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Bank capital management: International evidence ☆

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ABSTRACT

We examine the dynamic behavior of bank capital using a global sample of 64 countries during the 1994–2010 period. Banks achieve deleveraging primarily through equity growth (rather than asset liquidation). In contrast, they achieve leveraging through reduced earnings retention and substantial asset expansion. The speed of capital structure adjustment is heterogeneous across countries. Banks make faster capital structure adjustments in countries with more stringent capital requirements, better supervisory monitoring, more developed capital markets, and high inflation. In times of crises, banks adjust their capital structure significantly more quickly.

1. Introduction

Theoretical research on bank capital has primarily focused on the existence and determinants of optimal bank capital ratios (see, e.g., Orgler and Taggart, 1983; Myers and Rajan, 1998; Diamond

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and Rajan, 2000; Allen et al., 2011). An increasing body of empirical research provides support for the existence of an optimal capital structure (e.g., Marcus, 1983; Flannery and Rangan, 2008; Schaeck and Cihak, 2012). However, shocks to the actual and optimal capital ratios may create a wedge between the two. In this paper, we investigate, in a global context, an important aspect of bank capital management, i.e. the adjustment process to target capital. In particular, we provide answers to the following three questions. If banks' observed capital ratio deviates from their optimal or target capital ratio, which adjustments do they make to achieve those targets? Is the speed of adjustment to the target capital ratio homogeneous across countries? What affects the speed at which banks (de)leverage? These questions remain largely unanswered in the academic literature on bank capital, though they are of major importance for understanding adjustment costs, stress tests, the dynamic unwinding of financial crises, and the feedback loops between the financial sector and the real economy.

To address these questions, we model bank capital ratios using a partial adjustment framework with bank-specific and time-varying targets and heterogeneous adjustment to the target. Our empirical setup and rich international sample yield novel results for the capital structure and banking literature streams and offer new insights into an optimal regulatory design. Our contribution is twofold.

The first contribution of this study is an assessment of the balance sheet transactions banks rely on when they need to alter their capital ratio to reach the target level. We decompose the growth of equity, assets, and liabilities into their constituents and explore the underlying drivers. On the one hand, banks that need to reduce their leverage[1] primarily raise equity (either through share sales or retained earnings), rather than by curtailing asset growth. While asset growth is lower for under-capitalized banks, it is still positive. This phenomenon is perhaps surprising because it is generally thought that undercapitalized banks confront large costs of raising equity. Furthermore, in sample splits based on bank size, we find that smaller institutions are more prone to rely on fire sales for de-levering. On the other hand, banks that are above their target capital ratio lever up by expanding assets rather than by reducing capital. For such banks, the growth in reserves and retained earnings is slower. At the same time, assets grow substantially faster. The results of these analyses shed more light on the ongoing debate of whether and how firms and banks manage their capital structure.

Previous work primarily focuses on the impact of the bank's environment on its optimal capital ratio (in limited samples). In line with Shrieves and Dahl (1992) and the corporate finance literature, the modeling approach often allows for partial adjustment to these equilibrium target ratios. However, most studies assume that the speed of adjustment is uniform across all banks.[2] Our second contribution is to relax the homogeneity assumption in the speed of adjustment. We document a substantial amount of cross-country heterogeneity in bank adjustment speeds across the globe. The average speed of adjustment in the overall sample is 0.29. This indicates that each year, the typical bank closes about a third of the gap between its actual and its desired capital ratio. Put differently, it takes on average two years for a typical bank to close half the gap between its actual and target capital ratio.[3] The cross-country standard deviation in the speed of adjustment is 0.15, implying a half-life of 4.26 years for sluggish adjusters (i.e., banks whose speed of adjustment is one standard deviation below the sample mean) and a half-life of 1.15 years for flexible adjusters.

We investigate how cross-country variations in the macroeconomic and regulatory environment affect the speed at which banks converge to their target capital ratios. The speed at which banks reverse the deviations from their target capital ratio should vary with the cost and benefits of adjusting the leverage. We show that adjustment speeds plausibly vary with factors affecting the costs of external financing, bank financial flexibility, and the costs of financial distress. More specifically, we find that banks operating in countries with stricter capital requirements and multiple supervisors adjust more quickly. These findings suggest that stricter capital requirements reduce agency conflicts between equity holders and debt holders, whereas better supervision mitigates information asymmetries among financial agents, resulting in lower external financing costs. Similarly, more developed

[1] We use the terms "leverage" and "bank capital" interchangeably to refer to the equity-to-asset ratio.

[2] The few banking studies that allow for heterogeneous adjustment predominantly focus on a single country and examine whether undercapitalized banks exhibit faster adjustment (e.g., Berger et al., 2008; Memmel and Raupach, 2010).

[3] The half-life, i.e. the time it takes to close half of the gap between the current value and the target, is an often used concept in partial adjustment models. It is computed as $\log(0.5)/\log(1 - \text{speed of adjustment})$.