




The impact of off-balance-sheet activities on banks returns: An application of the ARCH-M to Canadian data

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Abstract

This paper revisits the impact of off-balance-sheet (OBS) activities on banks risk-return trade-off. Recent studies (e.g., [Stiroh and Rumble, 2006](#)) show that increasing OBS activities does not necessarily yield straightforward diversification benefits for banks. However, introducing a risk premium in the standard banks returns models, and resorting to an ARCH-M procedure, Canadian data suggest that banks risk-return trade-off displays a structural break around 1997. In the second subperiod of our sample (1997–2007), we find that the noninterest income generated by OBS activities no longer impacts banks returns negatively. While during the first period (1988–1996) the volatility variable is not significant in any returns equations, a risk premium eventually emerges, pricing the risk associated to OBS activities.

Introduction

Beginning in the 1980s, financial deepening¹ and financial innovations led to a more market-oriented structure, with firms increasingly relying on financial markets to fund their investments, an evolution observed both in Canada, the United States and elsewhere (Boyd and Gertler, 1994, Calmès, 2004, Roldos, 2006).² This evolution gave way to a major change in corporate financing, characterized by a relative decrease in the share of banks loans (i.e. indirect financing) and an increased share of bonds and stocks. This financial transformation challenged the banking business and justified, in part, the financial deregulation waves. Banks were progressively allowed to act as security dealers and to offer fiduciary services and portfolio advices to investors. They also began to securitize loans, a move in line with the financial deepening process.³ These kinds of non-traditional activities are loosely classified as OBS (off-balance sheet) activities – i.e., activities related to commission and fee income, trading income and other noninterest income. At first, banks might have thought that these new types of activities could lead to important diversification benefits, with an improvement in their risk-return trade-off (Rose, 1989, Saunders and Walter, 1994). Indeed, the decision to diversify might be considered endogenous (Campa and Kedia, 2002,

Stiroh and Rumble, 2006, De Jonghe, 2009) and the result of an optimization process, theoretically leading to a better risk-return trade-off on an expanded efficient frontier. However, banks can also use diversification benefits to actually take more risk, holding less capital and granting more loans, especially through securitization, which then becomes a “money machine” (Demsetz and Strahan, 1997, Buiters, 2009). As a matter of fact, in the United States, researchers find that OBS activities triggered a substantial *increase* in the volatility of banks’ net operating revenue growth (Acharya et al., 2002, Stiroh, 2004a, Stiroh, 2006b, Stiroh and Rumble, 2006, Lepetit et al., 2008b, De Jonghe, 2009). This volatility surge does not seem to be associated to greater, absolute or risk-adjusted (accounting) measures of bank returns – i.e. the return on assets or the return on equity. Actually, these measures of banks returns decreased with the upward trend in the share of noninterest income. Given the direct link between accounting measures of bank performance and the level and volatility of bank market returns, this situation might be perceived as problematic by banks stakeholders.

To shed more light on this phenomenon, we consider three hypotheses using aggregate data about the whole Canadian banking system. First, we check the impact of OBS activities on the *aggregate* banking risk-return trade-off over the whole sample, which runs from the first fiscal quarter of 1988 to the last fiscal quarter of 2007.⁴ Doing so, we can confirm that OBS activities increase banks risk in Canada. Over the whole sample period, our results show that OBS activities actually reduce Canadian banks mean accounting returns, while they also increase the volatility of bank net operating revenue growth. However, as in the European studies, we find an improvement in the risk-return trade-off over the period 1997–2007, OBS activities leading to greater returns on assets and equity. As their European counterparts, Canadian banks have more experience in OBS activities than US banks. Indeed, Canadian banks have been allowed to perform brokerage activities since 1987, whereas they began only in 1999 in the US.⁵ In any case, the surge in OBS activities actually increases the banking system riskiness. To explain the paradoxical weakness of the diversification benefits associated to OBS activities, and rationalize the deterioration of the risk-return trade-off observed in Canada over the 1988–2007 period (Calmès and Théoret, 2009a, Calmès and Théoret, 2009b), we resort to the commonly accepted view that noninterest income, being more related to aggregate shocks (compared to interest income), increases the exposure of banks to market conditions, and more generally to macroeconomic shocks, which are not easily diversifiable, and whose relative importance tends to grow relative to idiosyncratic shocks (Houston and Stiroh, 2006, Baele et al., 2007).⁶ This risk-return worsening is also partly explained by bank herding behaviour – a collective reaction of banks to aggregate shocks – which contributes to increase the risk exposure of the whole banking system (Baum et al., 2002, Baum et al., 2005, Calmès and Salazar, 2006, Quagliariello, 2006).

The second hypothesis we want to test regards the change in banking business, the new practices that lead to a better integration of the traditional bank lending activities with OBS ones. This change is associated to a structural break in 1997, which coincides with a sharp increase in the volatility of banks net operating revenues growth and in the ratio of noninterest income. 1997 is a natural break since it is precisely at this time that Value-at-Risk (VaR) became the standard bank risk measure.⁷ The VaR, being based on returns volatility, has a tendency to underestimate the negative impact of fat tails. This may have induced banks to blindly increase their total leverage with riskier activities, and particularly OBS activities. It certainly explains a great deal of the increased bank income volatility in the immediate years following 1997.⁸ In this respect, the results we find are consistent with the recent changes observed in the banking industry and the gradual adaptation to new, non-traditional activities, which Adrian and Shin (2009) call shadow banking.⁹ As it is usually the case, financial markets and institutions eventually adjust to financial innovations (Calmès, 2003, Caballero and Engle, 2003, Delong and DeYoung, 2007). Incidentally, our results are also in line with the study of Baele et al. (2007) who find diversification benefits in a large sample of European

banks. The authors explain their contradictory results in regard to the American experience by noting that European banks have more expertise in OBS activities than their US counterparts, these activities being allowed since 1989, i.e. 10 years before the USA. Baele et al. (2007) also note that Europe has a long tradition with investment banking, which is not the case for US banks.¹⁰

Last but not least, our third hypothesis concerns the emergence of a risk premium over the last period (i.e. 1997–2007), eventually pricing the increased risk associated to surging OBS activities. Our results suggest that OBS activities are actually endogenous, a fact generally overlooked in previous studies on banks risk-return trade-off. To the best of our knowledge, Baele et al. (2007) is one of the rare studies considering explicitly the relation between OBS activities and the risk premium required to price the risk associated to these activities.¹¹ They find that a bank which is more oriented towards non-traditional banking activities has a higher market beta. Although our results are consistent with theirs, our approach is not. Baele et al. (2007) study is based on cross-section data, while ours adopts an ARCH-M approach to the study of time series comprising the whole Canadian banking system – i.e. aggregate data.

In this respect, the main contribution of this paper is to apply a new empirical framework to study the recent changes in the relationship between various measures of banks returns and the share of noninterest income. We analyze the emergence of a risk premium accounting for the riskiness of OBS activities with a model of banks returns estimated by ARCH-M (Engle et al., 1987), a novelty in this literature. From the standpoint of asset pricing theory, to consider risk-adjusted measures only is not completely satisfying when returns are not first-degree homogenous in volatility – precisely the case with banking data. Instead, the volatility should appear on the RHS of the returns equations, as it is usually the case in asset pricing. Running this kind of experiment reveals that banks started to price their OBS risk in 1997, when the net interest and noninterest revenues correlation changed sign. DeYoung and Roland (2001) conjecture that the surging volatility of banks revenues should eventually give rise to the incorporation of risk premia in various measures of banks accounting returns. However, they do not test this conjecture. To the best of our knowledge, the studies of Stiroh, 2006a, Baele et al., 2007 are the only one which examine, in a stock market context, the relation between the share of noninterest income and the risk premium required to price the risk associated to OBS activities. In Baele et al. (2007), a panel study of European banks, the authors find that beta, a systemic measure of market risk, increases with the share of noninterest income in banks accounting revenues.¹² Instead of using a market approach à la Baele et al. (2007), we consider the direct introduction of the returns conditional volatilities in banks returns equations to account for the higher volatility of noninterest income growth relative to the volatility of interest income.¹³ Doing so, we find that Canadian banks risk-return trade-off presents a structural break, which may be dated around 1997. In the second subperiod of our sample (1997–2007), the share of noninterest income no longer impacts negatively the various measures of banks returns we examine, as was previously the case. More importantly, as conjectured by DeYoung and Roland (2001) and confirmed by Stiroh (2006a) on US data, we indeed find that a risk premium emerges in the second subperiod (1997–2007) while in the first subperiod (1988–1996), the volatility variable is not significant in any returns equations. This evidence tends to support the idea that a major change in Canadian banking occurred regarding the riskiness of these institutions, but also that Canadian banks have adapted to the increased volatility of their operations.

This paper is organized as follows. In Section 2, we first describe the data and then present some stylized facts regarding the banking deregulation process and its associated impact on the banking business – i.e. the so called shadow banking. In Section 3, we go on with the pricing of the risk premia in banks returns. In this section, we also describe our ARCH-M methodology. We then discuss the empirical results and formulate some final remarks about the increased riskiness of banking before concluding.

Section snippets

The data

To test the three hypotheses of our study, we use aggregate data of the whole Canadian banking system. Data come from the Canadian Bankers Association and the Office of the Superintendent of Financial Institutions (Canada). For our sampling, we simply consider the eight major Canadian domestic banks. Indeed, taken together, these banks represent more than 90% of the Canadian banking business. All these banks are chartered banks, that is to say commercial banks regulated by the Canadian Bank...

Methodology and empirical results

Markets naturally adjust when confronted with increased risk. According to the stylized facts we just described, a structural break in banking business has actually taken place around 1997. In this section, our results confirm this idea, and date the break-even point around 1997. A Chow test is run to check for this structural break. In this respect, the aim of this study is to examine whether there is any sign of a change in the way banks run their businesses. The share of noninterest income...

Conclusion

Following deregulation, risk definitively increased in the Canadian banking system, because the volatility of noninterest income growth is much higher than the one of net interest income growth. Even if the adequate pricing for this increased risk was slow to materialize, it finally emerged around 1997, as financial institutions eventually adapted to the new situation. Previous studies on the subject (e.g. Stiroh, 2006a, Stiroh, 2006b, Calmès and Liu, 2009, De Jonghe, 2009) were somewhat...

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References (48)

K.J. Stiroh *et al.*

[The dark side of diversification: the case of US financial holding companies](#)

Journal of Banking and Finance (2006)

C. Pérignon *et al.*

[Do banks overstate their Value-at-Risk?](#)

Journal of Banking and Finance (2008)

L. Lepetit *et al.*

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Journal of Banking and Finance (2008)

L. Lepetit *et al.*

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Journal of Banking and Finance (2008)

J. Goddard *et al.*

The diversification and financial performance of US credit unions

Journal of Banking and Finance (2008)

R. DeYoung *et al.*

Product mix and earnings volatility at commercial banks: evidence from a degree of total leverage model

Journal of Financial Intermediation (2001)

C. Calmès *et al.*

Financial structure change and banking income: a Canada–US comparison

Journal of International Financial Markets, Institutions and Money (2009)

J.R. Brown *et al.*

Why has the investment cash-flow sensitivity declined so sharply? Rising R&D and equity market developments

Journal of Banking and Finance (2009)

L. Baele *et al.*

Does the stock market value bank diversification?

Journal of Banking and Finance (2007)

A. Agusman *et al.*

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Journal of Banking and Finance (2008)



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