Monetary Policy and the Risk-Taking Channel: Insights from the Lending Behaviour of Banks

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- The financial crisis of 2007–09 and the subsequent extended period of historically low real interest rates in a number of major advanced economies have revived the question of whether economic agents are willing to take on more risk when interest rates remain low for a prolonged time period.
- This type of induced behaviour—an increased appetite for risk that causes economic agents to search for investment assets and strategies that generate higher investment returns—has been called the risk-taking channel of monetary policy.
- Recent academic research on banks suggests that lending policies in times of low interest rates can be consistent with the existence of a risk-taking channel of monetary policy in Europe, South America, the United States and Canada. Specifically, studies find that the terms of loans to risky borrowers become less stringent in periods of low interest rates. This risk-taking channel may amplify the effects of traditional transmission mechanisms, resulting in the creation of excessive credit.

Most central banks conduct monetary policy by setting a target for a specific short-term interest rate. Changes to the short-term policy interest rate, all else being constant, induce changes to medium- and long-term interest rates, as well as to other financial indicators such as the exchange rate. These rates, in turn, affect economic activity by decreasing the cost of mortgages when the prime rate falls, by making it cheaper for firms to borrow when yields on corporate bonds go down or by increasing exports when the exchange rate depreciates. They can, therefore, ultimately lead to changes in economic activity, because they influence the spending and investment decisions of consumers and firms.[1]

The transmission of monetary policy to the broader economy takes place through several channels. The first, which can be considered the traditional channel, operates through both the overall level of interest rates and the exchange rate. This is because, on one hand, long-term rates depend on the average expected short-term interest rate, while, on the other hand, the expected change in the exchange rate (adjusted for foreign exchange risk) depends on the differential between domestic and foreign interest rates (Sarno and Taylor 2008, 18).

1 For a detailed description of the link between changes to the policy rate and economic activity, see Macklem (2002).

Additional channels through which policy rates affect firms that rely on bank financing are the balance-sheet channel and the bank-lending channel (Bernanke and Gertler 1995). Through the balance-sheet channel, shifts in the policy rate affect the financial position of borrowers. For example, all else being equal, accommodative monetary policy strengthens the balance sheets of firms because lower interest rates decrease the interest rate expenses on their short-term debt, which increases net cash flows and improves their financial positions. In addition, falling interest rates, typically associated with increasing asset prices, may improve the value of borrowers' collateral and hence access to bank loans.[2] Through the bank-lending channel, banks affect the spending and investment decisions of firms by shifting the supply of credit. For example, tight monetary policy drains reserves from the banking system, limiting the ability of banks to supply credit, all else being equal.[3]

The recent financial crisis has spurred a debate on whether an additional mechanism in the transmission of monetary policy—the risk-taking channel—affects the supply of credit (Rajan 2006; Borio and Zhu 2008; Boivin, Lane and Meh 2010). Through this mechanism, prolonged periods of low interest rates may induce banks to increase the supply of credit to riskier borrowers, resulting in an overall increase in the riskiness of bank loan portfolios.[4] The presence of the risk-taking channel implies that, because of an elevated appetite for risk in times of prolonged low interest rates, banks may increase their lending by more than they normally would through traditional transmission mechanisms. The effect of prolonged low interest rates, therefore, may be amplified because of an excessive tolerance of risk.[5]

◀ *Through the risk-taking channel, prolonged periods of low interest rates may induce banks to increase the supply of credit to riskier borrowers, resulting in an overall increase in the riskiness of bank loan portfolios*

In this article, we focus on the implications of the risk-taking channel for banks because the channel is often described in the context of bank lending behaviour, mainly owing to the systemic importance of banks.[6] We first discuss two ways in which the risk-taking channel operates: the search for yield and excessive expansion of bank balance sheets. We then review recent academic research that explores the risk-taking channel using microeconomic data. Finally, we review an empirical analysis of whether this channel functions in Canada.

2 Changes in interest rates will not affect all firms in the same way. The magnitude of the effect will vary depending on the nature of the business, the size of the firm and its sources of finance. When interest rates decrease, for example, cash-rich firms may be in a worse financial position because they will receive less interest income from investments.

3 A key assumption of the bank-lending channel is that banks cannot (easily) replace deposits with other sources of funding such as certificates of deposit and/or new equity issues.

4 Interest rates can be considered "low" relative to different benchmarks such as the average policy rate or the rates predicted by a specific monetary policy rule, e.g., the Taylor rule, which describes the short-term rate in response to evolving macroeconomic fundamentals (Taylor 2009). When studying the risk-taking channel, it is necessary to identify prolonged periods in which rates remain low. One way in which interest rates are defined as low in this article is that the policy rate is considered low relative to a certain benchmark. It is important to note that rates remain low for several consecutive quarters, which allows us to define environments of low or high interest rates. We use the terms "low interest rates" and "accommodative monetary policy" interchangeably to avoid repetition.

5 Gambacorta (2009) also investigates monetary policy and risk taking, but outside the Canadian context.

6 Carney (2010) outlines the implications of this risk-taking behaviour for the corporate sector and the household sector. A prolonged period of low interest rates could also affect insurance companies and pension funds, which usually have to meet nominal targets on their liabilities. In a low interest rate environment, lower returns on assets make payments on long-term liabilities more difficult to fulfill. Because of the obligation to meet nominal targets that are set in periods of higher interest rates, pension funds and insurance companies may invest in riskier assets rather than renegotiate or even default on their obligations.

The Risk-Taking Channel and the Behaviour of Banks

Understanding the effect of the risk-taking channel is important for policy-makers because it has implications for the transmission of monetary policy to the real economy and because it may also affect financial stability.

The risk-taking channel implies an increase in the risk tolerance of banks when interest rates remain persistently low. This behaviour can manifest itself as a change in a bank's portfolio composition from less-risky to more-risky assets, known as the "search for yield" (Rajan 2006). Asset and collateral values may also increase. Periods of low interest rates "could breed complacency, making us overconfident that good times are here to stay, and generate an excessive appetite for risk" (Boivin 2011). Economic agents such as banks may not adequately adjust their expectations about future interest rates, assuming instead that rates will remain low for an extended period. As a result, banks may originate an excessive amount of lower-quality credit because of softened lending standards. In addition, the loan rates of risky borrowers may decrease relative to the loan rates of less-risky borrowers, suggesting that the price of the former does not adequately reflect the cost of the risk.

◂ *During periods of low interest rates, banks may not adequately adjust their expectations about future interest rates, assuming instead that rates will remain low for an extended period*

Another indication of the risk-taking channel is the excessive expansion of banks' balance sheets through leverage. Adrian and Shin (2010) suggest that banks actively manage their leverage (the ratio of total assets to equity) in response to changes in asset values. They find that investment banks expand their balance sheets through collateralized borrowing (transactions in which securities are provided as collateral) during periods of accommodative monetary policy and reduce them when monetary policy is tight. Using Canadian bank data, Damar, Meh and Terajima (2010) find a strong positive correlation between asset growth and leverage.

The expansion of bank balance sheets (through collateralized borrowing) may lead to the buildup of financial imbalances, which are vulnerable to rapid unwinding if investors become risk averse. This can lead to reduced liquidity, declines in marked-to-market values and forced asset sales. A discussion of the policies to limit the buildup of financial imbalances resulting from low interest rates is beyond the scope of this article. For more information on these policies and on the costs and benefits of using monetary policy to counteract financial imbalances, see Boivin, Lane and Meh (2010) and Bank of Canada (2011).

Evidence of the Risk-Taking Channel of Monetary Policy

The academic literature on the risk-taking channel examines whether banks extend relatively larger loans to riskier borrowers during periods of low interest rates. In addition, these studies associate the risk-taking behaviour of banks with a smaller difference between the loan rates of risky and less-risky borrowers in times of lower interest rates compared with times of higher interest rates.

Finding evidence of the risk-taking channel of monetary policy is a challenging empirical task. The risk-taking channel is supply-driven and generated by a greater appetite for risk by banks (and other lenders) when interest rates remain low for long time periods, but low interest rates also affect the demand for investments and credit, the quality of the pool of borrowers, and the volume of credit supplied (Bernanke and Gertler 1995). Therefore, to identify this channel in the banking sector, the effect of credit demand must be disentangled from the effect of credit supply—driven by low interest rates—on bank lending and pricing policies.

Jiménez et al. (2008) use exhaustive loan-level data combined with bank and firm information from Spain's Central Credit Register for the 1988–2008 period to examine whether monetary policy in the European Union led to the origination of riskier individual bank loans in Spain. They investigate the frequency of successful bank loan applications by firms as well as the amount and maturity of loans granted when interest rates decrease. Several of their results are consistent with the risk-taking channel: lower-capitalized banks are less likely to end existing loans to risky firms than are higher-capitalized banks when the short-term interest rate is low. Furthermore, with a low short-term rate, lower-capitalized banks are more likely to originate loans to applicants with a weaker credit history. These loans are also larger and have longer maturities.

Ioannidou, Ongena and Peydró (2009) use Bolivia's credit register, which includes all loans from 1999 to 2003, to estimate the causal effect of a change in interest rates on bank lending behaviour. Since the Bolivian peso was pegged to the U.S. dollar during that period, changes in U.S. monetary policy would affect the Bolivian economy, but not vice versa. The authors' results suggest that banks are more likely to originate loans to riskier borrowers when the policy rate (in this case, the federal funds rate) is low. Importantly, the difference between the loan rates to risky and less-risky borrowers decreases as the policy rate remains relatively low, even after controlling for the effect of economic activity.

Using data on the syndicated loan market over the 1990–2010 period, Paligorova and Santos (2012) examine whether the stance of U.S. monetary policy is associated with increased risk-taking behaviour by U.S. banks.[7] Their analysis compares the differences in all-in-drawn spreads[8] and loan amounts for risky and less-risky borrowers originated by the same bank and/or by the same bank to the same firm across different monetary policy environments. To control for a large number of factors that typically affect bank lending policies, they use information along three dimensions: (i) bank characteristics (size, equity ratio, liquidity, profitability); (ii) characteristics of the loan contract (all-in-drawn spread, type, reason, maturity); and (iii) firm characteristics (probability of default, investment opportunities, profitability, size, leverage).

Their results show that loan prices and sizes exhibit patterns that are consistent with the risk-taking channel: the difference in the all-in-drawn spreads between the loans to risky and less-risky borrowers decreases when interest rates remain lower relative to when they are higher. At the same time, the loan amounts are higher to risky borrowers than to less-risky borrowers when interest rates are low. These estimated impacts on spreads and the sizes of loans are obtained after accounting for the effects of loan, bank and firm characteristics, and macroeconomic circumstances.

To reduce concerns that these findings are driven by shifts in credit demand and/or supply factors that are not directly related to bank risk taking, Paligorova and Santos (2012) use a specific measure of the risk tolerance of banks. This measure is based on the Federal Reserve's Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS), which collects qualitative information from senior officers about the willingness of banks to grant

7 Syndicated lending is an important source of financing. Sufi (2007) reports that syndicated loans comprise 15 per cent of average debt outstanding in U.S. non-financial corporations. This market grew from US$137 million in 1987 to over US$1 trillion in 2006.

8 The all-in-drawn spread is defined as the total (fees and interest) annual spread paid over the London Interbank Offered Rate for each dollar drawn down from the loan.

credit and their attitudes toward risk.[9] The authors find that the more risk-tolerant banks charge risky borrowers relatively less in times of low interest rates than in times of high interest rates. This result confirms that the lower differential between all-in-drawn spreads for risky and less-risky borrowers when interest rates are low versus when they are high is indeed associated with higher risk tolerance in banks, measured by qualitative data.

Research shows that the more risk-tolerant banks charge risky borrowers relatively less in times of low interest rates than in times of high interest rates

The Risk-Taking Channel and Canadian Banks

To explore the risk-taking channel in bank lending, it is necessary to have detailed information on three separate components—borrowers, banks and loans—available for different monetary policy environments. In Canada, the data source that meets the above criteria is from the syndicated loan market,[10] which is an important source of credit for large Canadian corporations.[11]

Using detailed data on syndicated loans for Canadian borrowers for the 1993–2010 period (from Thomson Reuters LPC), Paligorova and Santos (forthcoming) analyze all-in-drawn spreads of risky and less-risky borrowers across different monetary policy environments. The authors combine loan information with firm- and bank-level balance-sheet data to account for the effects of credit demand and credit supply.[12] They suggest that the risk-taking channel may be present in the syndicated loan market if the difference between the all-in-drawn spread for risky and less-risky firms is smaller in prolonged periods of low interest rates, compared with periods of higher interest rates.

The study uses linear regression analysis in which loan spreads depend on loan, firm and bank balance-sheet factors. The main estimate of interest is the relationship between firm risk and all-in-drawn spreads across different monetary policy environments.[13] Firm risk is defined using credit ratings: investment-grade firms are deemed to be "less risky," and non-investment-grade firms are considered "risky." The authors define a low

9 The survey questions are: "Over the past three months, how have your bank's credit standards for approving applications for [commercial and investment] loans or credit lines . . . to large and middle-market firms . . . changed?" and "If your bank has eased its credit standards or its terms for [commercial and investment] loans . . ., how important [has] been . . . increased tolerance for risk?" Aggregated quarterly information from the SLOOS is publicly available at <http://www.federalreserve.gov/boarddocs/SnLoanSurvey/>. Paligorova and Santos (2012) rely on bank-specific answers, which are confidential.

10 Syndicated loans have several distinct features. They are shared among multiple lenders that are liable as underwriters up to a specified portion of the total deal value of the loan. Syndicated loans can be either secured or unsecured, but holders of syndicated loans are always senior to all other creditors. Thus, the holders of syndicated loans must be repaid in full before the claims of junior debt holders. Syndicated loans are floating-rate instruments that make use of a reference rate (such as the London Interbank Offered Rate, the Canadian Dealer Offered Rate or the prime rate of a specified bank) to which a specified interest rate spread is added.

11 The total amount of newly issued syndicated loans in 2000 was $82 billion; in 2007, it reached an annual peak value of $192.4 billion, and then decreased to $93.7 billion in 2009. Over the 1993–2010 sample period, the mean and median values of the all-in-drawn spread (which is a measure of the cost of loans) were 235 and 225 basis points, respectively, above the London Interbank Offered Rate. The loan size ranged from $19 million (10th percentile) to $1.7 billion (95th percentile), with a median size of $130 million. (All figures in Canadian dollars.)

12 Data on quarterly sales, leverage, tangible assets, market-to-book values and the profitability of public firms, all of which are known to affect rate spreads, are from Compustat. Bank-level information, such as assets, deposit-to-asset ratios, capital ratios and bank profitability, is from data collected by the Office of the Superintendent of Financial Institutions Canada.

13 In one part of the analysis, the authors examine only those firms that take multiple loans from the same bank over different monetary policy environments. This analysis of risk taking for the same pool of borrowers over different monetary policy environments is important because it has been shown that, depending on the macroeconomic environment, the pool of borrowers may change substantially and affect the overall price and quantity of credit.

interest rate environment in three different ways: (i) if the overnight target (policy) rate is lower than a certain benchmark such as the median interest rate over a sample period; (ii) if the policy rate is lower than the rate in the previous announcement date;[14] and (iii) if the policy rate is lower than the rate predicted by the Taylor rule.

The results suggest that the difference in the all-in-drawn spreads between loans to risky and less-risky borrowers decreases when interest rates are low relative to periods when they are high. Accounting for loan, firm and bank balance-sheet factors, as well as yearly and quarterly factors, the results show that the difference in the all-in-drawn spread between risky and less-risky borrowers is 48 per cent smaller when interest rates are lower than when they are higher (based on the first definition). This result is also economically significant: it implies that the difference in loan rates between risky and less-risky borrowers is 107 basis points smaller when the rates are low than when they are high.

This study is subject to several caveats. The main one is that a bank's risk tolerance is unobservable. Hence, drawing conclusions about the bank risk-taking channel based on the effects on loan prices of changes to the balance sheets of both banks and firms should, at best, be interpreted as evidence that is consistent with (or suggestive of) the existence of the risk-taking channel. It is possible that loan rates are subject to demand and supply effects that are not directly related to the risk-taking channel and are not fully controlled for by other variables included in the model. One way to address this issue is to measure the risk appetite of banks using qualitative information gathered from survey questions that ask banks whether they have become more risk tolerant in a particular period. Unfortunately, such detailed bank-specific information based on survey data is not available for Canada.[15]

This empirical exercise for the Canadian syndicated loan market nevertheless confirms, in accordance with international evidence from Europe, South America and the United States, that a greater appetite for risk may be a contributing factor to the observation that bank loans to risky borrowers become relatively cheaper when interest rates remain low for a prolonged period. This behaviour seems to exist across countries with different economic and institutional environments. These findings can be viewed as a first step toward a more detailed exploration of how and whether changes in the sizes and rates of loans resulting from an increased appetite for risk affect the real economy.

◂ *A greater appetite for risk may be a contributing factor to the observation that bank loans to risky borrowers become relatively cheaper when interest rates remain low for a prolonged period*

Conclusion

The possibility that a low interest rate environment (and low volatility) for a prolonged period of time was one of several factors that contributed to the recent financial crisis has led to an ongoing debate among policy-makers, practitioners and academics on the effects of monetary policy on the risk-taking incentives of economic agents.

14 The authors find that, according to the first definition, 39 per cent of all loan facilities are originated in a low interest rate environment and that, according to the second definition, 47 per cent of all loans are originated in a low interest rate environment. Under both definitions, there are prolonged periods in which rates remain low (defined either relative to the median, as in definition (i), or relative to the previous period, as in definition (ii)) and it is not possible for rates to be low for one quarter and high in the next quarter. The shortest time span in the sample in which rates are low is four consecutive quarters.

15 The Bank of Canada's *Senior Loan Officer Survey* collects information on the business-lending practices of Canadian financial institutions. In particular, the survey gathers the perspectives of respondents on price and non-price terms of business lending and on topical issues of interest to the Bank of Canada. It does not provide disaggregated results at the bank level.

An improved understanding of the risk-taking channel of the monetary policy transmission mechanism is needed for the following reasons. First, it may have an amplifying effect in the balance-sheet channel and the bank-lending channel, which needs to be accounted for in order to evaluate the effect of accommodative monetary policy. Second, prolonged periods of low interest rates, unless coupled with adequate prudential regulation at both the micro and macro levels, can contribute to softer bank lending policies and/or the buildup of financial imbalances resulting from a greater appetite for risk. Central banks have endorsed enhanced supervision of risk-taking activities at the institutional level and the development of macroprudential measures as main lines of defence against the buildup of such financial imbalances.

Finding evidence of an increase in appetite for risk based on the change in spreads and amounts of loans to risky and less-risky borrowers is a challenging empirical task, because these changes may be derived from factors other than risk appetite. Thus, research results in which risk appetite is inferred based on changes in the price and amount of credit have to be interpreted with caution. Research has nevertheless made progress in this area by documenting that this channel can operate in the commercial loan markets in several countries, including Canada. It is worth noting that none of the studies discussed asserts that risk taking is excessive, since they do not rely on an optimal risk-taking benchmark to gauge the extent of excessiveness. Rather, these studies offer empirical evidence that is consistent with elevated risk-taking behaviour in lending policies when interest rates remain low for a prolonged period of time.

To further understand the aggregate economic impact of this channel, it is important to examine whether a greater risk appetite in response to low interest rates is present outside the banking sector. Insurance companies, pension funds and mutual funds may also exhibit an increased appetite for risk when interest rates are low. Further research is needed to determine whether different economic agents are inclined to have a stronger appetite for risk when rates remain low for a prolonged period.

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