

# Bank lending, credit shocks, and the transmission of Canadian monetary policy

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Received 25 August 2005; received in revised form 15 May 2006; accepted 19 June 2006

Available online 1 September 2006

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## Abstract

This paper uses a sticky-price dynamic general-equilibrium model to study the role of bank lending as a transmission mechanism of monetary policy shocks and to assess real effects of exogenous credit shocks under alternative monetary policy Taylor-type rules. Financial frictions, which are modeled as spreads between deposit and loan interest rates, depend on economic activity as well as on exogenous credit shocks. A general finding is that, even though almost all of the real effects of a monetary policy shock come from the price rigidity, imperfections in credit markets are responsible for their significant amplification. Nevertheless, if the central bank follows a forward-looking inflation targeting rule, bank lending is responsible for transmission of monetary policy shocks even though prices are flexible. Moreover, exogenous credit shocks account for substantial fractions of output, inflation, and nominal interest rates fluctuations in the short and medium terms.

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*JEL classification:* E32; E4; E51

*Keywords:* Bank lending channel; Credit shocks; Monetary policy rules

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## 1. Introduction

In the literature, it is argued that bank lending (the credit channel) may play an important role in the amplification and propagation of monetary policy shocks to real variables (see [Bermanke & Gertler, 1994](#)). Banks, by their very nature, are well suited to deal with certain types of borrowers, especially small firms where the problems of asymmetric information can be especially pronounced. According to the bank lending view, monetary policy affects the balance sheet of the banks. For example, an increase in interest rates by the monetary authority implies that banks will have to pay more in the overnight loan market. The rise in the overnight rate in turn leads to adjustments in interest rates and a decrease in the supply of bank credit, as banks shift out of risky loans and into safer assets. Tight monetary policy also leads to a fall in bank deposits. The fall in bank deposits will result in a further fall of bank lending and consequently a

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fall in investment and output. Ultimately, prices will fall. Declines in bank lending induced by a monetary contraction should also cause a decline in household expenditure on durables and housing. This is because increases in interest rates lead to deterioration in household balance sheets because of the fall in their cash flow.

For bank lending to play an important role in the transmission of monetary policy, *Kashyap and Stein (1995a)* argue that three conditions have to be met. First, nominal rigidity has to be present in the economy. Second, a proportion of firms must depend on banks for their external financial needs. Third, the monetary authority must be able to influence the supply of loans by private banks. Empirical work conducted with U.S. data find support for the bank lending channel of the transmission mechanism (*Bernanke & Blinder, 1992; Fazzari, Hubbard, & Petersen, 1988; Kashyap & Stein, 1995b, 2000*). Recently, *Altunbas, Fazylov, and Molyneux (2002)* and *Kakes and Sturm (2002)* find strong evidence of the bank lending channel in Europe. Results in the two papers indicate that smaller banks in Europe are more negatively impacted upon by contractionary monetary policy than large banks.<sup>2</sup> *Mojon, Smets, and Vermeulen (2002)* use balance sheets of a number of European firms to analyze the effects of monetary policy changes on firms' investment. They find that a change in the user cost of capital, which is influenced by interest rates movements, has both statistically and economically significant effects on investment. Furthermore, while they observe that the average interest rate on debt is generally higher for small firms than for large firms, their results show weak evidence that the effects of monetary policy on small firms are larger than those on larger firms.<sup>3</sup>

Based on *Dib (2006)* that estimates a sticky-price dynamic, stochastic general-equilibrium (DSGE) model for Canada, we develop and simulate a DSGE model that considers price stickiness as well as some form of financial frictions. The main focus of the paper is to examine how the credit channel allows the central bank's policy actions to affect the economic activities and to assess the importance of the real effects of exogenous credit shocks. Even though Canada is a small open economy, using a closed economy framework is still justified. Applying Canadian data, *Dib (2003b)* estimates and simulates small open and closed economies DSGE models and finds no remarkable difference between the models on the effects of monetary policy shocks.<sup>4</sup> Note also that the Canadian banking system is dominated by six large banks that supply more than 80% of loans to households and firms. This allows us to assume that the credit is entirely supplied by Canadian banks. On the other hand, Canada has adopted a flexible exchange rate regime since the beginning of 1970s, which has largely reduced the impact of foreign shocks on the Canadian economy.<sup>5</sup>

The model used in this paper includes four exogenous sources of disturbance: technology, monetary policy, money demand, and credit shocks. Nominal and financial frictions are also introduced to allow the monetary authority to affect the behavior of real variables in the short term. Nominal rigidity is introduced through a quadratic price-adjustment cost function, while financial frictions are modeled as spreads between deposit and loan interest rates and assumed to depend on the state of the economy as well as on exogenous credit shocks. The central bank is assumed to follow three alternative monetary policy rules: (1) a modified Taylor-type rule that adjusts the short-term nominal interest rate in response to deviations of inflation, output, and money growth from their steady-state values; (2) a strict inflation targeting rule; and (3) a forward-looking Taylor rule in which the central bank reacts to expected inflation as well as to output and money growth.

Unlike limited participation models, the intermediate-goods-producing firms cover their expenditure on intermediate inputs by bank loans rather than retained earnings. Thus, one key feature of the model is an input–output production structure as in *Basu (1995)*.<sup>6</sup> This assumption allows us to introduce money in the economy using the money-in-utility-function specification, rather than a cash-in-advance constraint, and to derive a standard money demand function that depends on consumption and the net interest rate. The fraction of total deposits lent out to the intermediate-goods-producing firms is partly endogenous and depends on the state of the economy. The remaining portion of deposits is held as reserves that earn no return. The elasticity of willingness of financial intermediaries to lend is empirically estimated and found to be procyclical.

<sup>2</sup> The findings of *Kakes and Sturm (2002)* suggest that small German banks are very sensitive to monetary policy shocks, while larger banks are able to neutralize the shocks.

<sup>3</sup> Furthermore, *Chrystal and Mizen (2002)*, with the help of an econometric model, provide a framework to analyze the balance sheets and financial flows between different sectors of the UK economy. The main result of *Chrystal and Mizen (2002)* is that credit is an important element in the transmission of monetary policy in the United Kingdom.

<sup>4</sup> *Dib (2003a)* estimates a closed economy for Canada to examine the real effects of monetary policy shocks in a model with nominal and real rigidities. Also, *Meh and Moran (2004)* use a closed economy model for Canada to examine the role of bank capital and financial frictions in the transmission of monetary policy shocks.

<sup>5</sup> Furthermore, *Bailliu and Fujii (2004)* find an empirical evidence of low exchange rate pass-through in Canada since the mid-1980s.

<sup>6</sup> See *Basu (1995)* and *Huang, Liu, and Phaneuf (2004)* for more explanation about the advantages of an input–output production structure.

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