintermediation hypothesis above did occur in the US, particularly at the short end of the loan market. Data available from the Federal Reserve shows that during the financial crisis the total amount of commercial paper outstanding declined, particularly right after the Lehman Brothers bankruptcy, and that commercial and industrial loans on bank balance sheets jumped.

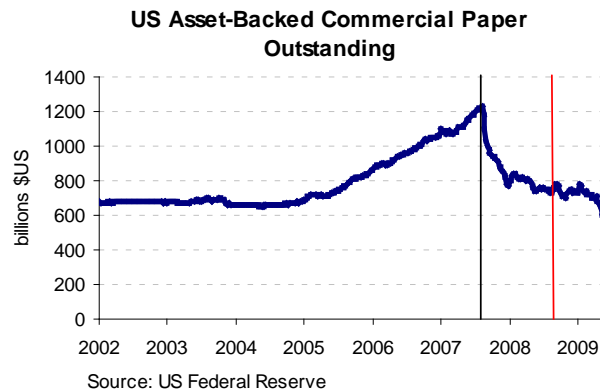


Source: US Federal Reserve

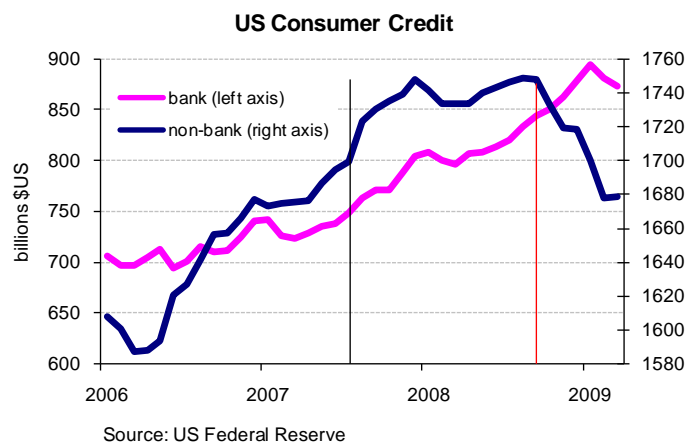
Some scholars, including Ivashina and Scharfstein (2008), argue the jump in commercial and industrial loans was due to non-financial firms drawing down the loan commitments and lines of credit to insulate the against the potential impacts of the frozen short-term paper markets.

It is also clear from Federal Reserve data that much of the reduction in commercial paper issuance was from the collapse of the asset-backed (securitized) category. In the following graph the first vertical bar (black) indicates the beginning of the credit crisis in August 2007 and the

second (red) indicates the bankruptcy of Lehman Brothers Inc. This colour convention will be used for the remainder of the paper.



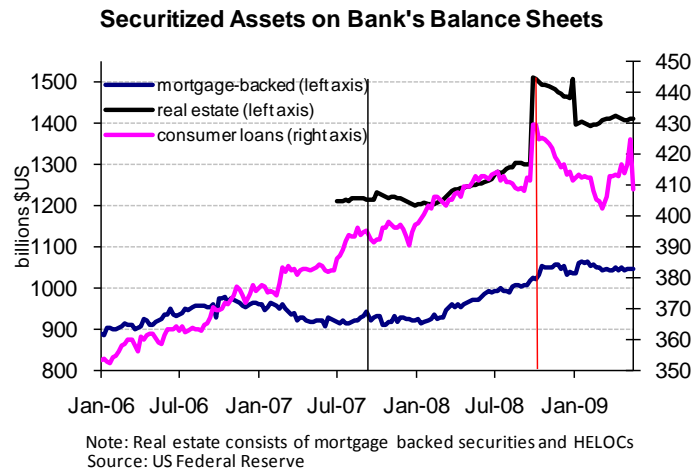
The total amount of credit available in the US economy grew at a significantly slower rate subsequent to the credit crisis. Between 2004 and 2007 total US consumer credit grew by between 4.3% and 5.5%. In 2008 aggregate consumer credit grew by only 1.8%, largely due to a 3% contraction in the fourth quarter subsequent to the Lehman bankruptcy²³. Furthermore, in 2008, credit provided by every non-bank category shrunk except the government student loan category, while overall credit from commercial banks grew by 8.6%²⁴.



²³ All numbers from US Federal Reserve Statistical Release G. 19.

²⁴ Credit granting categories includes: Commercial banks, finance companies, credit unions, Federal Government and Sallie Mae, savings institutions, nonfinancial business, and securitized pools.

Although the amount of asset-backed commercial paper and securitized consumer credit shrunk subsequent to the beginning of the August 2007 crisis and Lehman bankruptcy, the amount of securitized assets held on bank balance sheets grew. Clearly US commercial banks were playing a larger role in these formerly market based sources of financing.



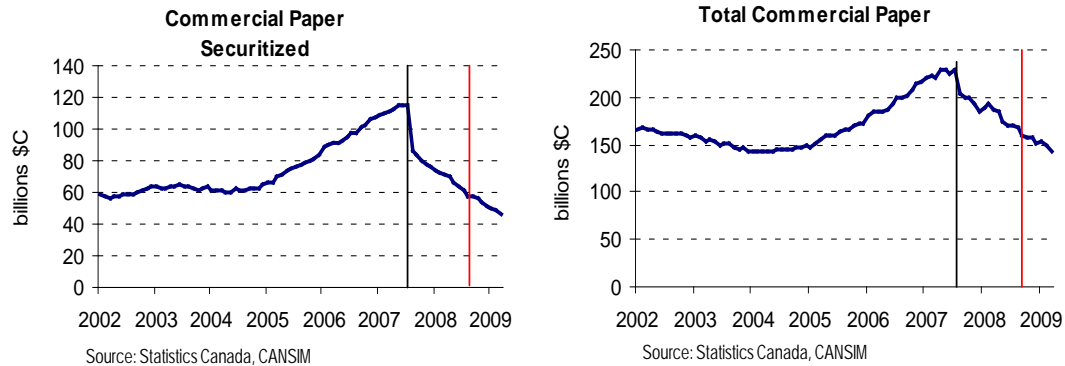
Despite all the above evidence, it is not the focus of this paper to delve to deeply into an investigation of the nature and magnitude of the reintermediation that occurred in the United States. Rather some high-level evidence that reintermediation did occur has been presented; the remainder of my examination will be on Canadian credit markets.

5.3.2 Reintermediation in Canada

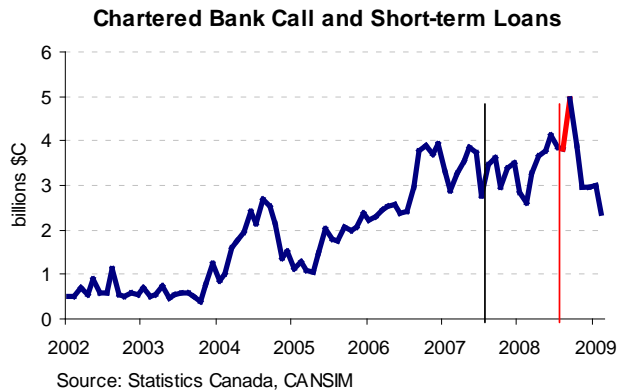
In Canada, much of the financial market and chartered bank data comes from Statistics Canada and is released through the Bank of Canada's *Weekly Financial Statistics*. Contained in this publication is a wealth of information regarding financial intermediary assets and aggregate credit in the Canadian economy. It is this data that will be used to examine if and what signs of reintermediation are present in the Canadian economy.

5.3.2.1 Canadian Commercial Paper and Short-term Lending Markets

The effects of the 2007 financial crisis are most evident in the commercial paper market. It is clear that right after the crisis began, the amount of securitized commercial paper, and hence the total amount of commercial paper outstanding was drastically reduced.

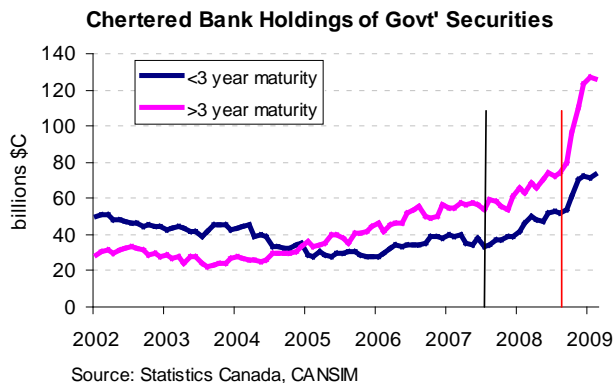


The reduction in securitized commercial paper was not offset by a rise in any other forms of commercial paper since the total amount of commercial paper outstanding declined by the same amount as the securitized portion. In aggregate, the size of the total commercial paper market decreased by 15.6% between the time the financial crisis began in August 2007 and March 2009. Since it is evident the commercial paper markets came under extreme pressure as a result of the freeze-up in the asset-backed category, it makes logical sense to search for reintermediation in bank products that would serve as substitutes to the short term paper (e.g. short-term business loans, bankers acceptances). Much like the expansion of commercial and industrial loans in the US, Canadian chartered banks did see their short-term and call loans increase subsequent to the Lehman bankruptcy, although no break in trend is evident after the August 2007 kick-off of the credit crisis.

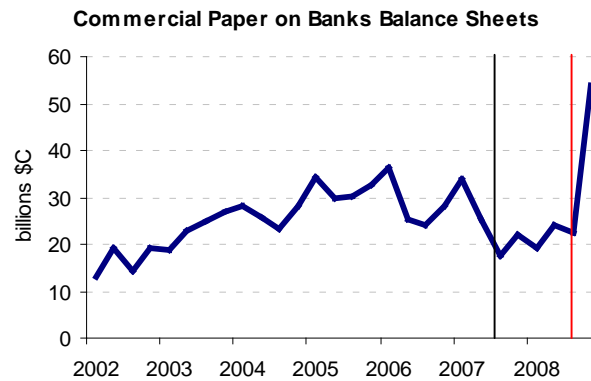


Chartered bank short-term business loans jumped 29% in September 2009 (the month Lehman went bankrupt) to \$4.95 billion, the highest level on record. This increase was probably a result of businesses drawing on established credit lines for fear of future inability to raise money in financial markets. Despite the sharp increase, the level of short-term loans returned to more normal levels at a faster rate than those in the US. Thus any reintermediation that occurred in this category was short lived.

Chartered banks did however see an unprecedented increase in holdings of Government of Canada long and short-term bonds. It is clear that banks were choosing to hold less risky assets in the face of turmoil in global financial markets. Although this is not evidence of reintermediation in the same way an expansion in short-term loans would be, it could be considered an indirect form of reintermediation.



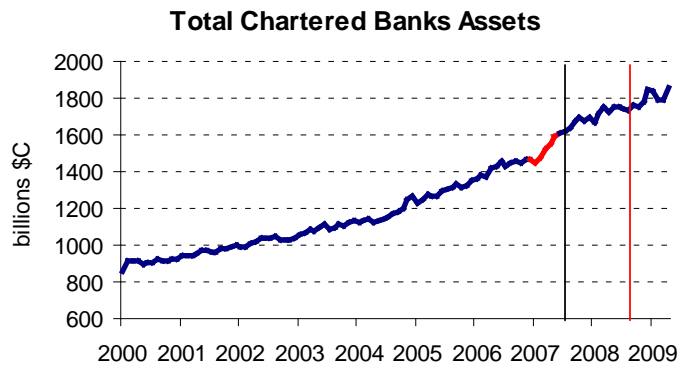
The amount of commercial paper being held on bank balance sheets also jumped dramatically in Q4 2008. A large portion of the commercial paper market consisted of the asset-backed commercial paper and considering this, the jump in Q4 2008 in the amount on bank balance sheets, is a likely consequence of them being unable to sell the paper into financial markets. At any rate it is another sign of indirect reintermediation by chartered Canadian banks in short-term lending markets.



Source: Statistics Canada, CANSIM

5.3.2.2 Chartered Bank Assets

The broadest and most substantial indication of chartered bank reintermediation would be an abnormal expansion of total chartered bank assets, which includes liquid assets such as government securities and short term paper and less liquid assets such as mortgages, consumer loans and loans to businesses.



Source: Statistics Canada, CANSIM

A quick glance at the above graph shows that there has been no obvious expansion of Canadian banks' balance sheets after the credit crisis began in August 2007. In fact the only somewhat abnormal growth in aggregate assets occurred immediately before the credit crisis began, from the beginning till the middle of 2007 (red highlighting).

To test whether a structural break has occurred subsequent to the 2007 financial crisis using econometric methods, a Chow test is done. The Chow test is the appropriate test in this case since the financial crisis has a definite starting point and it is apparent when that point is. A Chow test uses coefficients from two linear regressions, in this case on the data from before the crisis began and after the crisis began and compares the slope and intercepts to see whether they are statistically different from one another.

By regressing chartered bank assets on lagged values of itself and comparing the coefficients from the two different time periods it can be determined whether any kind of structural break has occurred. The results of the Chow test agree with visual observations and confirm that there was no change in the time coefficient before or after the crisis:

$$(1) \text{ lagassets1} - \text{lagassets2} = 0$$

$$F(1, 76) = 6.42$$

$$\text{Prob} > F = 0.0133$$

We can also test for the equality of the intercept as well as the time coefficient:

$$(1) \text{ lagassets1} - \text{lagassets2} = 0$$

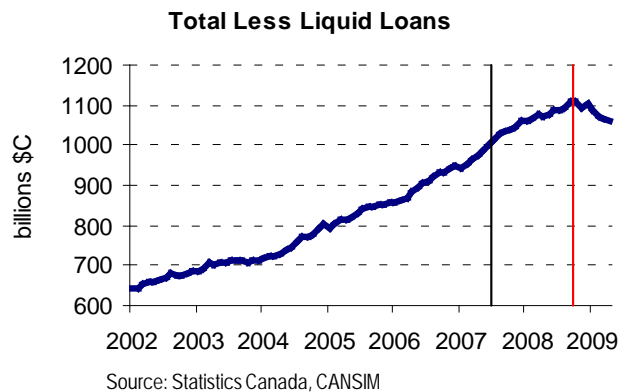
$$(2) \text{ dcrisis} - \text{dnocrisis} = 0$$

$$F(2, 76) = 3.54$$

$$\text{Prob} > F = 0.0339$$

In both cases we are able to reject the null hypothesis of a structural break at the $\alpha=5\%$ level and conclude there has been no extraordinary chartered bank credit expansion on the scale of their total assets.

Although there are no clear signs of reintermediation on total chartered bank assets, the data will be disaggregated to further search for signs of reintermediation. A narrower category, which might be expected to exhibit the signs of reintermediation, is the less liquid bank assets category. These are the assets that were previously being securitized and that banks would now have to hold on their balance sheets²⁵.

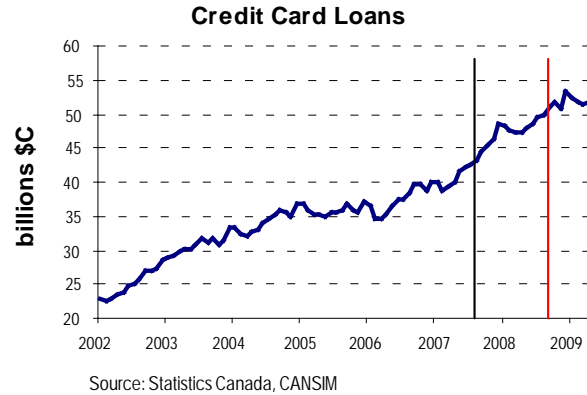


But, as was the case with total assets, there are no signs of reintermediation at this level either. A Chow test on this data also confirms the visual assertion.²⁶

If the less liquid loans category is further disaggregated there are, in fact, no asset sub-classes that show a clear structural break, which indicates Canadian chartered banks did not have to bring an extraordinary amount of assets onto their balance sheets. The only sub category, which did show a higher rate of growth on bank balance sheets, immediately after the credit crisis hit in August 2007, was the credit card loans category.

²⁵ By far the most common type of securitized assets was the mortgage-backed security (MBS). Other securitized assets were credit card loans, automobile loans, and to a much lesser extent small business loans and commercial mortgages.

²⁶ (1) $LagIII1 - LagIII2 = 0$
 $F(1,76) = 3.83$
 $Prob > F = 0.0315$



The Chow test also confirms visual suspicions. If a test for a structural break is conducted, by regressing credit card loans on lagged values of themselves before and after the credit crisis, the null hypothesis of a structural break fails to be rejected:

$$(1) \text{lagcreditcards1} - \text{lagcreditcards2} = 0$$

$$F(1, 76) = 0.24$$

$$\text{Prob} > F = 0.6252$$

The Chow test also confirms that the intercept and slope coefficients are sufficiently different:

$$(1) \text{lagcreditcards1} - \text{lagcreditcards2} = 0$$

$$(2) \text{dcrisis} - \text{dnocrisis} = 0$$

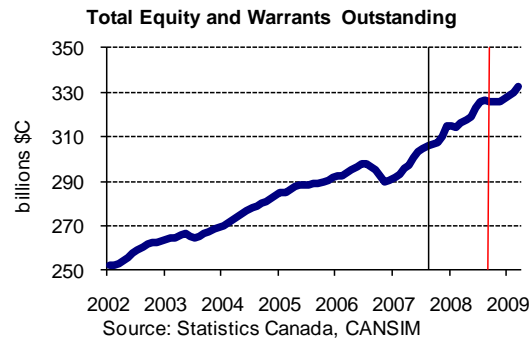
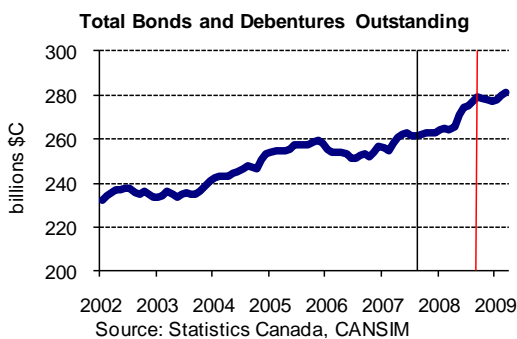
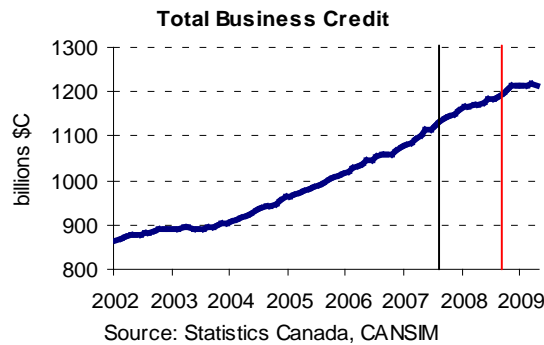
$$F(2, 76) = 2.60$$

$$\text{Prob} > F = 0.0808$$

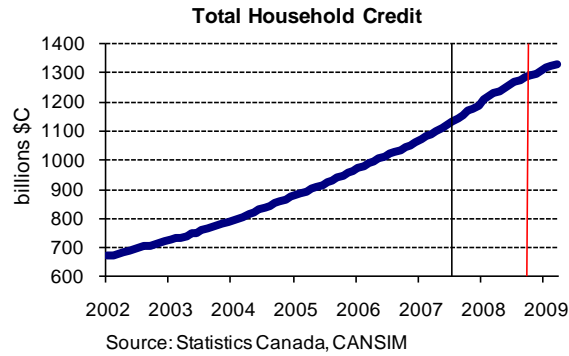
Thus, despite the credit card category exhibiting some signs of potential reintermediation, there is in general no conclusive evidence of a substantial and widespread reintermediation in Canada subsequent to the financial crisis from quantities of chartered bank loans. At this point it is then fitting to delve deeper and examine measures of aggregate credit in the economy, to see if signs of the reintermediation can be found.

5.3.2.3 Credit Measures

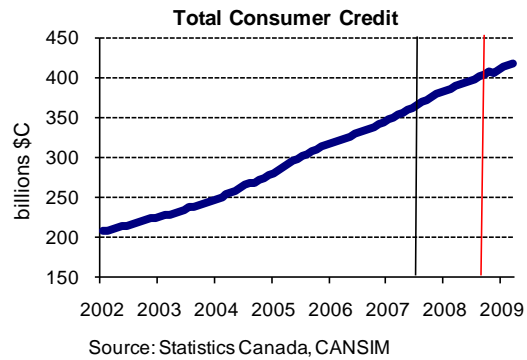
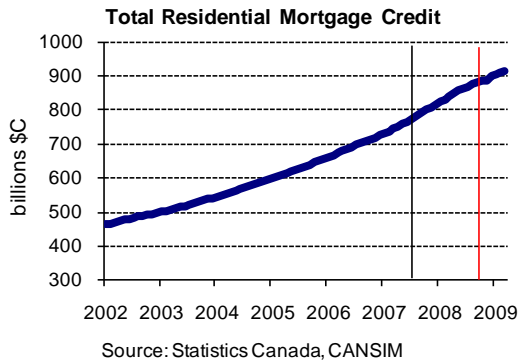
Aggregate business credit experienced fairly stable growth between 2002 and March 2007, with a change in trend noticeable beginning at the end of 2003 when the Canadian economy began to boom. There was also a slight reduction in the growth rate of business credit at the beginning of 2008, however, evidence of a severe reintermediation is lacking. The monthly growth rate of business credit averaged 5.2% in the three years preceding the financial crisis, compared to 4.7% in the twelve months following it. Business credit derived from market sources like bonds, debentures and equities continued to grow subsequent to the crisis while credit issued by chartered banks slowly crept downwards. Even credit provided by special purpose corporations failed to shrink materially. Considering these points there is no reason to delve deeper into business credit.



Aggregate household credit also seems to exhibit smooth, steady growth and shows no indication of an abnormal reduction in its overall level subsequent to either the beginning of the financial crisis or the Bankruptcy of Lehman Brothers.²⁷



Total household credit can be disaggregated into consumer credit and residential mortgage credit.

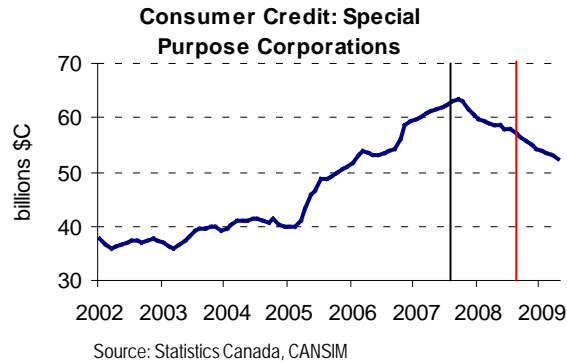


Both of which, again, show a steady, constant trend with no structural breaks indicating any reduction in the availability of credit to consumers and homeowners due to the 2007 financial crisis²⁸. However, if total consumer credit (right hand graph) is then disaggregated, and we look at the assets of special purpose corporations,²⁹ which are the conduit vehicles used in

²⁷ Compared to the twelve months preceding the bankruptcy of Lehman Brothers, consumer credit growth fell 30% in the six months after the bankruptcy; although, in contrast to the US, it failed to shrink outright during the recession. The reason credit growth declined seems to be a normal recession-driven contraction in credit and does not show any indications of being linked to procyclicality Basel II.

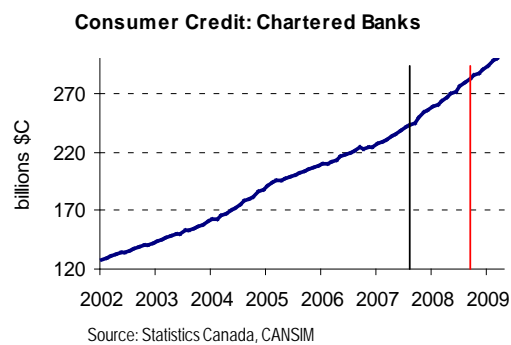
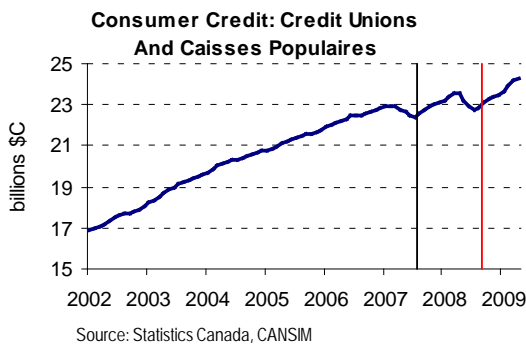
²⁹ Note this does not include all securitized assets; those that remain on financial institutions balance sheets are excluded from this category.

securitization, it is clear there was a reduction in the credit they were providing right after the financial crisis began.



Between 2005 and the beginning of the financial crisis, consumer credit provided by special purpose corporations grew by a monthly average of 1.4%, compared to decline of 0.5% after the August 2007 crisis began. In total, the size of the market declined by \$9.4 billion, or 15.1% from the time the crisis began and March 2009.

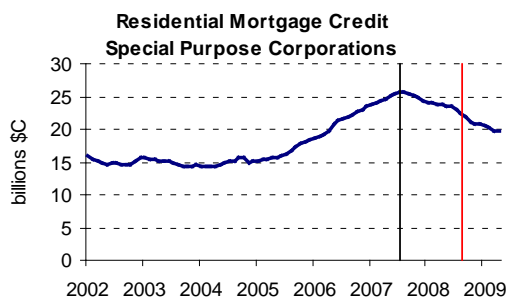
This leaves the question: if overall consumer credit has continued to grow but credit provided by special purpose corporations has declined, which category has increased to counter the losses in securitization?



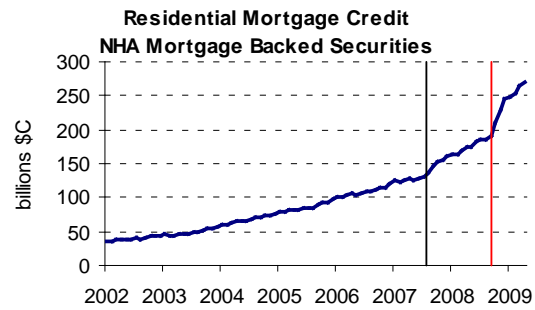
Although it may be somewhat unclear from the graphs it appears as though the chartered banks have picked up most of the slack from the reduction in credit provided by special purpose corporations. Consider that in the fifteen months following the beginning of the financial crisis in

August 2007, consumer credit provided by credit unions and caisses populaire increased by 6.8%, non-depository credit intermediaries grew their credit outstanding by 6.2%, while chartered bank credit growth was 14.9%. This is consistent with the notion of chartered banks being unable to remove asset-backed securities from their balance sheets.

Moving back a few graphs to ‘residential mortgage credit’ that category too can be disaggregated to provide some interesting results.



Source: Statistics Canada, CANSIM



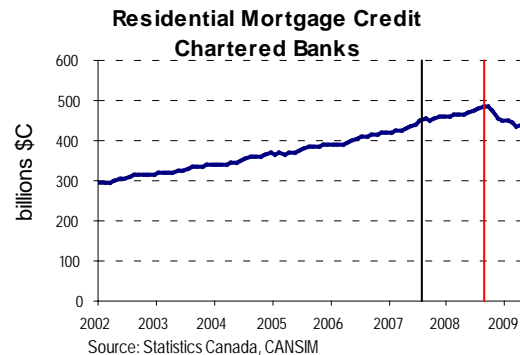
Source: Statistics Canada, CANSIM

It is clear that the amount of residential mortgage credit held by special purpose corporations, which are non CMHC guaranteed and securitized mortgages, began to decline immediately subsequent to the onset of the financial crisis. However, the exact opposite occurred for the National Housing Agency (NHA) mortgage-backed securities category (CMHC securitized and guaranteed), which saw an acceleration in growth immediately subsequent to the onset of the recession and then again immediately after the bankruptcy of Lehman Brothers³⁰. Considering the relative sizes of the non-agency mortgage-backed security market and the NHA market (The NHA market is much larger), it is clear that securitization activity (the amount of disintermediated credit) actually began to grow faster immediately subsequent to the crises.

If this information is taken congruently with the fact that residential mortgage credit held by the chartered banks saw no change after the onset of the crisis but then contracted sharply right

³⁰ Neither of these categories includes securitized loans that are held on banks' balance sheets.

after the bankruptcy of Lehman Brothers, it is clear that disintermediation, not reintermediation, occurred³¹ in Canada's mortgage markets subsequent to the financial crisis.



As an aside, the impressive growth in the amount of NHA mortgage-backed securities is somewhat peculiar. It seems that, in fact, banks were able to remove large amounts of mortgages from their balance sheets to strengthen their reserves. CMHC may have been facilitating this process, as they are responsible for the securitization. It was probably their (as well as regulators) intention to do everything in their power to strengthen the Canadian banking system during the financial crisis— which in this case, meant strengthening the positions of the chartered banks. Had it not been for this, it is possible that Canada may have seen a similar trend of reintermediation as the United States.³²

Thus, in contrast to the US, Canada's financial system does not exhibit clear signs of reintermediation by the major banks. Market funding mechanisms such as bond issues and equity and warrants outstanding showed no abnormal break in trend subsequent to either the initial breakdown in the structured product markets or after the Wall Street bankruptcies. It does appear that some companies drew down in existing lines of credit immediately subsequent to the recession but the reintermediation was very short lived and only occurred at the short end of the

³¹ The entire list of consumer credit granting categories consists of credit unions and caisses populaires, non-depository credit intermediaries, trust and mortgage loan companies, life insurance companies, chartered banks, special purpose corporations, pension funds and NHA mortgage backed securities.

³² The same mortgage credit insurers in the US couldn't securitize assets and sell them so easily since investors were not so willing to purchase mortgage-backed securities based in the US (in addition the US equivalents, Fannie Mae and Freddie Mac, had to deal with their own bankruptcies)

market. Commercial paper and structured product markets did contract subsequent to the financial crisis, indicating some reintermediation occurred at the short end of the market. However, as the final few graphs indicate, Canadian household market based funding systems functioned well throughout the recession and there is little evidence that banks reintermediated an abnormal amount of credit at the long end of the market (which accounts for the vast majority of outstanding credit). In fact, at the long-end of the market disintermediation appears to have accelerated immediately subsequent to the Wall Street bankruptcies.

6 Improvements to the Basel II Accord

It is almost certain that increased procyclicality is a downside to the new regulation; however the estimates as to the degree of *marginal* procyclicality, over and above that already present in the financial system absent Basel II, fall within a wide range. There are studies which show that capital requirements will as much as double in a downturn while others show it is unchanged or even decreases³³.

The papers that do find procyclicality to be an issue with the new accord are fairly consistent in that the negative consequences primarily arise when the economy enters a downturn or is at a more extreme point in the business cycle. In all the papers reviewed in this essay that create a model to quantitatively estimate the degree of procyclicality in Basel II, procyclicality is only major issue when the economy enters a downturn and especially when the economy moves sharply from expansion into recession. Examples where this is the case include, but are not limited to, Repullo and Suarez, Kashyap and Stein, Gordy and Howells (reviewed later) and Tsocomos et. al. This point is an important consideration when presenting improvements and solutions to the procyclicality problems of Basel II because the solutions typically only really need to address this subset of possible situations.

³³ See Gordy and Howells (2003, p.399)

In general, there is a trade-off between procyclicality and the probability a bank will go insolvent. Capital requirements that are more stringent and are sensitive to the probability of default of banks' assets typically imply a very low probability of insolvency for the lending institution. However, trend lending will be lower and procyclicality will be increased. Likewise, procyclicality in the banking system can be diminished but the probability of bank insolvencies will increase. The Basel II Accord, taking account of this trade-off, attempts to set the probability of bank failure to below one tenth of one percent over one year i.e. banks hold enough capital such that there is no more than a 0.01% probability of default for any given bank in any given future twelve month period. This may give rise to the question: if banks have enough of their own incentives to avoid bankruptcy – why is it necessary to use regulation to prevent financial institution bankruptcies? While banks do have strong incentives to avoid bankruptcy, there are significant externalities to financial institution insolvencies that transcend throughout society and the broader economy. Thus it is the goal of regulation to compensate for these externalities and internalize them.

Taking the fact that procyclicality issues tend to largest when the economy enters a recession and that there is a trade-off between procyclicality and bank failures, multiple authors have suggested decreasing the capital charges to banks only during economic downturns. Put another way, when banks are more capital constrained (and thus there is underinvestment in the economy) it makes sense to accept a higher probability of bank default. The point here is that when the state of the economy deteriorates, bank lending should not bear the full brunt of the recession, it should be spread to bank solvency levels as well.

Kashyap and Stein's "*The Cyclical Implications of the Basel-II Capital Standards*," is one such paper that suggests accepting a higher rate of default during recessions. The authors purport that the current Basel II method of having one single risk-curve, which maps credit risk measures (such as the PD and LGD) into capital charges, is sub-optimal. Instead, it is desirable to have a family of risk curves for different states of the economy, whereby the mapping of capital charges

depends on the state of the economy. When the economy is enjoying good times, regulators would target a high confidence level of bank insolvency (99.9%) but when the economy deteriorates, they could target, say a 99.5% level. The authors advocate two methods regulators could use to achieve this reduction: 1) by actually lowering the capital requirements (say from 8% to 6%) and 2) by lowering the risk weights so that banks have lower risk-weighted assets during recessions.

The upside to Kashyap and Stein's proposal is that it maintains the relative mapping of credit risk into capital charges at each point in time. If an asset is more risky than another and has a higher capital charge, that relative difference is maintained when the state of the economy changes, although the absolute capital charge for both decreases. A potential downside however, is that banks would anticipate that capital charges will change in the future, which could lead to some sort of capital arbitrage or flight to quality issues.

Repullo and Suarez agree with Kashyap and Stein's assertion that the best way to mitigate procyclicality in Basel II is for bank solvency rates to bear some of the weight of recessions. However, the proposals differ slightly in that Repullo and Suarez also propose to increase capital requirements (and hence, the probability of bank solvency) during periods of economic expansion such that the *long-run average* bank solvency level would still be 99.9%. According to the authors, this would maintain the financial system security gains associated with Basel II, but would not marginally add to procyclicality, because it is not an issue when the economy is in a normal expansion. According to the model presented by Repullo and Suarez (covered previously), allowing the probability of bank failures to increase by just 0.01% to 99.8%, would decrease credit rationing significantly in the two sequences where it was the worst³⁴. In the sequence when the economy moves from the low default state to the high default state, it would

³⁴ Recall credit rationing is the amount of credit that is demanded by entrepreneurs but not supplied by banks due to insufficient lending capacity. Thus 10% credit rationing means 10% of the loans demanded were not supplied. Since lending implies investment, economic output is impacted by the credit rationing.

fall from 10.7% to below 4.5% and in the scenario when the economy is in the high default state and stays in the high default state, it would fall from 4.5% to below 4%.

The second key method in which the existing literature proposes to mitigate procyclicality within Basel II has to do with the types of rating systems the capital requirement parameters are based on. The two principle classes of ratings are point-in-time (PIT) and through-the-cycle (TTC) schemes. PIT ratings imply the capital requirements are based on the current value of the capital parameters (e.g. current value of PD and LGD). This means that, as the economy moves through the business cycle, the parameters (and hence capital requirements) change with the business cycle. Thus the parameters tend to move together – as an economy enters recession the PD and LGD etc. will all typically increase together and vice versa. TTC systems, by contrast, aim to have the parameters independent of the economic cycle³⁵ - they are based on some kind of historical average and are thus much more constant than PIT ratings. Most banks currently employ PIT ratings for use in calculating capital requirements, which means regulatory capital tends to move inversely with economy. A few economists assert that this is the main driver of procyclicality in Basel II and TTC ratings would be superior.

Catarineu-Rabell et. al. is one such paper that advocates the use of TTC ratings schemes. The authors argue that, left to their own devices, banks will choose to adopt PIT ratings systems since profits are slightly higher under this rating scheme. This will cause the Basel II Accord to be strongly procyclical and result in large contractions in credit during downturns and an exacerbation of the economic cycle. However, if banks were to adopt TTC rating schemes for the parameters, the Basel II accord will not be any more procyclical than under the risk insensitive requirements of Basel I. The authors also assert that Basel II, combined with PIT ratings, could increase capital requirements by as much as 50% in an economic downturn compared to under Basel I.³⁶

³⁵ Ratings on debt issues by the rating agencies are all TTC ratings.

³⁶ The results of this paper are largely in agreement with those in Illing and Paulin (2005).

Although the authors make a convincing argument that procyclicality will be diminished by adopting TTC ratings, they make no mention of potential side effects of adopting this scheme. Furthermore, there does not seem to be an established method on how exactly to calculate TTC ratings, which could create cross-bank consistency issues. Typically, a historical average approach is used to calculate a TTC rating but this could become an issue during periods of torrid financial innovation and when new products make their way into the marketplace very quickly (as occurred during the 1990s and 2000s). These new products wouldn't have an adequate history to calculate a proper TTC rating, and forcing banks to determine the appropriate TTC rating could severely hamper the pace of product adoption and impede overall economic growth. Furthermore, the degree of standardization across banks operating in different jurisdictions to ensure capital requirements were truly consistent would be formidable, particularly considering Basel II is supposed to be global in scope.

Another paper that comments on the use of ratings systems to decrease procyclicality in Basel II is "*Procyclicality in Basel II: Can we treat the disease without killing the patient?*" by Gordy and Howells. The authors note that a majority of academic literature examines Basel II by focusing on Pillar 1 of the accord and hence the focus of their paper is through Pillar 3: market discipline. They agree with Catarineu-Rabell et. al. that using TTC the ratings will decrease the procyclicality in Basel II, although they also assert that the only material difference will occur at extreme times of the business cycle, such as an economic downturn: "The sharpest peaks and troughs in the economic capital time-series are blunted in the Basel II-PIT series. Otherwise, the two series track very closely..." (Gordy and Howells, 2003, p. 410).

Despite the dampening effects of using TTC ratings, the authors argue that there are material disadvantages to using these ratings, which more than offset the gains in reduced procyclicality. Specifically, capital charges based on TTC ratings are not correlated very strongly with economic

capital, which is one of the principle goals of the Basel II accord³⁷. This distorts the information transmitted by the capital requirement and thus would not allow effective market discipline to take place. Gordy and Howells then conclude that a form of dampening the IRB function, as advocated by Repullo and Suarez and Kashyap and Stein, is preferable to using TTC ratings.

7 Concluding Remarks

Although the Basel II Accord is undoubtedly an improvement over its predecessors, it further asserts the notion that any form of far-reaching bank legislation is likely to contain both benefits and drawbacks. Risk-based capital requirements, in some form or another, do currently appear to be the best method for regulators to not only bring economic and regulatory capital into alignment but also obtain the truest representation of financial institutions' risk level; however, as they currently stand, risk-based requirements come with unfortunate side effect of exacerbating the economic cycle.

Although estimates of the degree of marginal procyclicality caused by Basel II varies widely among academics, existing literature is largely in consensus that procyclicality is a material downside to the accord, particularly at extreme points in the business cycle such as when entering a recession. However, in spite of all the procyclicality issues, this paper has still concluded that Basel II is a step in the right direction and that the Three Pillars of the accord: capital requirements, supervisory review and market discipline, provide regulators with a superior framework with which to regulate banks.

The financial crisis and ensuing recession of 2008/2009 provides a unique period to examine procyclicality in Basel II because the accord was newly adopted and the recession was severe. Evidence from the US credit markets suggests that the 2008/2009 recession will see the largest contraction in credit since World War II (still unfolding at the time of writing), which almost

³⁷ "The primary objective under Pillar 1 is better alignment of regulatory capital requirements with "economic capital" demanded by investors and counterparties," (Gordy and Howells, 2003).

certainly is at least partially due to the adoption of Basel II. The case in Canada has been far less obvious, with only a moderate contraction in overall credit growth. This could indicate that the health of the financial system here was enough to absorb any procyclical declines in credit brought on by Basel II.

Despite the long-term trend towards capital market financing, the dislocations brought about by the turmoil in financial markets during the crisis forced US banks to reintermediate credit. The relative proportion of bank credit grew, particularly at the short end of the market. However and analysis of Canadian financial and credit market data indicates the same did not occur in Canada, except for a small amount at the short end of the market.

Although it has been argued that Basel II is a step in the right direction, it is clearly far from perfect. It is likely, considering that procyclicality issues are only really prevalent when the economy is at extreme points in the business cycle, some moderation in the target level of bank solvencies could offset a great deal of the procyclicality without giving up too much in terms of financial system stability.

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