

Annex 3.1

Macroeconomic Effects of Tighter Capital Requirements in Canada: A Non-Technical Summary of the Insights from the Christensen, Meh, and Moran Model of Bank Capital

Introduction

This note summarizes the macroeconomic impacts of tighter capital requirements on Canadian output that are examined in the Christensen, Meh, and Moran (2010) model of bank capital, which is based on Meh and Moran (2010).

Model

In the macroeconomic model, the condition of banks' balance sheets is determined endogenously and has important economic implications. The key innovation of this model is in capturing the role of bank capital in the amplification and propagation of shocks. The macroeconomic model incorporates several nominal and real frictions, in the spirit of state-of-the-art New Keynesian models.

At the heart of the model is an optimal configuration of financial contracts under asymmetric information, building on the seminal works of Holmstrom and Tirole (1997) and Stiglitz and Weiss (1984). Banks intermediate funds between dispersed investors/depositors, who are the ultimate lenders, and firms, who are the ultimate borrowers and producers of the capital goods. A key function of banks is to monitor and screen firms on behalf of dispersed investors/depositors and mitigate information asymmetries. The intermediation process is complicated by two sources of moral hazard. The first affects the relationship between banks and firms, and arises because firms may not exert an optimal level of effort, since effort is costly and not publicly observable. To mitigate this problem, banks can monitor the behaviour of firms and require that they invest their own funds in projects.

The second source of moral hazard pertains to the relationship between banks and investors, and stems from the fact that banks (to which dispersed investors delegate the monitoring of firms) may not monitor with optimal intensity, since monitoring is costly and not publicly observable. In response, investors will provide loanable funds only to banks that are well capitalized. All things being equal, a higher level of bank capital lessens the moral hazard problem between banks and investors and increases the ability of banks to attract loanable funds.

In the model, banks hold bank capital both to mitigate these agency problems and to satisfy a regulatory capital requirement. Raising new bank capital is costly, however, and this implies that in the short run, bank capital is determined primarily by retained earnings. In the model, the overall effects of higher capital requirement depend on the relative amount of bank capital and on the net worth of firms.

Analysis

The policy experiment consists of raising the bank capital requirement by 1 percentage point. The effects of capital regulation on the macroeconomy depend critically on how fast the stronger capital standard is implemented (the implementation period). To develop intuition for the economic effects of the policy change, it is useful to analyze what would happen in our model when the full effect of the tightening is assumed to be implemented immediately. We consider two cases. In the first case, the policy change requires that banks use more of their own capital per unit of loan, starting immediately. But bank capital is accumulated gradually in our model, through a bank's retained earnings, and therefore cannot respond rapidly to the new regulatory requirement with new capital. The only adjustment possible in the short run to meet the new standard on capital-to-loan ratios is therefore to decrease bank lending significantly. However, decreased bank lending leads to lower bank earnings, and thus to lower bank capital in future periods, which makes it even more difficult in future periods to meet the new, tougher requirements. There is thus a feedback effect that tends to amplify and prolong the negative effect of higher capital on the real economy.

In the second case, the first effect—initial decreases in bank lending leading to further decreases in future periods—is counterbalanced by significant rises in bank monitoring or screening intensity, which have a positive effect on bank earnings because banks are compensated by the contract with higher lending rates for the increased monitoring costs they entail.

When the regulatory requirement is implemented immediately, the first effect is very strong and, as a result, bank lending, aggregate investment, and overall economic activity initially decrease markedly and only gradually recover to reach the new steady state. When the implementation is longer, the bank has more flexibility to meet the new requirement by building retained earnings and hence accumulate bank capital. Thus, the longer the phase-in period, the lower the adverse effects of stringent capital requirements on the real economy and the more likely the second effect described above dominates.

Results

Our first finding is that, overall, a stronger capital standard has a modest negative effect on the Canadian economy. Specifically, we find that when the implementation period is four years, a 1 percentage point rise in the capital ratio leads to a decrease in GDP of about 0.14 per cent below the initial steady-state level in the eighth quarter, and to a drop of 0.10 per cent in the 32nd quarter. The maximum drop in output is 0.32 per cent, and this occurs in the 17th quarter.

Our second finding is that the negative effects of tighter capital requirements on GDP are quantitatively large when the implementation period is short. For example, for the 2-year phase-in period, aggregate output falls by 0.38 per cent below the initial steady state in the eighth quarter, whereas the decrease in output is 0.14 per cent when the implementation period is four years. For the 2-year phase-in period, the fall in output in the eighth quarter is almost three times higher than that in the 4-year implementation period.

References

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