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Equity market information, bank holding company risk, and market discipline ☆

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Abstract

For market discipline to be effective, market factors such as changes in firm equity and debt values and returns, must influence firm decision making. In banking, this can occur directly via bank management or indirectly though supervisory examinations and oversight influencing bank management. In this study, we investigate whether equity market variables can provide timely information and add value to accounting models that predict changes in bank holding company (BOPEC) risk ratings over the 1988–2000 period. Using a variety of equity market indicators, the findings suggest that one-quarter lagged market data adds forecast value to lagged financial statement data and prior supervisory information in the logistic regressions. Furthermore, using extensive out-of-sample testing for the years 2001–2003, we find: (1) that multiple models estimated over different phases of the business and banking cycles are superior to a single model for forecasting BOPEC rating changes; (2) that equity data adds economically significant power in forecasting BOPEC rating upgrades and performs well for identifying no changes; (3) that for downgrades, the accounting model forecasts the best; (4) that modeling the three possible risk ratings categories simultaneously (downgrade, no change and upgrade) minimizes both Type I and Type II classification errors; and (5) that using multiple models to forecast risk ratings enhances the overall percentage of correct classifications.

JEL classification: G21; G28

Keywords: Market discipline; Market information; Bank holding company risk; Off-site monitoring models

1. Introduction

In recent years bank supervisors have more intensely focused on using market information to enhance the process of identifying risk in banking organizations. This focus has been prompted in part by the rapid growth in the number of large organizations whose portfolios, and occasionally global operations, have become increasingly complex in scope and opacity to supervisors and financial markets. Because of these changes, these institutions are more able to cause a systemic event with possibly catastrophic market effects. Yet another impetus is in recent research suggesting that bank supervision can benefit from using information embedded in the financial market valuation of banking organizations' debt and equity securities (Flannery, 1998, 2001).[1] Therefore, bank supervisors are searching for market-based risk assessments that can provide more timely

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[1] Other studies that focus on the equity market valuations of banking organization risk include Krainer and Lopez (2004, 2003), Curry et al. (2003a), Cannata and Quagliariello (2005), Gunther et al. (2001) and Berger et al. (2000). The literature generally shows that equity market data adds value to accounting models in the identification of banking company risk on an in-sample basis but only marginally out-of-sample.

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insights into the changing risk profiles of banking firms than quarterly accounting based information.[2] As a consequence, for banking firms that have publicly traded securities, supervisors actively monitor changes in equity prices, returns, bond and credit derivative spreads, and other types of market information. On the international front, using the signaling features of markets has become an integral part of the new comprehensive Basel II capital regulations.[3]

This paper explores the notion that equity market information can improve bank supervision by adding value to accounting based models in forecasting bank holding company (BOPEC) risk ratings.[4] Furthermore, the paper sheds light on a second issue – that of market efficiency. If the information content of market data adds value to the prediction of supervisory risk ratings, then this supports the view that markets are operating in an efficient manner by anticipating changes in banking company risk and validated by onsite examinations. Positive findings in this area will suggest that markets can provide useful information to bank supervisors and become a channel for market discipline to be effective in restraining risky behaviors of institutions.

In understanding the channels by which firms' past market information translates into forecasts of risk ratings, we consider three possible avenues. First, markets have vast resources with numerous investors and analysts having access to both public and private information about firm risk – some of which drifts out through the grapevine. If markets are efficient, this knowledge ultimately leads to changing equity market valuations reflecting market attitudes and expectations of bank risks and profitability. A second channel is through bank supervision which may incorporate public market assessments of changing risk patterns into the supervisory risk rating process (Burton and Seale, 2005). A third way is through corporate governance and the disciplining effects of markets. Management and boards of directors may respond to adverse market assessments of company performance and choose less risky strategies. Any changes in bank risk structures are validated during supervisory examinations and oversight and reflected in BOPEC risk ratings. However, it must be demonstrated that bank level financial market information reasonably improves forecasts of changes in risk rankings as measured by exams ratings before any conclusions can be drawn.

This paper advances the literature on several fronts. First, our models use a larger number and greater variety of equity variables than previous research, which usually rely on traditional measures of market price and market returns. We include variables such as scaled price volatility, excess returns, return volatility, market-to-book valuation, and trading volume. Second, in order to better account for cyclical shifts in economic conditions and banking specific cyclical factors, we examine three very distinct economic and banking eras: recession and banking crisis (1988–1992), recovery (1993–1995), and expansion (1996–2000). We analyze each period separately to determine how market data contribute to rating forecast models over these cycles, and test if estimating separate models for each of these diverse periods is more robust than a single model estimated over the entire period (1988–2000). The single model approach used in earlier work was rejected because it ignores possible complex shifts in the estimated parameters at different phases in the business and banking cycles. We verify this by testing the models for parameter shifts and find that they are significantly different among the periods, thus rejecting the notion that a single model estimated over the entire period is superior.

Third, we use an ordered logistic model which accounts for all risk rating options available to bank supervisors, including upgrades, downgrades, and no rating changes. By simultaneously modeling the dominant rating event of no change, we overcome the limitations of earlier work where the primary focus was on predicting either rating downgrades, upgrades or the levels of BOPEC ratings. Our more logical approach reduces misclassifications of upgrades as downgrades and vice versa. Finally, we evaluate the predictive power of the estimated models by using extensive out-of-sample forecasts over the 2001–2003 period and find, in contrast to the previous literature, an economically important role for equity market data to more accurately forecast BOPEC rating changes.

The empirical results show that one-quarter lags of equity market data in BOPEC prediction models make a statistically significant contribution to the overall fit of the model regardless of the period of estimation. Moreover, out-of-sample tests reveal that equity market data substantially improve the ability of the models to forecast upgrades and are at least as good in forecasting downgrades as the of financial accounting data. We find that the models using only equity market information yield economically better forecasts of upgrades in the out-of-sample testing for nearly all periods studied. These tests suggest that the use of multiple models – including those with only accounting data, only equity market variables, or some combination may be superior in forecasting BOPEC upgrades and downgrade ratings changes than the use of a single model. We conclude that equity market variables, of the type and variety used in this study, should be an integral part of off-site bank holding company (BHC) surveillance models

[2] See the proceedings of a conference on using an interpreting market data in bank supervision at the Federal Reserve Bank of Cleveland, March 26, 2004.

[3] See Bank for International Settlements (2001).

[4] BOPEC stands for *B*anking subsidiaries; *O*ther nonbanking subsidiaries; *P*arent company; consolidated *E* arnings; and consolidated *C*apital. For each component, a rating is assigned from 1 to 5, with 1 being the best and 5 near insolvency. Overall or "composite" ratings between 1 and 5 are also assigned for the entire organization. For the year 2005, the rating system for bank holding companies was modified. However, because this study predates the new system, we focus on the BOPEC rating system.