A DYNAMIC MODEL OF BANK VALUATION

Georgios Bertsatos, Plutarchos Sakellaris

May 2016

H i g h l i g h t s

- We model the Price-to-Book ratio of bank equity in terms of fundamental variables.
- Deviations from long-run equilibrium indicate equity over- or undervaluation.
- We examine a panel of large and systemic US bank holding companies (BHCs).
- Equity valuation for these BHCs has a stable long-run relationship to fundamentals.
- There are substantial and persistent deviations of market from fundamental value.

We develop a dynamic model of equity valuation for banks. This model establishes the long-run equilibrium price-to-book (PB) ratio of equity in relationship to fundamental variables such as the cost of equity (COE), the expected growth of net income (NI) and the modified dividend payout ratio (DPR). The model is dynamic in that it allows short-run deviations of the PB ratio from its long-run fundamental value. Deviations of actual from fundamental long-run valuation indicate whether any particular common stock is under- or overvalued, relative to its long-run equilibrium valuation. As it is derived from a generalized dividend discount model (DDM) of stock valuation we call it the Dynamic Dividend Discount Model or 3DM. The model uses the pooled mean group (PMG) method of dynamic heterogeneous panels estimation proposed by Pesaran et al. (1999) in order to estimate the long run equilibrium relationship, provided that it exists, as well as the dynamic behavior of the PB ratio.

Valuation models calculate the firm/equity value or a financial ratio, such as PB, either with single formulas (e.g. discounted cash flow models) or with an econometrically estimated equation. Our model, 3DM, belongs to the second category, which includes static valuation models (for recent examples see Jordan et al., 2011, and Calomiris and Nissim, 2014) as well as dynamic valuation models that assume or imply cointegration (e.g. Campbell and Shiller, 1989, Vuolteenaho, 2002, and Jiang and Lee, 2007). Our key contribution is to provide a novel model of PB ratios that is structural, fully dynamic, specific to banks, and allows for temporary divergences of market PB ratios from long-run equilibrium values.

We apply this model to the stock market valuation of large and systemic US bank holding companies (BHCs) over a decade encompassing the financial crisis. These BHCs participated in a series of capital assessment exercises and stress tests conducted by US federal regulators starting in 2008. We establish a dynamic relationship between the PB ratio of equity and the cost of equity, expected growth of net income and modified dividend payout ratio. The fundamental value of the PB ratio implied by this long-run relationship tracks market movements quite well.

In our sample of 25 BHCs, we find large heterogeneity in the degree to which PB ratios are temporarily above or below their long-run equilibrium valuation. These divergences are persistent. A year after a shock almost 29.5% of the initial disequilibrium still remains. Our model is agnostic about the reasons for the existence of deviations of stock market valuation from a long-run equilibrium value. Williams (2013) contains a review of economic models that attempt to explain such deviations.

The full article can be found here.