IS BANK EFFICIENCY CYCLICAL? THE RELATIONSHIP BETWEEN ECONOMIC AND FINANCIAL MARKET CONDITIONS AND BANK PERFORMANCE

by

Yi-Kai Chen, Eric J. Higgins, and Joseph R. Mason*

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Chen: National University of Kaohsiung; Higgins: Kansas State University; Mason: Drexel University and Wharton Financial Institutions Center.

*Corresponding author. Joseph R. Mason, Department of Finance, LeBow College of Business, Drexel University, Philadelphia, PA 19104, (215) 895-2944 ph, (215) 895-2955 fx, E-mail: joe.mason@drexel.edu.

Abstract

A major concern of bank capital regulation arises from procyclicality: worsening bank conditions result in more stringent capital regulations that force banks to tighten credit and further constrict economic growth, further worsening bank conditions. Hence, if bank conditions are highly correlated with fundamental macroeconomic performance (beyond idiosyncratic portfolio difficulties) bank regulation may promote economic downturns through the credit channel. The present manuscript sheds light on the magnitude of the correlation between bank performance and economic growth by estimating translog flexible function specifications of bank cost and profit efficiency during the period 1988-1997, yielding a panel data set of nearly 300,000 bank/quarter observations, and then using the results to test how local and national business and national financial market conditions affect bank efficiency. A model that controls for idiosyncratic bank characteristics and major bank deregulatory events shows that typical measures of business conditions are procyclically related to bank performance, whereas financial market conditions appear countercyclical.

Macroeconomic conditions affect firm performance. But firm performance reflects on *bank* performance through bank loan portfolios. In the presence of adverse loan performance, bank regulators may order banks to slow lending and pursue recoveries from defaulted firms. That regulatory procyclicality, no matter how prudent, may result in banks becoming reluctant to lend in an environment where firms perform adversely, constraining credit supply and thus firm growth and performance and, thus, economic growth. Hence, it is important to understand how banks respond to changing economic performance so that they can better lend in expansionary monetary policy regimes and promote economic recovery instead of propagating economic downturn.

The view that banks may procyclically propagate economic downturns is well established, albeit controversial. Such classics as Friedman and Schwartz (1963), Sims (1972), and Christiano and Ljungqvist (1988) convincingly demonstrate that business conditions are linked to conditions like bank lending and bank failures, while Fama and French (1989) and Jensen, Mercer, and Johnson (1996) demonstrate that business conditions are also related to financial market performance. Thakor (1998) further suggests that relationships between banks and capital markets are at once competitive and complementary, in that efficient bank intermediation can lead borrowers to exploit marginal information asymmetries in markets. Our analysis synthesizes those approaches, examining the effects of local and national business conditions and national financial market conditions on individual bank performance.

Many previous studies of bank effects on business cycle persistence utilize bank failures as a measure of sectoral difficulties (see, for instance, Bernanke (1983) and Anari, Kolari, and Mason (2005)). However, there are relatively few studies that utilize other, more continuous, measures. Our study constructs and tests the effects of business and market conditions

on quarterly estimates of bank profit and cost efficiency in a panel data context over a ten-year (forty-quarter) time period using almost 300,000 bank/quarter observations, our goal being to allow bank efficiency to fluctuate from quarter to quarter to better capture important macroeconomic effects.

We measure bank performance using both bank cost and profit efficiency. While Berger and Mester (1997) provide a comprehensive study of potential correlates with bank efficiency, there is little work devoted to examining how those variables and their effects change over time. Berger and DeYoung (1997), one of the few studies that examines intertemporal differences in efficiency across banks, confine their approach to examining intertemporal relationships between bank cost efficiency and problem loans but do not formally link problem loans to business or market conditions. Hence an unanswered question remains: are there real business cycle effects affecting banks that cause intertemporal changes in efficiency and ultimately procyclical changes in loan quality and bank condition?

We investigate whether business and market condition variables explain bank efficiency. We experiment with a variety of business and market condition proxies, including market returns and default premiums (to address Thakor's (1998) competitive complementarities), national-level fed funds premia, GDP growth, unemployment growth, the Conference Board's leading indicators (to address national business conditions directly), and state GDP growth and unemployment growth (to address the importance of local economic effects).Ultimately, we conclude that local and national business conditions and national financial market conditions are jointly important to bank cost and profit efficiency, suggesting that there is a substantial element of procyclicality in bank performance in the US economy.

The next section introduces the efficiency estimation exercise. Section II describes the data and specifications. Section III presents our empirical results. Section IV concludes.

I. Efficiency Estimation

In this study we use a Fourier-flexible functional form to estimate quarterly profit and cost frontiers over a ten-year panel of quarterly data. The Fourier-flexible functional form consists of a specification structure made up of a translog function that includes Fourier trigonometric terms. While the translog function (without Fourier trigonometric terms) has been the most popular functional form for estimating cost and profit functions, it is widely acknowledged that the translog function does not fit data that are far from the mean in terms of output size or mix. In fact, McAllister and McManus (1993) and Mitchell and Onvural (1996) suggested that some of the differences in results of scale economy studies are due to ill-fitting translog functions used to measure efficiency across a wide range of bank sizes and Berger and DeYoung (1997) found that measured inefficiencies were about twice as large when the straight translog function was specified in place of the Fourier-flexible form. Berger and DeYoung (1997), and Berger and Mester (1997, 2003) argue that the translog function including Fourier trigonometric terms is more flexible and is a global approximation to virtually any cost or profit function.

We use the Stochastic Frontier Approach (SFA) to calculate profit and cost efficiency frontiers. The Stochastic Frontier Approach is also called Econometric Frontier Approach (EFA). Berger, Hunter, and Timme (1993) and Bauer, Berger, Ferrier, and Humphrey (1998) review econometric and linear programming techniques for estimating X-efficiency including the SFA, the thick Frontier Approach (TFA), Data Envelopment Analysis (DEA), and the

Distribution-Free Approach (DFA). SFA, TFA, and DFA are parametric approaches and DEA is a nonparametric approach. DEA, being a nonparametric approach, ignores prices and accounts only for technical inefficiency that occurs by using too many inputs or producing too few outputs. Hence, DEA generally emphasizes technological optimization rather than economic optimization, which does not correspond to the cost and profit efficiency concepts we are interested in here.[1]

Among the parametric approaches, DFA cannot be used in this study because DFA describes the average deviation of each firm from the best average-practice frontier, which in our data set would be the average across time. Similarly, Bauer, Berger, Ferrier, and Humphrey (1998) establish that, while all methods are highly correlated in their estimates of efficiency, single year estimates of the SFA approach have a stronger persistence of correlation over time than single year estimates of the TFA approach due to inherent randomness introduced within the thick frontier. Since we estimate efficiency on a quarter by quarter basis, the results of Bauer, Berger, Ferrier, and Humphrey (1998) therefore imply that the SFA approach is most appropriate for this study.

Cost efficiency models measure the degree to which firms are able to minimize costs while holding current input prices and output quantities constant. However, DeYoung (1997) indicated that cost-based models might misrepresent the nature and extent of inefficiency in banks. For instance, banks might create more revenue by increasing costs. Thus, revenue

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[1] Another drawback of the nonparametric approaches is that random errors are not allowed in the data. That is, there are no random fluctuations in efficiency, so that all deviations from the estimated frontier represent inefficiency. In such an environment, if there is any luck or measurement error in an observation not on the estimated frontier, it will be mistakenly included in that firm's measured efficiency. Berger and DeYoung (1997) show that, as a result, it is difficult to compare individual different financial institutions' efficiencies by using DEA.

efficiency might lead to cost inefficiency. But if revenue efficiency overcomes cost inefficiency, banks will be more profitable. Hence, Berger and Mester (2003) and Berger and DeYoung (2001) suggest that profit maximization could be superior to cost minimization for studies of firm performance because profit functions more completely approximate the economic goals of firms and their owners. Profit efficiency is based on the economic goal of profit maximization, which is robust to both increased revenues and decreased costs. Nonetheless, profit efficiency estimates tend to contain more random error than cost efficiency estimates due to the difficulties of measuring bank revenue functions in addition to cost functions.

Berger and Mester (1997) suggest that an alternative measure profit efficiency may be superior to the standard approach if: (i) there are substantial unmeasured differences in the quality of banking services in the sample; (ii) banks in the sample cannot achieve every output scale and product mix; (iii) output markets are not perfectly competitive, and (iv) output prices are not accurately measured. Since we measure the efficiency of *all* US commercial banks, substantial differences do exist in banks' service quality. Furthermore, not all banks can equally achieve every output scale and product mix. Moreover, given banking industry regulation, it is difficult to argue that output markets are perfectly competitive. Lastly, output prices are not available for all sizes of banks. Hence the profit efficiency results that follow are based exclusively upon the alternative profit function.

The Reports of Condition and Income (Call Report) are the source of the banks' output and input data as well as bank size variables. The study period is from the first quarter of 1988 to

the fourth quarter of 1997.[2] We gather output and input information on a quarterly basis for all commercial banks, using 40 separate translog flexible function forms (one for each quarter) to estimate the cost and profit structure of banks and to derive bank efficiency. Our use of quarterly data differs from previous studies of bank efficiency. We examine quarterly instead of annual data to take into account changes in bank efficiency over time and control for the effects of consolidation in the banking industry.

The standard translog cost function including Fourier trigonometric terms is:

$$
\begin{aligned}
\ln \frac{TC_{it}}{w_{3it} z_{2it}} = {} & \alpha_0 + \sum_{k=1}^{4} \beta_{kit} \ln\left(\frac{y_{kit}}{z_{2it}}\right) + \sum_{l=1}^{2} \alpha_{lit} \ln\left(\frac{w_{lit}}{w_{3it}}\right) + \sum_{r=1}^{1} \gamma_{rti} \ln\left(\frac{z_{rit}}{z_{2it}}\right) \\
& + \sum_{k=1}^{4}\sum_{j=1}^{4} \beta_{kjit} \ln\left(\frac{y_{kit}}{z_{2it}}\right) \ln\left(\frac{y_{jit}}{z_{2it}}\right) + \frac{1}{2}\sum_{l=1}^{2}\sum_{h=1}^{2} \alpha_{lhit} \ln\left(\frac{w_{lit}}{w_{3it}}\right) \ln\left(\frac{w_{hit}}{w_{3it}}\right) \\
& + \frac{1}{2}\sum_{r=1}^{1}\sum_{m=1}^{1} \gamma_{rmit} \ln\left(\frac{z_{rit}}{z_{2it}}\right) \ln\left(\frac{z_{mit}}{z_{2it}}\right) + \sum_{k=1}^{4}\sum_{l=1}^{2} \delta_{lkit} \ln\left(\frac{y_{kit}}{z_{2it}}\right) \ln\left(\frac{w_{lit}}{w_{3it}}\right) \\
& + \sum_{l=1}^{2}\sum_{r=1}^{1} \rho_{lrit} \ln\left(\frac{w_{lit}}{w_{3it}}\right) \ln\left(\frac{z_{rit}}{z_{2it}}\right) + \sum_{k=1}^{4}\sum_{r=1}^{1} \varphi_{krit} \ln\left(\frac{y_{kit}}{z_{2it}}\right) \ln\left(\frac{z_{rit}}{z_{2it}}\right) \\
& + \sum_{k=1}^{4} [\xi_i \cos q_k + \varpi_i \sin q_k] + \sum_{k=1}^{4}\sum_{k=1}^{4} [\xi_{ij} \cos(q_k + q_k) + \varpi_{ij} \sin(q_k + q_k)] \\
& + \sum_{i=1}^{4}\sum_{j=1}^{4}\sum_{k=1}^{4} [\xi_{ijk} \cos(q_k + q_k + q_k) + \varpi_{ijk} \sin(q_k + q_k + q_k)] \\
& + \ln(u^{c}{}_{it}) + \ln \varepsilon^{c}{}_{it}, \qquad (1)
\end{aligned}
$$

Equation (1) is estimated separately for each quarter, allowing the parameters to vary over time. In equation (1), $\ln(u^{c}_{it})$ represents the X-efficiency factor and $\ln(\varepsilon^{c}_{it})$ is the random error with a mean of zero each period. The current specification assumes four standard bank outputs and

[2] There is a dramatic form change in the call report between 1987 and 1988 that prohibits analysis prior to 1988. After 1997, there may be considerable effects of interstate branching in our results.

three input prices standardized by bank's financial equity capital and price of labor respectively. The specifications for the variables are as follows:

> $\mathbf{TC_{it}}$ = total quarterly adjusted costs of bank i at time t = (total operating expenses + interest expenses)[3]
>
> $\mathbf{y_k}$ = quarterly adjusted bank output quantities; (k=1) real estate loans, (k=2) individual loans, (k=3) business loans, and (k=4) securities.[4]
>
> $\mathbf{w_l}$ = quarterly adjusted bank input prices; (l=1) price of deposits, (l=2) price of purchased funds, and (l=3) price of labor.[5]
>
> $\mathbf{z_r}$ = quarterly adjusted bank fixed netput quantities, (r=1) physical capital and (r=2) financial equity capital.[6]

In order to prevent taking the log of zero, one has been added to the variables (TC/w_3z_2), (y_k/z_2), and (z_r/z_2). The variable q_k is the adjusted value of the quarterly adjusted bank output quantities that spans the interval between $0.1*2\pi$ and $0.9*2\pi$.[7] Since Berger and DeYoung

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[3] Adjusted quarterly total costs are calculated by using quarterly cumulative total costs in each quarterly call report and subtracting the quarterly cumulative total costs of the previous call report. If there are any negative quarterly adjusted total costs during a year, the data after that quarter in that year will be eliminated.

[4] The specification of financial assets as outputs and financial liabilities and physical factors as inputs is consistent with Sealey and Lindley's (1977) intermediation, or asset, approach to modeling bank production.

[5] The price of deposits is the interest paid on transactions, savings, and retail time deposits (except time deposits of $100,000 or more) less service charges, divided by the total dollar value of these deposits. The price of purchased funds is the interest paid on large time deposits (time deposits $100,000 or more), foreign deposits, federal funds purchased, demanded notes, trading liabilities, other borrowed money, subordinated notes, and debentures divided by the total dollar value of these funds. The price of labor is salaries and employee benefits divided by the number of full-time-equivalent employees.

[6] We use netput variables similar to those used by Berger and Mester (2003). We do not include off-balance-sheet items because off-balance-sheet data is not available for the call report until 1990 and many off-balance sheet items are available only after 1993.

[7] $\cos q_k$, $\sin q_k$, $\cos(q_k+q_k)$, $\sin(q_k+q_k)$, $\cos(q_k+q_k+q_k)$, and $\sin(q_k+q_k+q_k)$ terms are the reasons that make the Fourier-flexible form a global approximation. Those terms are mutually orthogonal over the $[0,2\pi]$ interval. The orthogonality is perfect only if the data are evenly distributed over the $[0,2\pi]$ interval. However, the distribution of

(2001) showed that including factor share equations embodying Shepard's lemma restrictions is akin to implicitly assuming no allocative inefficiencies, we omit those from the specification.

The estimation of the profit function is similar to the cost function. Since we use the alternative profit function, the variables used in the calculation of profit efficiency are the same as those used in the estimation of cost efficiency except that the dependent variable, $\ln(C/w_3z_2)$, is replaced by $\ln[(\pi/w_3z_2)+\theta]$ and the composite error term ($\ln u^c + \ln\varepsilon^c$) is replaced by ($\ln u^\pi + \ln\varepsilon^\pi$). π_{it} is the quarterly adjusted profit, which includes the revenues from loans and securities less TC_{it}. In order to prevent zero and negative numbers in the natural log of profits, an adjustment factor, θ, is added. The constant $\theta = |(\pi/w_3z_2)^{min}+1|$ is added to every bank's quarterly adjusted profit. This adjustment is consistent with Berger and Mester (2003). Both the profit and cost specifications of equation (1) are estimated with 40 quarterly ordinary least squares regressions.

From equation (1), we measure cost efficiency for bank i by comparing its actual costs, adjusted for random error, to the minimum costs that the bank can produce using the same output and other exogenous variables. The measurement of bank's cost efficiency is thus:

$$XEFF_{it}^{c} = \frac{\hat{C}_{\min,it}}{\hat{C}_{it}} = \frac{\exp[\hat{f}^{c}(w_{it}, y_{it}, z_{it})]\times\exp[\ln\hat{u}^{c}_{\min,t}]}{\exp[\hat{f}^{c}(w_{it}, y_{it}, z_{it})]\times\exp[\ln\hat{u}^{c}_{it}]} = \frac{\hat{u}^{c}_{\min,it}}{\hat{u}^{c}_{it}}, \qquad (2)$$

where $\ln u^c_{min,it}$ is the minimum of the of the residual of equation (1) across all the bank samples.

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bank outputs may not be evenly distributed. To reduce approximation problems near the endpoints, we cut 10% off each end of the $[0,2\pi]$ interval, so that the q_k span $[0.1x2\pi, 0.9x2\pi]$. Thus, $q_k=0.2\pi - \mu*a + \mu*\ln y_k$; $\mu = (0.9*2\pi - 0.1*2\pi) / (b-a)$ where $[a,b]$ is the range of $\ln y_k$ over the 40 examined quarters.

The estimation of profit efficiency ($XEFF^{\pi}_{it}$) is done by comparing the individual bank's actual profits to the best practice bank with the maximum profits given for the given bank's outputs (y), input prices (w), and netputs (z). The estimation is as follows:

$$XEFF^{\pi}_{it} = \frac{\hat{\pi}_{it}}{\hat{\pi}_{\max,it}} = \frac{\exp[\hat{f}^{\pi}(w_{it}, y_{it}, z_{it})] \times \exp[\ln \hat{u}^{\pi}_{it}] - \theta_t}{\exp[\hat{f}^{\pi}(w_{it}, y_{it}, z_{it})] \times \exp[\ln \hat{u}^{\pi}_{\max,t}] - \theta_t}, \quad (3)$$

$XEFF^{c}_{it}$ and $XEFF^{\pi}_{it}$ are normalized to fall between zero and one. However, the estimation of X-efficiency is not robust to outliers. Based on Berger, Leusner, and Mingo (1997) and Berger and DeYoung (2001), we use 5th and 95th percentiles to truncate profit and cost X-efficiencies in order to limit the impact of outliers.

All commercial banks are used to form the cost frontier.[8] The quarterly bank cost and profit efficiency observations are shown in Table 1. Table 1 also shows summary statistics of all commercial bank cost efficiencies in each examining period. Note also the relatively high standard deviations on the quarterly profit efficiencies in Table 1. Those are consistent with Berger and Mester's (1997) observation that profit efficiencies are inherently more noisy than cost efficiencies due to measurement error in bank revenue functions.

II. Data and Specifications

Local Business Conditions

There are many reasons to believe that bank performance is related primarily to local economic conditions. Brickley, Linck, and Smith (2002) and Berger, Miller, Petersen, Rajan, and

Stein (2005) show that relationship lending is still prevalent and Chen, Higgins, and Mason (2004) show that smaller locally owned banks may have a competitive advantage over larger banks in high asymmetric information lending environments. Berger, Bonime, Covitz, and Hancock (2000) find that past local, state, and regional shocks affect the relative cross-sectional performance of banks.

We use the quarterly state personal income and unemployment rate as proxies for local economic conditions.[9] When state personal income is rising, we expect that intermediation is less costly (information is less valuable if a rising tide lifts all boats) and more profitable. When unemployment is rising, the opposite occurs. The variables ΔSTPI and ΔSTUNEMP are the percent change of the state personal income and state unemployment rate respectively. Summary statistics of local business condition variables are shown in Table 2.

National Business Conditions

The specifications tested below include four national business condition variables: the fed funds premium (FFP), GDP growth (ΔGDP), unemployment growth (ΔUNEMP), and the Conference Board's index of leading indicators (ΔLEAD).[10]

Bernanke and Blinder (1992) and Jensen, et al. (1996) supported the use of FFP (the difference between the federal funds rate and the three-month Treasury-bill rate) as an indicator

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[8] Commercial banks are defined as institutions bearing charter type 200, 210, 250, or 340, and a primary issuer code and total assets both greater than zero.

[9] Quarterly state personal income is available from the Bureau of Economic Analysis. State unemployment rates are available from the U.S. Department of Labor.

[10] The information related to national-level business conditions comes from the Conference Board's Business Cycle Indicators web site. Interest rate information, such as prime interest rates and the monetary policy components, as well as gross domestic product (GDP), comes from the Federal Reserve Board of Governors.

of monetary policy developments. Bernanke and Blinder (1992) found that the federal funds rate is a good indicator of monetary policy, which partly affects the composition of bank assets. Jensen et al. (1996) suggested that although the FFP explained a slightly lower level of the variation in security returns than explained by discount rate dummy variables, it provides information about future movements in real variables. Hence we use FFP as a leading indicator of monetary policy movements and thus economic performance.

Friedman and Schwartz (1963), Sims (1972), and Christiano and Lyungqvist (1988) show that business conditions are linked to monetary aggregates and thus bank performance. We include ΔGDP and ΔUNEMP as the percent changes of gross domestic production and the change of the unemployment rate respectively.

Still, it is unclear whether ΔGDP and ΔUNEMP are leading, coincident, or lagging indicators. Hence, we also include ΔLEAD as the percentage change of the Conference Board's index of leading economic indicators. The components of the index are: average weekly hours of production workers in manufacturing, average weekly initial claims for unemployment insurance, new orders for consumer goods and materials (in 1987 dollars), vendor performance index (percent of companies reporting slower deliveries), contracts and orders, plant and equipment (1987 dollars), building permits index (new private housing units), change in unfilled orders (durable goods in 1987 dollars), percentage change in sensitive material prices, stock price index (Standard and Poor's 500), money supply (M2 in 1987 dollars), and index of Consumer expectations (from the University of Michigan).[11] Additionally, Lynge (1981), Cornell (1983), and Pearce and Roley (1983) find that the monetary policy as measured by

money supply announcements influence financial markets. Because money supply M2 is one of the components in leading indicator, the percentage change of the index is widely regarded as the proxy of both the business conditions and monetary policy.[12]

Financial Market Conditions

Fama and French (1989) and Chauvet and Potter (2000) found evidence of significant dependence in the conditional distribution of stock returns on business conditions. Hence, we use the return of CRSP NYSE/AMEX/Nasdaq equal-weighted market index as our variable MR. Fama and French (1989) and Chauvet and Potter (2000) also show a time-varying relationship between risk and return around business cycle turning points using a default premium (DEF) in addition to MR. We calculate DEF as the difference between the quarterly average of daily rates on the Baa corporate bond and the ten-year Treasury bond from the Federal Reserve Statistical Release H.15, Selected Interest Rates. We anticipate the both the MR and DEF variables would be positively related to efficiency as both variables have been shown to be positively related to business conditions.

Other Controls: Bank Size and Growth, Market Concentration, and Deregulatory Events

Scale economies are widely hypothesized in bank efficiency. Hence, we expect the control for bank size, LTA (the log of total assets) to be positive. It could be, however, that large

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[11] See Auerbach and Kotlikoff (1995) for more information on the construction of the index.
[12] Other studies, like Waud (1970), Smirlock and Yawitz (1985), Pearce and Roley (1985), and Cook and Hahn (1988), have included Federal Reserve discount-rate changes as an economic conditions variable. Although results estimated with a discount rate variable are consistent with those reported herein, in the spirit of parsimony we decided not to report those since the discount window is no longer actively used for monetary policy.

banks generate excess efficiency to accommodate growth. Hence we also control for bank loan growth using ΔTL, the percent change in total loans.

It is believed that when market concentration is low, market competition (and efficiency) is high. Berger and Mester (2003) and Berger and DeYoung (2001) found a negative and significant correlation between bank efficiency and state-level Herfindahl (HERF). They note, however, that while cost efficiency should decline with HERF, profit efficiency may not if revenues are squeezed through competition.

The period under investigation was affected by three major regulatory events, FIRREA, FDICIA, and Riegle-Neal. Thus, we include dummy variables to control for the major regulatory environments during our sample period. FIRREA is the dummy variable to control the effect of the Federal Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989, which was signed by President Bush on August 9, 1989. The dummy variable is 1 at and after the third quarter of 1989, and the dummy variable of the other periods is 0. FDICIA is the dummy variable to control for the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991, which was signed by President Bush into law on December 20, 1991. Thus, we define the dummy variable FDICIA as 1 at and after the fourth quarter of 1991 and the others are 0. RNIBBEA represents the dummy variable to control for the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, enacted in September 1994. Therefore, RNIBBEA of the third quarter of 1994 and after the period are 1 and that of others periods is 0. Carow and Larsen (1997) and Madura and Wiley (2000), DeYoung, Hasan, and Kirchhoff (1998) generally conclude that recent regulatory changes like those controlled for here are efficiency enhancing.

We also include controls for seasonality and time trends. $Season_k$, for which k=1 to 3, are the dummies for the measurement of the seasonal effects. $Year_m$, for which m=1 to 9,

are the measurement of the time trend. Summary statistics and definitions for all variables are shown in Table 2.

Model Specifications

In order to elucidate the effects of the different local and national business and national financial market conditions variables we introduce those effects into econometric specifications in an orderly fashion. All of our model specifications control for loan growth, size, market concentration, seasonalities, and regulatory environments.

We first begin by examining the impact of each of the macroeconomic variables on efficiency. The specific model is:

$$\Delta XEFF_{it}^{c} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 FFP_{it} \text{ or } \beta_5 \Delta GDP_{it} \text{ or } \beta_6 \Delta UNEMP_{it} \text{ or } \beta_7 \Delta LEAD_{it}) + \beta_8 FIRREA_{it} + \beta_9 FDICIA_{it} + \beta_{10} RNIBBEA_{it} + \sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt} \quad (4)$$

Thus, for both profit and cost efficiency, we estimate four different specifications of equation (4) including each of the macroeconomic variables independently.

In our second specification, we include the two local economic variables independently with the control variables. The specific model is:

$$\Delta XEFF_{it}^{c(\pi)} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 \Delta \text{STPI}_{it} \text{ or } \beta_5 \Delta STUNEMP_{it}) + \beta_6 FIRREA_{it} + \beta_7 FDICIA_{it} + \beta_8 RNIBBEA_{it} + \sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt} \quad (5)$$

For equation (5), again for both profit and cost efficiency, we estimate two different specifications including each of the local economic variables independently.

Finally, we conduct a “horse race” between the macroeconomic variables, the local economic variables, and the financial market variables. While we recognize that there may be a high degree of correlation between these sets of variables, we are interested in determining if one set subsumes the predictive ability of the other set. This will allow us to determine if

each set of variables represents an independent source of predictability for bank efficiency. The specific model that we estimate is:

$$\Delta XEFF_{it}^{c(\pi)} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 \Delta \text{STPI}_{it} \text{ or } \beta_5 \Delta STUNEMP_{it}) + \beta_6 MR_{it} + \beta_7 DEF_{it} + \beta_8 \Delta GDP_{it} + \beta_9 FIRREA_{it} + \beta_{10} FDICIA_{it} + \beta_{11} RNIBBEA_{it} + \sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt} \quad (6)$$

In the spirit of parsimony we choose to report only ΔGDP in this specification,. Results are similar using other macroeconomic variables and are available from the authors upon request. We toggle the two state-level variables in the presence of ΔGDP, giving us two specifications each for cost and profit efficiency using equation (6).

III. Results and Discussion

All specifications include controls for idiosyncratic loan growth (ΔTL), size (LTA), and market concentration (HERF). Growth and size are negative in both the cost and profit efficiency specification, although they are generally statistically significant only in the profit efficiency specification. Hence, our specifications appear to pick up economies of scale in profit efficiency, although not cost efficiency.

HERF is positive and statistically significant in the cost efficiency specifications, although not in the profit efficiency specifications. As previous literature has suggested, this result makes sense if increased competition results in cost saving and efficiency but squeezes profit margins.

Each specification also contains controls for major legislative changes to bank regulation during the period of interest. All of the events, FIRREA, FDICIA, and RNIBBEA, are associated with increased cost efficiency (with the exception of two specifications wherein the

effect of RNIBBEA is statistically insignificant). FIRREA and RNIBBEA, however, are routinely associated with lower profit efficiency while FDICIA is associated with increased profit efficiency. Again, these effects are to be expected if FIRREA and RNIBBEA increased competition in the industry, which is widely viewed to be the case.

All specifications contain statistically significant time trends and seasonal effects due to the time series component of the data.

Tables 3 and 4 show profit and cost efficiency specifications that include only the different national-level business conditions variables. In Table 3 (the cost efficiency specification) the FFP and ΔUNEMP variables are negatively associated with cost efficiency and the ΔGDP and ΔLEAD variables are positively associated with cost efficiency. Recall that the FFP is the difference between the federal funds rate and the three-month Treasury-bill rate. A high spread therefore indicates low short-term expected economic growth. Similarly, high unemployment growth indicates low economic growth. High ΔGDP and high ΔLEAD are associated with increased economic growth. Hence, Table 3 illustrates a relationship wherein economic growth is positively associated with cost efficiency, that is, a procyclical relationship.

Table 4 illustrates a similar relationship with respect to profit efficiency. The main difference to note between the cost and profit efficiency specifications are the R-squared values for the different specifications. R-squareds in the cost efficiency specifications lie in the 0.20 range, while those for the profit efficiency models lie in the 0.04 range. As previous authors have suggested, this is not surprising since there is much more noise in profit efficiency due to the necessity of measuring the cost *and* revenue functions in developing the relevant frontier measurement. Given that fact, much of the extant literature focuses almost exclusively on cost

efficiency. Hence, the present results are strengthened further by the consistency of the national business conditions effects across profit and cost efficiency specifications.

Table 5 shows that local business conditions variables also explain significant variance in profit and cost efficiency. Similar to the results in Table 3, cost efficiency is positively associated with growth in state personal income (ΔSTPI) and negatively related with growth in unemployment (ΔSTUNEMP). Profit efficiency is positively associated with ΔSTPI, although the relationship with ΔSTUNEMP is statistically insignificant. Although not reported here, the local effects are robust to including any of the individual the national-level business conditions variables from Tables 3 and 4 in the specification.

Table 6 includes market condition variables along with local and national business conditions variables. Although Table 6 only reports results using ΔGDP as a national business conditions measure, the results reported in Table 6 are again robust to including the national variables from Tables 3 and 4.

The previously reported local business conditions results are generally robust to the market conditions variables. However, it is interesting to note that the profit efficiency specification containing ΔSTUNEMP now achieves statistical significance with respect to the positive coefficient on that variable. There are two potential explanations for that result. The first hypothesis is that banks with multi-state operations may not be very affected by state unemployment growth (as they are by national unemployment growth in Table 4).

The second hypothesis stems from the relationship between banks and markets uncovered in the profit efficiency specifications. Table 6 shows that MR is negative and DEF is positive in the profit efficiency specification, the opposite signs of those expected. We can speculate that the result may be due to Thakor (1998)-type complementarities between banks and

markets: high market returns proxy for a relatively low asymmetric information environment, in which a banks' intermediation functions based upon private information do not add much value. If that is the case, the opposite holds as well: banks' high asymmetric information intermediation functions may add value in regional economies experiencing high unemployment growth (ΔSTUNEMP), but not overall declines in personal income (ΔSTPI). Nonetheless, substantial work beyond the scope of this paper will be necessary to substantiate those hypotheses.

IV. Conclusions

This paper began by proposing to test directly the relationship between business conditions and bank performance. This relationship is important because business conditions and bank lending are felt to be complementary, which implies there may exist substantial procyclicality between bank performance and business cycle persistence.

Most previous studies of this phenomenon have used bank failures as a measure of banking sector disturbance. We, however, construct an approximately 300,000 bank/quarter panel data set of cost and profit efficiency measures to more continuously test for the effects of procyclicality that could lead to the widely hypothesized business cycle persistence.

Simple models of bank performance suggest that bank cost and profit efficiency is related to local and national business conditions and financial market conditions in ways that appear procyclical. Importantly, although all those sources of influence, local and national business conditions and financial market conditions, appear correlated each also appears individually important in explaining cost and profit efficiency over time.

Additionally, national unemployment appears to have a substantially different effect on profit efficiency than state unemployment. Furthermore, market returns and the default

premium in the profit efficiency specifications appear to demonstrate a competitive influence among financial markets and the banking sector. Hence profit efficiency specifications seem to show that bank and market complementarities may take effect during market downturns, wherein higher-asymmetric information intermediation becomes more valuable as markets decline and default spreads widen. However, decreased profit efficiencies may still arise if those market downturns are also associated with severe overall economic difficulties (especially on a national level), since those will result in decreased bank efficiency and, potentially, business cycle persistence.

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TABLE 1. STATISTICS OF COMMERCIAL BANK X-EFFICIENCY MEASURES, BY YEAR

	Cost Efficiency			Profit Efficiency		
Time Period Quarter/Year	N	Mean	Std Dev	N	Mean	Std
Q188	8566	0.9897	0.0059	8520	0.5145	0.3033
Q288	8575	0.9900	0.0058	8523	0.5093	0.2509
Q388	8501	0.9897	0.0059	8485	0.5225	0.2546
Q488	8448	0.9795	0.0095	8383	0.3808	0.6000
Q189	8492	0.9908	0.0052	8492	0.4435	8.9844
Q289	8444	0.9828	0.0077	8430	0.5063	0.3641
Q389	8408	0.9900	0.0055	8391	0.5186	0.2307
Q489	8332	0.9886	0.0061	8293	0.4604	0.3039
Q190	8330	0.9910	0.0049	8323	0.5373	0.2544
Q290	8267	0.9904	0.0052	8213	0.5174	0.2532
Q390	8214	0.9901	0.0053	8199	0.5076	0.4905
Q490	8127	0.9880	0.0064	8114	0.4431	0.4698
Q191	8156	0.9909	0.0048	8115	0.5055	0.5149
Q291	8056	0.9907	0.0050	8012	0.5152	0.2574
Q391	7995	0.9904	0.0051	7968	0.5068	0.3414
Q491	7834	0.9891	0.0055	7806	0.4539	0.7357
Q192	7858	0.9917	0.0043	7828	0.5320	0.3253
Q292	7735	0.9918	0.0044	7720	0.5383	0.3162
Q392	7620	0.9906	0.0049	7530	0.4781	0.3248
Q492	7454	0.9922	0.0044	7455	0.4788	0.3471
Q193	7499	0.9934	0.0037	7491	0.5436	0.2667
Q293	7335	0.9935	0.0037	7318	0.5145	2.1116
Q393	7226	0.9935	0.0037	7246	0.5350	0.2509
Q493	7108	0.9925	0.0041	7129	0.4611	0.5164
Q194	7146	0.9942	0.0033	7146	0.5527	0.2397
Q294	7038	0.9939	0.0034	7030	0.5614	0.2549
Q394	6931	0.9940	0.0034	6950	0.5647	0.2769
Q494	6831	0.9919	0.0042	6851	0.5110	0.4447
Q195	6755	0.9945	0.0031	6754	0.5583	0.5728
Q295	6693	0.9943	0.0032	6679	0.4560	7.7317
Q395	6612	0.9948	0.0030	6626	0.5830	0.2163
Q495	6486	0.9942	0.0034	6519	0.5433	0.2398
Q196	6498	0.9950	0.0028	6498	0.5866	0.2214
Q296	6343	0.9948	0.0030	6338	0.5740	0.2186
Q396	6245	0.9951	0.0029	6260	0.5805	0.2197
Q496	6184	0.9947	0.0030	6216	0.5462	0.2662
Q197	6184	0.9954	0.0026	6184	0.5917	0.2195
Q297	6035	0.9953	0.0028	6035	0.5888	0.2184
Q397	5915	0.9954	0.0027	5927	0.5967	0.2209
Q497	5794	0.9950	0.0029	5823	0.5530	0.2474

TABLE 2. VARIABLE DEFINITIONS AND SUMMARY STATISTICS

Variable	Definition	Mean	Std Dev
Bank Efficiency Variables (dependent variables)			
ΔCXEF	quarterly percentage change of cost efficiency	0.0001	0.0053
ΔAPXEF	quarterly percentage change of profit efficiency	-0.0400	0.4540
Bank Size and Structure (control) Variables			
LTA	natural logarithm of bank size based on bank's total assets	11.3030	1.3030
ΔTL	percentage change of total loans outstanding	0.1170	13.5060
HERF	quarterly Herfindahl index weighted by share of affiliate deposits in each state that the bank charter in	0.0700	0.0580
National Business Conditions			
FFP	The difference between the federal funds rate and the three-month Treasury-bill rate	0.0034	0.0040
ΔGDP	Percentage change of gross domestic products	0.0140	0.0054
ΔUNEMP	Average percentage change of unemployment rate at the national level	-0.0050	0.0340
ΔLEAD	Percentage change of the leading economic indicator	0.0012	0.0039
State Business Conditions			
ΔSTPI	growth of state personal income	0.0140	0.0120
ΔSTUNEMP	percentage change of state unemployment rate	-0.0030	0.1310
Financial Market Conditions			
MR	market returns	0.0830	0.0930
DEF	default premium	0.0180	0.0030
Regulatory Event Dummy Variables			
FIRREA	dummy of the Federal Institutions Reform, Recovery, and Enforcement Act of 1989	0.8500	0.3600
FDICIA	dummy of Federal Deposit Insurance Corporation Improvement Act of 1991	0.6250	0.4800
RNIBBEA	dummy of Riegle-Neal Interstate banking and Branching Efficiency Act of 1994	0.3500	0.4800
Season Dummy Variables			
QUARTER1	dummy variable for quarter 1	0.2500	0.4300
QUARTER2	dummy variable for quarter 2	0.2500	0.4300
QUARTER3	dummy variable for quarter 3	0.2500	0.4300
Time Trend Dummy Variables			
YEAR88	time trend dummy for year 1988	0.1000	0.3000
YEAR89	time trend dummy for year 1989	0.1000	0.3000
YEAR90	time trend dummy for year 1990	0.1000	0.3000
YEAR91	time trend dummy for year 1991	0.1000	0.3000
YEAR92	time trend dummy for year 1992	0.1000	0.3000
YEAR93	time trend dummy for year 1993	0.1000	0.3000
YEAR94	time trend dummy for year 1994	0.1000	0.3000
YEAR95	time trend dummy for year 1995	0.1000	0.3000
YEAR96	time trend dummy for year 1996	0.1000	0.3000

TABLE 3. COST EFFICIENCY MODELS WITH NATIONAL-LEVEL BUSINESS CONDITIONS

This table contains the results of models with national level macro economic factors in equation below. The definitions of the variables in the models are shown in Table 2

$$\Delta XEFF^{c}_{it} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 FFP_{it} \text{ or } \beta_5 \Delta GDP_{it} \text{ or } \beta_6 \Delta UNEMP_{it} \text{ or } \beta_7 \Delta LEAD_{it}) + \beta_8 FIRREA_{it} + \beta_9 FDICIA_{it} + \beta_{10} RNIBBEA_{it} + \sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt}$$

Dependent Variable:	**Cost Efficiency**			
Intercept	-0.0061***	-0.0105***	-0.0080***	-0.0081***
ΔTL	-1.47E-06	-1.33E-06	-1.34E-06	-1.44E-06
LTA	-1.12E-05	-1.17E-05*	-1.12E-05	-1.17E-05
HERF	0.0003*	0.0003*	0.0003	0.0003*
FFP	-0.5073***			
ΔGDP		0.1955***		
ΔUNEMP			-0.0281***	
ΔLEAD				0.1259***
FIRREA	0.0033***	0.0043***	0.0039***	0.0027***
FDICIA	0.0012***	0.0009***	0.0010***	0.0021***
RNIBBEA	0.0004***	0.0001**	-5.00E-05	0.0005***
QUARTER1	0.0054***	0.0051***	0.0054***	0.0053***
QUARTER2	0.0019***	0.0012***	0.0014***	0.0014***
QUARTER3	0.0034***	0.0033***	0.0028***	0.0029***
YEAR88	0.0052***	0.0017***	0.0027***	0.0033***
YEAR89	0.0097***	0.0054***	0.0062***	0.0070***
YEAR90	0.0029***	0.0015***	0.0026***	0.0034***
YEAR91	0.0018***	0.0021***	0.0029***	0.0025***
YEAR92	-4.00E-05	0.0008***	0.0019***	0.0014***
YEAR93	-0.0017***	0.0007***	0.0001*	0.0010***
YEAR94	-0.0018***	-0.0001**	-0.0004***	0.0004***
YEAR95	0.0009***	0.0015***	0.0014***	0.0013***
YEAR96	-0.0005***	0.0002***	0.0007***	0.0002***
Adjusted R^2	0.1964	0.2052	0.1993	0.1887

***, **, and * represent 1%, 5%, and 10% statistical significance levels, respectively.

TABLE 4. PROFIT EFFICIENCY MODELS WITH NATIONAL-LEVEL BUSINESS CONDITIONS

This table contains the results of models with national level macro economic factors in equation below. The definitions of the variables in the models are shown in Table 2

$$\Delta XEFF_{it}^{\pi} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 FFP_{it} \text{ or } \beta_5 \Delta GDP_{it} \text{ or } \beta_6 \Delta UNEMP_{it} \text{ or } \beta_7 \Delta LEAD_{it}) + \beta_8 FIRREA_{it} + \beta_9 FDICIA_{it} + \beta_{10} RNIBBEA_{it} + \sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt}$$

Dependent Variable:	**Profit Efficiency**			
Intercept	0.1579***	0.0495***	0.1161***	0.0811***
ΔTL	-0.0004**	-0.0004**	-0.0004**	-0.0004**
LTA	-0.0067***	-0.0067***	-0.0067***	-0.0067***
HERF	-0.0203	-0.0202	-0.0212	-0.0200
FFP	-10.9814***			
ΔGDP		4.9536***		
ΔUNEMP			-0.5811***	
ΔLEAD				6.2545***
FIRREA	-0.0861***	-0.0625***	-0.0737***	-0.1163***
FDICIA	0.0035	-0.0048	-0.0010	0.0521***
RNIBBEA	-0.0287***	-0.0348***	-0.0379***	-0.0241***
QUARTER1	0.2594***	0.2519***	0.2611***	0.2567***
QUARTER2	0.0781***	0.0628***	0.0682***	0.0670***
QUARTER3	0.1114***	0.1105***	0.0976***	0.1028***
YEAR88	-0.0827***	-0.1580***	-0.1365***	-0.0922***
YEAR89	0.0766***	-0.0164	-0.0011	0.0634***
YEAR90	0.0058	-0.0222**	-0.0014	0.0777***
YEAR91	-0.0302***	-0.0198**	-0.0061	0.0159
YEAR92	-0.0495***	-0.0317***	-0.0084	-0.0080
YEAR93	-0.0879***	-0.0344***	-0.0481***	-0.0119
YEAR94	-0.0375***	-0.0003	-0.0064	0.0226***
YEAR95	0.0206***	0.0355***	0.0300***	0.0502***
YEAR96	-0.0103**	0.0034	0.0134***	0.0063
Adjusted R^2	0.0422	0.0431	0.0423	0.0427

***, **, and * represent 1%, 5%, and 10% statistical significance levels, respectively.

TABLE 5. PROFIT AND COST EFFICIENCY MODELS WITH LOCAL-LEVEL BUSINESS CONDITIONS

This table contains the results of models with state level economic factors in equation below. The definitions of the variables in the models are shown in Table 2

$$\Delta XEFF_{it}^{c(\pi)} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 \Delta \text{STPI}_{it} \text{ or } \beta_5 \Delta STUNEMP_{it}) +$$
$$\beta_6 FIRREA_{it} + \beta_7 FDICIA_{it} + \beta_8 RNIBBEA_{it} + \sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt}$$

Dependent Variable:	**Cost Efficiency**		**Profit Efficiency**	
Intercept	-0.0085***	-0.0073***	0.0944***	0.1393***
ΔTL	-1.36E-06	-1.48E-06	-0.0004**	-0.0004**
LTA	-2.24E-07	-9.19E-06	-0.0063***	-0.0067***
HERF	4.98E-05	0.0004**	-0.0292*	-0.0203
ΔSTPI	0.0628***		1.8636***	
ΔSTUNEMP		-0.0022***		0.0183
FIRREA	0.0039***	0.0033***	-0.0704***	-0.0869***
FDICIA	0.0011***	0.0012***	0.0009	0.0018
RNIBBEA	7.97E-05	0.0003***	-0.0373***	-0.0307***
QUARTER1	0.0056***	0.0058***	0.2657***	0.2563***
QUARTER2	0.0015***	0.0013***	0.0710***	0.0703***
QUARTER3	0.0031***	0.0028***	0.1068***	0.0981***
YEAR88	0.0025**	0.0023***	-0.1372***	-0.1463***
YEAR89	0.0052***	0.0055***	-0.0228**	-0.0182
YEAR90	0.0009***	0.0014***	-0.0389***	-0.0314***
YEAR91	0.0014***	0.0016***	-0.0372***	-0.0386***
YEAR92	0.0006***	0.0011***	-0.0397***	-0.0266***
YEAR93	0.0004***	0.0003***	-0.0425***	-0.0449***
YEAR94	-0.0002***	-7.12E-05	-1.57E-03	1.77E-03
YEAR95	0.0008***	0.0006***	0.0207***	0.0121***
YEAR96	2.18E-05	7.15E-05	-1.27E-05	3.20E-04
Adjusted R^2	0.2032	0.1856	0.0434	0.0416

***, **, and * represent 1%, 5%, and 10% statistical significance levels, respectively.

TABLE 6. COST AND PROFIT EFFICIENCY MODELS WITH LOCAL- AND NATIONAL-LEVEL BUSINESS CONDITIONS AND NATIONAL FINANCIAL MARKET CONDITIONS

This table contains the results of models with both state level economic factors and national level macro economic factors in equation below. The definitions of the variables in the models are shown in Table 2.

$$\Delta XEFF_{it}^{c(\pi)} = \alpha + \beta_1 \Delta TL_{it} + \beta_2 LTA_{it} + \beta_3 HERF_{it} + (\beta_4 \Delta \text{STPI}_{it} \text{ or } \beta_5 \Delta STUNEMP_{it}) +$$
$$\beta_6 MR_{it} + \beta_7 DEF_{it} + \beta_8 \Delta GDP_{it} + \beta_9 FIRREA_{it} + \beta_{10} FDICIA_{it} + \beta_{11} RNIBBEA_{it} +$$
$$\sum_{k=1}^{3} \theta_k SEASON_{kt} + \sum_{m=1}^{9} \varphi_m YEAR_{mt}$$

Model Variables	Cost Efficiency		Profit Efficiency	
Intercept	-0.0184***	-0.0185***	-0.1540***	-0.1478***
ΔTL	-1.27E-06	-1.31E-06	-0.0004**	-0.0004**
LTA	-4.54E-06	-1.10E-05	-0.0065***	-0.0067***
HERF	0.0002	0.0004**	-0.0251	-0.0187
ΔSTPI	0.0450***		1.4280***	
ΔSTUNEMP		-0.0016***		0.0373***
MR	0.0013***	0.0010***	-0.0435***	-0.0565***
DEF	0.4572***	0.4708***	12.0652***	12.2974***
ΔGDP	0.2324***	0.2788***	5.5974***	7.2162***
FIRREA	0.0035***	0.0033***	-0.0845***	-0.0909***
FDICIA	0.0003***	0.0003***	-0.0227***	-0.0255***
RNIBBEA	0.0008***	0.0010***	-0.0113*	-0.0064
QUARTER1	0.0051***	0.0052***	0.2606***	0.2468***
QUARTER2	0.0015***	0.0013***	0.0717***	0.0710***
QUARTER3	0.0037***	0.0036***	0.1237***	0.1212***
YEAR88	-0.0006***	-0.0010***	-0.2227***	-0.2369***
YEAR89	0.0043***	0.0045***	-0.0481***	-0.0465***
YEAR90	0.0006***	0.0010***	-0.0540***	-0.0488***
YEAR91	0.0007***	0.0010***	-0.0490***	-0.0455***
YEAR92	-0.0008***	-0.0005***	-0.0660***	-0.0577***
YEAR93	-0.0008***	-0.0007***	-0.0665***	-0.0648***
YEAR94	0.0002***	0.0002***	0.0064	0.0087
YEAR95	0.0013***	0.0013***	0.0327***	0.0334***
YEAR96	-0.0003***	-0.0003***	-0.0094**	-0.0089*
Adjusted R^2	0.2272	0.2195	0.0448	0.0439

***, **, and * represent 1%, 5%, and 10% statistical significance levels, respectively.