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Real interest rates, leverage, and bank risk-taking ☆

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Abstract

Do low interest rate environments lead to greater bank risk-taking? We show that, when banks can adjust their capital structures, reductions in real interest rates lead to greater leverage and higher risk for any downward sloping loan demand function. However, if the capital structure is fixed, the effect depends on the degree of leverage: following a decrease in interest rates, well capitalized banks increase risk, while highly levered banks may decrease it if loan demand is linear or concave. Further, the capitalization cutoff depends on the degree of bank competition. This effect therefore should vary across countries and over time.

JEL classification: E44; E58; G21

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1. Introduction

The recent global financial crisis has brought the relationship between interest rates and bank risk taking to the forefront of the economic policy debate. Many observers have blamed the low interest rate environment in the middle part of the recent decade for the credit boom and the ensuing crisis in the late 2000s. In the run up to the crisis, they argue, low interest rates and abundant liquidity led financial intermediaries to take excessive risks by fueling asset prices and promoting leverage. One contributing factor that has been much discussed relates to the role of loose monetary policy: the argument is that had monetary authorities raised interest rates earlier and more aggressively, the consequences of the bust would have been much less severe. More recently, a related debate has been raging on whether continued exceptionally low interest rates are setting the stage for the next financial crisis.[1]

These arguments have become increasingly popular in both academia and the business press. Surprisingly, however, the theoretical foundations for these claims have not been much studied and hence are not well understood. Macroeconomic models have typically focused on the quantity rather than the quality of credit (e.g., the literature on the bank lending channel) and have mostly abstracted from the notion of risk. Papers that consider risk (e.g., financial accelerator models in the spirit of Bernanke and Gertler [12]) explore primarily how changes in interest rates affects the riskiness of borrowers rather than the risk attitude of the banking system.[2] In contrast, excessive risk-taking by financial intermediaries operating under limited liability and asymmetric information has been the focus of a large banking literature which, however, has largely ignored the role of real interest rates and its determinants, such as monetary policy.[3] This paper is an attempt to fill this gap.

We develop a model of financial intermediation where banks can engage in costly monitoring to reduce the credit risk in their loan portfolios. Monitoring effort and the pricing (i.e., interest rates) of bank assets and liabilities – debt and equity – are endogenously determined and, in equilibrium, depend on a reference (or risk-free) real interest rate. We start by studying the case where banks' capital structure is endogenously determined by allowing banks to adjust their capital structure in response to changes in risk-free rates. We obtain two main findings. First, a reduction in risk-free interest rates leads banks to increase their leverage. Reflecting this increase in leverage, our second main finding is that a drop in risk-free rates will unambiguously lower bank monitoring and increase risk taking. We then consider the case where a bank's capital structure is fixed exogenously and find that, in contrast to the case where capital is optimally chosen, the effects of changes in the risk-free interest rate on bank monitoring and, hence, portfolio risk critically depend on a bank's leverage. Specifically, a reduction in the risk-free rate leads highly capitalized banks to monitor less, while the opposite is true for poorly capitalized banks when loan demand is linear.

Our model is based on two standard assumptions. First, banks are protected by limited liability and choose the degree to which to monitor their borrowers or, equivalently, choose the riskiness of their portfolios. Since monitoring effort is not observable, a bank's capital structure can affect its risk-taking behavior. Second, the cost of a bank's liabilities is affected by changes in the risk

[1] See, for example, Rajan [43], Taylor [47], or Borio and Zhu [17].

[2] Angeloni and Faia [10] is a recent attempt to introduce bank risk in a New Keynesian macro framework.

[3] Diamond and Rajan [27] and Farhi and Tirole [29] are recent exceptions, although these deal with the effects of expectations of a "macro" bailout rather than the implications of the monetary stance. Reviews of the older literature are in Boot and Greenbaum [16], Bhattacharya, Boot, and Thakor [14], Carletti [21].