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OFF-BALANCE SHEET ACTIVITY, MARKET-DETERMINED AND ACCOUNTING-DETERMINED STOCK PRICES OF COMMERCIAL BANKS

ABSTRACT

The rapid growth of OBSA in recent years has concerned bank regulators that such OBSA are risk-increasing and should be brought under control through additional capital requirements. Previous empirical literature tested the riskiness of certain OBSA by employing systematic or total risk as dependent variables, and documented that some OBSA may reduce bank risk. This paper reexamines the relationship between market values, accounting values of bank stock and OBSA. This paper tests the implication of OBSA on market values of bank equity by employing a generalized Gordon-type stock valuation model. The results support the hypothesis that book values of equity predict market values of bank stock significantly, and OBSA do not appear to influence market values of bank stock. Because diversified investors are concerned with systematic risk and hence market values of equities, additional capital requirements of OBSA may be inappropriate.

1. Introduction

The purpose of this paper is to investigate the relationship between book values, market values and off-balance sheet activities (OBSA) of commercial banks of various sizes by employing a generalized Gordon-type stock valuation model.

Bank regulators are concerned with the dramatic proliferation of off-balance sheet activities (OBSA) and their risk-exposure. Moreover, the regulators have proposed that some OBSA be included in the calculation of a risk-based capital requirement. The regulatory presumption is that such OBSA are risk-increasing. Whether such contention is justified remains an open question.

Bank regulators examine accounting information to determine the solvency of a banking institution. Empirical research generally supports the hypothesis that accounting information is a surrogate of market information. OBSA are not summarized on the balance sheet but are instead given in the verbal footnotes to balance sheets. However, banks are required to report such activities to the FDIC beginning 1984. In off-balance sheet transactions, banks earn fee incomes instead of interest spreads, and loans are not held on the books.

Two main effects of OBSA on risk, namely diversification and leverage effects, have been rationalized in theoretical literature. According to diversification effects, banks engage in OBSA to diversify their asset portfolios and achieve within-firm diversification. The leverage effects of OBSA imply that such activities augment potential leverage and hence increase risk (Pavel [1987], Benveniste and Berger [1986]). Empirical literature tested such diversification and leverage effects of OBSA by employing market risk (beta) or total risk (variability of market equity return) as dependent variables and hence indirectly documented the impact of OBSA on market values of bank equities (Hassan [1990] and Hassan [1991]). This study tests directly the premium or discount that OBSA imposes on market values of bank equities.

This research consists of five sections. Section 2 discusses previous literature on the relationship between accounting and market information, and significance of this study. The empirical methodology and hypotheses are discussed in Section 3. Section 4 analyzes data and presents empirical results. A summary of the study's major conclusions and policy evaluations appears in Section 5.

2. Previous Research and Significance of this Study

The relationships between book and market values of bank stocks have been documented across several dimensions. Durand [1957] was one of the first to examine the relationship between the market value and book value of bank stocks. This study documented that the book value of the sample bank equities was the most important determinant of their market price.

A pioneering study by Beaver, Kettler and Scholes [1970] examines the relationships, using simple correlations, between a firm's market determined beta and single indicators of financial policy. They found significant correlation between beta and dividend payout, financial leverage and an "accounting" beta which measures the covariability of a firm's earnings with earnings of all firms. In addition, the study modeled the market beta as a function of several accounting measures for the purpose of forecasting the market beta. They found that accounting data provided superior forecasts of the market determined risk measure for the time period examined.

Pettway [1976] investigated the impact of banks' capital position on (1) the risk premium of the bank's capital notes, (2) the bank's beta, and, (3) the price-earnings (P/E) ratio, during the 1971-74 perid. His cross-sectional study indicated that dividend yield, payout ratio and earnings growth are significant in explaining the variability of price-earnings ratios. He also found no apparent relationship between beta and these accounting variables for large banks prior to 1974 and slightly significant inverse relationships after 1974.

A study by Beighley, Boyd and Jacobs [1979] examined the relationship between financial leverage and stock price for 113 bank holding companies for the periods 1972 through 1974. By using a three month average of bank stock price as the dependent variable, they found that dividends, earnings growth, firm size and loan loss rate were the most important determinants of the market prices of bank equities. They also found that for the given sample of bank holding companies, the higher a bank's degree of financial leverage at a point in time, the lower is the bank's stock price, after controlling for bank size, earnings growth, dividends and loan losses.

Jahankhani and Lynge [1980] investigated the relationship between financial policies of commercial banks and two market-determined measures of risk. Financial policies are proxied by average balance sheet and income statement data over the period 1972-1976 for 95 commercial banks and bank holding companies. Accounting data measures of financial leverage, liquidity, dividend payout ratio, loan loss experience and variability in earnings and deposits are used. These are related to a measure of systematic risk (beta) and total risk (standard deviation of equity return) also calculated for the same five-year period. Bivariate and multivariate relationships are examined. As independent variables used to explain beta, the coefficients of the dividend payout ratio, variability of deposits and the loan to deposit ratio are significant. In explaining total risk the coefficients of the dividend payout ratio, a financial leverage measure, variability of deposits and earnings, a loan loss measure and a liquidity measure are all significant.

Kamath [1980] examines the relationship between commercial bank stock equity premium (or discount) and 16 variables representing the bank's profitability, systematic and unsystematic risk, marketability, growth and dividend policy. The analysis suggests that four variables, namely, the return on equity, the beta coefficient, the volume of stock trading and the growth of net asset value, statistically have the most influence upon the premium or discount on bank stocks. A seven variable multiple regression model was able to account for about 75% of the variability in the price to book ratio in each of the years from 1974 to 1976.

None of these bank studies include OBSA as explanatory variables. But inclusion of OBSA in such accounting-based models can help analyze their impact on the market values of bank equities.

Lynge and Lee [1987] used accounting-based risk-forecasting models to investigate the impact of OBSA on both equity risk and systematic risk for large commercial banks for the time period 1984-85 for a sample of 81 large banks. The estimated coefficients of independent variables incorporating OBSA are statistically significant in models explaining total risk but not significant in models explaining systematic risk.

Brewer, Koppenhaver and Wilson [BKW, 1986] used a two-factor CAPM model that estimates systematic risk associated with income, balance sheet and OBSA. BKW contend that OBSA is a proxy for overall bank quality and good management. This explains why beneficiaries are willing to hold the contingent claims that banks issue. Further, they find that certain forms of OBSA (standby letters of credit) actually decrease the risk of diversified bank shareholders due to the market discipline that the guarantee beneficiaries impose on bank management. Finally, the results of BKW indicate that loan commitments and commercial letters of credit are not priced in the equity market. Thus their issuance did not appear to increase the risk of the bank.

Most recently, Unal and Kane [1987] used a statistical market value accounting model (SMVAM) to explain the market values of bank equities into market values of its recorded and unrecorded net assets. An adjustment factor is used to estimate the net market value of on-balance items. The unrecorded equities, defined as the difference between unbooked assets and liabilities, is termed as "off-balance sheet items." By regressing market values of bank equities on book values of their net worth, Unal and Kane found that large banks show a market premium over book equity prior to 1980, but rarely thereafter. Medium banks show a market discount over book equity until 1983 and small banks until 1985. They also show the market value of unrecorded equity to be significantly negative prior to 1980 (across bank size) but insignificant thereafter.

Although Unal and Kane [1987] explained deposit-insurance guarantees as an unrecorded component of equity, they did not explicitly consider deposit-insurance subsidies in regression analysis. However, they mentioned the possibility of specification problem in their analysis. By introducing OBSA in regression analysis, this paper seeks to recify such problem.

The empirical literature, to date, has failed to account for the effects of OBSA on the market values of bank equities. It is well-documented in literature that accounting values contain significant predictive power from which to ascertain market values. This study will report on two tests. First, this study will investigate the effects of OBSA on market values of bank equities by employing a generalized Gordon-type model that includes, in addition to OBSA, several accounting variables used in past empirical research. Second, this research will focus on the association between book values and market values of bank equities. From these tests, it can be empirically determined whether overall OBSA has acted as a deflator or inflator for market values of equities. Only if OBSA acts as a deflator can federal regulators seemingly assume that this portion of bank activities is in need of additional regulation (presumably in the form of risk-based capital guidelines). If, on the other hand, overall OBSA activity acts as an inflator of bank market value, regulators should reconsider the potentially adverse effects of increased capital requirements on the chosen risk-stance of the bank. If OBSA are insignificantly correlated with market values of equities, it can also be ascertained that well-diversified investors do not price such OBSA and, therefore, proposed capital requirements of OBSA may be inappropriate.

3. Methodology and Hypotheses

The standard constant dividend growth model (commonly referred to as the Gordon Model) provides the framework for this analysis:

$$P_0 = \frac{D_0(1+g)}{k-g}. \tag{1}$$

where:

P_0 = current price,
D_0 = current dividend per share,
g = expected growth of dividends, and
k = appropriate discount rate.

Equation (1) implies that the price of the common stock is a function of three basic factors: the expected cash dividend, expected growth rate of the dividend stream, and the required rate of return corresponding to the firm's risk class.

P_o is the equilibrium stock price. Trading will occur only to the extent that investors hold divergent beliefs about k and g and the equilibrium price will change only as events alter the market's perception of k and g.

As the pricing factors in equation (1) are not directly observable, proxy variables for k and g must be developed as surrogates. Because proxy measures are used, it cannot be expected that the specific functional form of the equations will be maintained. A more general form can be adopted for empirical purposes:

$$P_o = f(d_o,\ g',\ k'),\ \text{where:}$$

$$\frac{\partial P_o}{\partial d_o} > 0,\ \frac{\partial P_o}{\partial k'} < 0 \text{ and } \frac{\partial P_o}{\partial g'} > 0. \tag{2}$$

For purposes of convenience in empirical testing, the relationship can be assumed to be linear. The signs of partial derivatives are those that are expected, based on equation (2) and assuming that k′ and g′ are good proxy measures.

The following generalized Gordon-type model will be used to test the effect of OBSA on market value of equity:

$$P_m = f(\overset{?}{\text{OBSA}},\ \overset{+}{P_b},\ \overset{-}{\text{lev}},\ \overset{+}{\text{payout}},\ \overset{-}{\beta},\ \overset{-}{\sigma_{re}},\ \overset{-}{\text{lnloss}}). \tag{3}$$

where

P_m = market value of bank share X number of shares;

OBSA = aggregate of reported contingent liabilities from all forms of OBSA except interest rate swaps. This aggregate is deflated by the total book value of assets in an attempt to avoid potential heteroskedasticity;

P_b = book value of equity per share X number of shares;

lev = book value ratio of liabilities to assets;

Payout = ratio of dividend per share to ernings per share;

β = accounting determined bank beta;

σ_{re} = standard deviation of return on book equity;

lnloss = provision for loan losses.

The expected partial derivatives are shown above each variable in equation (3). All right-hand variables except OBSA in equation (3) are balance-sheet variables. These variables are developed to capture the three fundamental factors embodied in equation (2).

Two main effects of OBSA on risk and hence on market value of equity, namely diversification and leverage effects, are rationalized in theoretical literature. Diversification effects are expected to increase equity values while leverage effects to decrease equity values. However, a priori, it is difficult to say which effect dominates.

P_b is expected to be positively related to P_m because there is sufficient evidence in empirical literature that book values of equity predict market values of equity reasonably well.

The lnloss represents the probability of future defaults that may be expected to reduce earnings and dividend. Therefore, lnloss will affect P_m negatively.

Dividend stabilization policy implies that firms are reluctant to change dividends drastically, and, in particular to cut dividends once a certain level has been established. Therefore, high dividend payouts are associated with low risk and hence high market values of equities.

Banks use a high degree of financial leverage. Because a higher degree of leverage increases financial risk, lev is inversely related to market values of equity.

Standard deviation of book equity return (σ_{re}) is an accounting-risk measure. Rapid growth identifies with high risk and low market values of equities. Similarly, accounting beta (β) is a good surrogate of market beta. A high accounting beta translates into a higher return by stockholders and lower market values of equities.

A pooled cross-section and time-series econometric technique is used to test the following two hypotheses:

Hypotheses one: H_0: OBSA does not significantly affect P_m
H_1: OBSA does significantly affect P_m

Hypothesis two: H_0: P_b is not significant in determining P_m
H_1: P_b is significant in determining P_m

4. Data Analysis and Empirical Results

4.1 Data Analysis

The Compustat Data Tapes were used to obtain the observed values of P_m, payout, and the net income and average total asset amounts used in calculating the accounting beta. Return on average equity was also calculated from Compustat. The standard deviation of return on average equity is based on six annual observations between 1983 and 1988. Because accounting returns are deflated by a market index, accounting betas are actually a hybrid. The CRSP Equally-Weighted index was selected and annualized for use as the market index. Karels and Sackley [1991] show that accounting betas calculated with this index provide a more positive correlation with market-determined betas than other accounting-derived or market-derived indices. An accounting beta was calculated for each bank using 11 annual observations from 1977 through 1988.

All remaining data items were obtained from the FDIC Data Tapes containing the Call and Income Reports. The leverage variable was calculated as the difference between the value one and the equity/asset ratio, defined by total assets. The OBSA variable is a composite of the 18 reported figures comprising Schedule RC-L (Commitments and Contingencies).

4.2 Empirical Results

Descriptive statistics of the regression variables are presented in Table 1. Table 2 presents correlations among all independent variables and dependent variables used in regression analysis. Book values of equities (P_b) show positive association and variability of book equity return (σ_{re}) shows negative association with market values of equities at the 5% significance level. The remaining variables, except payout, exhibit expected signs but are not significant at the 5% level. These bivariate relationships provide credence to the explanatory power of independent accounting risk measures to predict market values of bank equities.

The independent accounting risk variables, in general, are not highly correlated with one another, indicating that multicolinearity is not a serious problem. However, variability of book equity return show positive correlations with both leverage (lev) and accounting betas (β). These results are not surprising since leverage (lev) increases equity variance and leverage influences accounting betas. Loan-loss provision (lnloss) variable shows negative correlation with dividend payout (payout), indicating that high loan losses are associated with lower dividend payouts, all other things being the same.

Table 3 presents pooled cross-section and time-series results of empirical model (3). All explanatory variables except lnloss have expected signs. Book values of equity (P_b) act a premium over market values of equity and is significant at the 1% level. OBSA shows neither premium or discount over market values of equity and is insignificant. Leverage (lev) and accounting beta (β) discounts market equity values and are statistically significant. While dividend payout (payout) and variability of book equity return (σ_{re}) retain their expected signs but these are not statistically significant.

Loan loss reserve (lnloss) has the perverse coefficient and is significant. One possible explanation for this result is that investors may actually have a preference for banks which exhibit aggressiveness in their lending practices, despite its short-term detrimental effects.

The results of this research are consistent with those of others. Like Kamath [1980] and Pettway [1976], book-values of equities (P_b), leverage ratio (lev), dividend payout (payout) and beta (β) are significant in explaining market values of equities. However, this research improves upon the existing empirical literature by including off-balance sheet contingent items (OBSA) and empirically examining the impact of OBSA on market values of bank equities.

The results compare favorably with those of Unal and Kane [1987]. Off-balance sheet activities (OBSA) show insignificant relationship with market value of equities. This study is an improvement over Unal and Kane, at least technically, because while Unal and Kane mention off-balance sheet items but do not explicitly analyze their impact, this research includes OBSA in regression results. However, this paper and Unal and Kane arrive at the same conclusion that OBSA activities are not significant predictors of market values of bank stocks across all sizes after 1980s.

5. Summary and Conclusions

The primary purpose of this paper has been to examine the influence of off-balance sheet activities (OBSA) on market values of bank stocks. By applying a pooled cross-section and time-series econometric technique to estimate a generalized Gordon-type model of bank stock valuation, it appears that OBSA does not affect market values of equities and book values of equity are significant predictors of market values of bank equities. However, accounting risk variables such as book values of equity, leverage ratio, accounting beta and loan loss provision appear to be significant predictors of bank stock valuation. A pooled cross-section time-series is employed so that intertemporal movements and interbank difference can be considered simultaneously and the data base can also be extended. Such technique is of particular interest to this research because cross-section or time-series data alone (16 cross-section and 6 time-perios) do not yield sufficient degrees of freedom in regression analysis.

Due to a well-established relatinship between book and market-determined bank stock values, the regulatory proposal to control OBSA through risk-based capital requirements may be inappropriate. The results show that OBSA, in general, are insignificant predictors of market values of equities. Therefore, such OBSA are not a concern for diversified investors. There is some evidence that certain widely-issued forms of contingent liabilities do not increase but actually decrease the riskiness of individual banks. The current findings, in addition to past evidence, imply that regulatory interference of OBSA in the form of additional capital requirements may create distortions in banking off-balance sheet capital market.

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TABLE 1

DESCRIPTIVE STATISTICS OF VARIABLES USED IN MULTIPLE REGRESSION

VARIABLE	MEAN	ST. DEV.	MIN.	MAX.
P_M[1]	362.1	262.06	60.86	17782.9
OBSA	.16963	.12590	.0081	.7322
P_b[2]	314.68	237.12	124.53	1503.5
lev	.93298	.013583	.899	.961
Payout	.17536	1.1825	- 11.0	1.451
β	.00085419	.006149	- .005492	.01598
σ_{re}	.043412	.029169	.012	.1096
lnloss[3]	5381.6	7726.5	67.0	44623.0

1, 2 : in $ millions.
3 : in $ thousands.

TABLE 2

CORRELATION MATRIX OF DEPENDENT AND INDEPENDENT VARIABLES

P_m	1.0000							
OBSA	-0.1085	1.0000						
P_b	0.9369	-0.1395	1.0000					
lev	-0.0837	-0.0782	0.0421	1.0000				
payout	-0.0092	-0.1806	-0.0147	-0.0767	1.0000			
β	-0.1135	0.0086	0.0207	0.1941	0.0129	1.0000		
σ_{re}	-0.4304	-0.0738	-0.3393	0.3251	-0.1285	0.63085	1.0000	
lnloss	-0.0786	-0.0786	-0.1206	-0.0309	-0.4399	0.01308	0.1053	1.000
	P_m	OBSA	P_b	lev	payout	β	σ_{re}	lnloss

TABLE 3

POOLED CROSS SECTION TIME SERIES REGRESSION RESULTS

VARIABLE	COEFFICIENT	t-RATIO	
Constant	1544.4	3.512	***
P_b	1.0554	21.524	***
lev	-1625.1	-3.4369	***
payout	5.1944	0.99745	
β	-5428.0	-4.2545	***
σ_{re}	-250.55	-0.75971	
lnloss	0.0016477	1.9722	**
OBSA	40.883	1.0469	

BUSE R^2	.8621	Significance:	
SSE	94.048	**	5%
F	78.606	***	1%
88 D.F.			

TABLE 4

LIST OF SAMPLE BANKS

1. Baybanks Inc.
2. Central Fidelity Banks Inc.
3. Colorado National Bankshares
4. Cullen/Frost Bankers Inc.
5. Dauphin Deposit Corp.
6. First Alabama Bancshares Inc.
7. First Florida Banks Inc.
8. First of America Bank Corp.
9. First Virginia Banks Inc.
10. Mercantile Bancorporation
11. Mercantile Bankshares Corp.
12. NBD Bancorp
13. Sunwest Financial Services Inc.
14. Trustcorp
15. United Missouri Bankshares
16. Zions Bancorporation