Determinants of the Rate of Return on Commercial Bank Assets, 1033-1998

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ABSTRACT

This empirical study seeks to identify, for the period 1933-1998, determinants of the rate of return on bank assets (ROA). The study finds that the ROA has been an increasing function of the interest rate yield on bank loans to the private sector, the growth rate of real GDP, and the percentage of deposits covered by federal deposit insurance. In addition, the ROA appears to have benefited from the implementation of provisions in the Federal Deposit Insurance Corporation Improvement Act of 1991. Finally, increased financial services industry competition has reduced the ROA.

I. INTRODUCTION

Not since the Great Depression had the regulatory authorities in the United States closed so many banks as they did during the 1980s and early 1990s. For the period 1943-1981, few banks were closed due to insolvency. However, this situation changed dramatically beginning in 1982, when some 42 banks were closed. The years 1983 and 1984 witnessed 48 and 79 closings, respectively. Bank closings accelerated in the years following, surpassing 100 per year through the early 1990s. A similar general pattern of closures plagued the thrift industry as well.

These experiences led to a variety of studies in recent years that have investigated the economic health of the financial services industry. Most of these studies have examined the impact of factors such as the federal deposit insurance ceiling per account, the cost of funds, real GDP growth, and federal legislation such as the Financial Institutions Recovery, Reform and Enforcement Act of 1989, FIRREA, and the Federal Deposit Insurance Corporation Improvement Act of 1991, FDICIA [Barth (1991); Barth, Brumbaugh, and Litan (1992); Kane (1989); Saltz (1995; 1997)].

However, whereas such studies stress causes of financial institution failures (defined as outright closings plus forced mergers with other financial institutions), there has been relatively little attention given to determinants of bank profits as such at the industry level. Given the burdens that can be placed on taxpayers and depositors by bank closings induced by protracted periods of negative profits, it seems advisable to identify factors likely to impact on bank profitability in the aggregate. Such is the purpose of this study. Hopefully, insights gained from the analysis may be of value in the future when efforts are needed to systematically protect the profit status of the banking industry.

II. THE FRAMEWORK

The individual bank is treated as a profit maximizing, price-taking firm. The bank's profits are treated as being affected by both market-based, i.e., economic, variables and by certain variables that reflect government regulations and statutes.

It is assumed that the bank seeks to maximize

$$PROF = rL*LN*(1-PLN) + rS*SEC — COST*DEP — rD*DW\ C(LN,SEC,DEP,DW) \quad (1)$$

where
PROF = net profit;
rL = the average interest rate yield on the bank's outstanding loans to the private sector of the economy;
LN = volume of the bank's outstanding private-sector loans;
PLN = the percentage of the bank's outstanding loans that is not performing;
rS = the interest rate yield on the bank's holdings of U.S. government securities;
SEC = the volume of U.S. government securities in the bank's portfolio;
COST = the average unit cost of the bank's deposit liabilities;
DEP = volume of deposit liabilities at the bank;
rD = the Federal Reserve discount rate;
DW = net funds borrowed by the bank from the Fed's discount window;
C( ) = the bank's factor and implicit cost function.

The term rL*LN*(1-PLN) may be regarded as the revenue from private-sector loans. The performance of the bank's outstanding loans is likely to be affected by a variety of factors over time. Arguably, the growth rate of real GDP (Y) is a reasonably comprehensive reflection of the overall performance of the economy over time and hence a potentially useful way to explain PLN. It is hypothesized that the greater the growth rate of real GDP, the lower the PLN [Amos (1992); Cebula (1994); Chao and Cebula (1996); Loucks (1994)]. This relationship reflects a decreased likelihood of loan delinquencies and defaults during times of more rapid expansion.

The greater the competition faced by the bank, the lower its profit level is expected to be. This is because, in part, an increased degree of competition (COMP) is likely to be reflected in lower lending rates (rL) and/or increased rates paid to attract or retain deposits (COST).

Based on these arguments and the transparent profit-maximization process summarized in equation (1), it follows that:

$$PROF = h(rL, Y, rS, COST, rD, COMP, \ldots) \quad (2)$$

Aside from market forces such as those identified above, given that the banking industry has been such a highly regulated industry, it may be prudent to include control variables. Including such variables presumably helps to account for the potential impact of federal regulations and statutes that arguably may have affected banking industry performance over the years. Based on previous research, such as Barth (1999), Barth, Brumbaugh, and Litan (1992), and Cebula (1999), it is argued that at least two such factors may warrant consideration in the analysis: the extent of federal deposit insurance coverage and FDICIA.

As Barth (1991, p. 1) observes regarding federal deposit insurance, "the intent of the federal government was to instill enough confidence in depositors that they would never again engage in widespread and disruptive runs on financial institutions." Presumably, the greater the proportion of deposits covered by federal deposit insurance (FDICOV), the more secure bank depositors might feel and the greater the perceived financial safety and stability of banking institutions. The greater the perceived safety and security of the banks, the lower the perceived riskiness of deposits at banks and hence the lower the commercial bank cost of deposits and hence the higher banking institution profitability. Thus, PROF should be an increasing function of FDICOV.

The FDICIA statute includes provisions [FDIC (1995, p. 26)] for "...prompt corrective action measures to be taken when an insured institution's capital falls below prescribed levels, increased

examination frequency, and mandated standards for safety and soundness, real estate lending, and interest rate risk management." As Cebula (1999, p. 152) observes, "...both the numbers of problem banks and bank failures have declined dramatically since the enactment of FDICIA." It is hypothesized therefore that since its implementation, FDICIA has exercised a generally positive impact on overall bank performance. This impact may be in part because FDICIA has, by lowering the perceived riskiness of deposits at banks, helped to reduce the cost of deposits (COST). If this is the case, bank profitability should be enhanced.

Based on the factors provided above, it is expected that:

$$PROF = j(rL, Y, rS, COST, rD, COMP, FDICOV, FDICIA,...) \quad (3)$$

Except for the variable COST, for which adequately dependable data that are comparable over the study period are not available (but whose value is nonetheless reflected by other variables in the system), the estimation below investigates this entire framework.

III. EMPIRICAL FRAMEWORK

Predicated on the framework summarized in equation (3), the following reduced-form equation is to be estimated:

$$PROF_t = a + b\, rL_{t-1} + c\, Y_{t-1} + d\, rS_{t-1} + e\, rE_{tt-1} + f\, COMP_t + g\, FDICOV_{t-1} + h\, FDICIA_t + u \quad (4)$$

where
$PROF_t$ = the annual rate of return on commercial bank assets (ROA) in year t, as a percent;
rL_{t-1} = the average interest rate yield on commercial bank loans to the private sector of the economy in year t-1, as a percent per annum;
Y_{t-1} = the percent change in real GDP over year t-1;
rS_{t-1} = the average interest rate yield on three-month U.S. Treasury bills in year t-1, as a percent per annum;
rD_{t-1} = the average Fed discount rate during year t-1, as a percent per annum;
$COMP_t$ = a dummy variable for the more competitive years following deregulation: $COMP_t$=1 for 1982 and thereafter and $COMP_t$ = 0 otherwise;
$FDICOV_{t-1}$ = the average percentage of deposits at commercial banks that was covered by federal deposit insurance during year t-1;
$FDICIA_t$ = a dummy variable for the year following implementation of FDICIA: $FDICIA_t$ = 1 for 1992 and thereafter and $FDICIA_t$ = 0 otherwise.

Reflecting data availability, the study period runs from 1933 through 1998. The data are all annual. The industry-level profit rate is proxied by the average percentage annual pre-tax rate of return on bank assets (ROA), available from the FDIC (1999). The principal data sources for the remaining variables included the FDIC (1999) and the CEA (1999). The one-period lag of certain right-hand-side variables is adopted to avoid simultaneity problems.

The ADF (Augmented Dickey-Fuller) test reveals that variables rL_{t-1}, Y_{t-1}, rS_{t-1}, and rD_{t-1} are stationary only in first differences, whereas variables $PROF_t$ and $FDICOV_{t-1}$ are stationary in levels with a trend. Hence, regression equation (4) is estimated with rL_{t-1}, Y_{t-1}, rS_{t-1}, and rD_{t-1} expressed in first differences form and with a linear trend variable (TREND). To correct for heteroskedasticity, the White procedure is adopted.

IV. FINDINGS

The OLS estimate of equation (4) is given by:

$$\begin{aligned} PROF_t = {} & 0.08 + 0.36\, zrL_{t-1} + 0.22\, zY_{t-1} - 0.006\, zrS_{t-1} + 0.005\, zrD_{t-1} - 0.23\, COMP_t \\ & \quad (+2.10) \quad (+1.69) \quad (-0.22) \quad (+0.15) \quad (-6.25) \\ & + 0.011\, FDICOV_{t-1} + 0.49\, FDICIA_t - 0.0004\, TREND, \\ & \quad (+5.26) \quad (+8.05) \quad (-0.23) \\ & DW = 1.73,\ Rho = 0.12,\ R\text{-}SQ = 0.79,\ F = 25.69 \end{aligned} \tag{5}$$

In equation (5) terms in parentheses are t-values, and z is the first-differences operator.

Among the seven explanatory variables, three are significant at the one percent level with the expected sign. One is significant at the five percent level with the expected sign, and one is significant at beyond the ten percent level with the expected sign. The coefficient of determination indicates that the model explains nearly four-fifths of the variation in the dependent variable. Finally, the F-ratio is significant at the one percent level.

Based on equation (5), the estimated coefficient on the variable zrLt-1 is both positive and significant at the four percent level. Thus, it appears that the bank profit rate is an increasing function of the interest rate yield on bank loans to the private sector. The estimated coefficient on the zYt-1 variable is positive and significant at the nine percent level, perhaps modestly supporting the hypothesis that the greater the real GDP growth rate, the lower the loan delinquency and default rates and the higher the gross revenues for commercial banks. The coefficient on the FDICOVt-1 variable is positive and significant at the one percent level. This would seem to imply that, over time, the greater the extent of federal deposit insurance coverage of bank deposits, the greater the ROA has been. This may reflect increased depositor confidence in the banking system and the economic implications thereof. The estimated coefficient on the FDICIAt variable is also positive and significant at the one percent level. This finding may suggest that implementation of various provisions in FDICIA have acted to improve overall banking industry performance (as intended). Next, the coefficient on the variable COMPt is negative and significant at the one percent level, suggesting that increased competition acted to reduce commercial bank profitability. Finally, the coefficients on variables zrDt-1 and zrSt-1 are not statistically significant at even the ten percent level, suggesting that the discount rate and Treasury bill rate did not exercise significant impacts on bank performance over the study period.

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