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Community Bank Performance in the Presence of County Economic Shocks

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Abstract

A potentially troubling characteristic of the U.S. banking industry is the geographic concentration of many community banks' offices and operations. If geographic concentration of operations exposes banks to local market risk, we should observe a widespread decline in their financial performance following adverse economic shocks. By analyzing the performance of a sample of geographically concentrated U.S. community banks exposed to severe unemployment shocks in the 1990s, we find that banks are not particularly sensitive to local economic deterioration. Indeed, performance at banks in counties that suffered economic shocks is not statistically different from performance at banks that did not suffer economic shocks.

These findings suggest that an additional supervisory tax such as higher capital requirements on banks with geographically concentrated operations is unwarranted. They also suggest that such banks are unlikely to reduce risk significantly through geographic expansion. Finally, bank supervisors should not rely systematically on county-level labor data to forecast or even to explain contemporaneous community bank performance. Rising county-level unemployment rates are consistent with both healthy and deteriorating bank performance.

JEL Codes: G1, G2
Key Words: community bank, bank performance, idiosyncratic risk, local market risk, geographic diversification, economic shocks, county unemployment

I. Community Bank Exposure to Local Market

Because of the way that U.S. banking laws evolved, many U.S. community banks have geographically concentrated offices and operations. Historically, national and state banking laws prevented banks from branching into other counties and states. Justification for such legislation was to promote sound and stable banking markets by limiting competitive pressures on existing banks and to prevent an excessive concentration of financial power.[1] Such laws, however, left banks vulnerable to local economic downturns. Despite liberalized branching laws, thousands of small banks with geographically concentrated offices remain. As of June 2000, 62 percent of U.S. commercial banks derived all of their deposits from offices in a single county.[2] Many banks, therefore, remain potentially vulnerable to local economic downturns.

Portfolio theory suggests that geographically concentrated banks may be riskier than more geographically diversified banks because of heightened credit risk. Banks with geographically concentrated lending activities have difficulty diversifying credit risk because of the high monitoring costs involved in booking loans to customers in distant locations. Bank performance may deteriorate significantly when the local economy suffers a recession or a negative economic shock because its customer base is affected by similar economic events. We call this risk *local market risk*. A bank with a more diversified loan base would be affected less severely.

Alternatively, banks with geographically concentrated operations may not be particularly vulnerable to local market risk. Although research has shown that community banks tend to lend to firms and individuals nearby (Laderman 1991), such

[1] Berger et. al. (1995), Jayaratne and Strahan, 1997.
[2] Summary of Deposits 2000, Federal Deposit Insurance Corporation.

banks may engage in financial diversification through loan sales and participations, making their loan portfolios less dependent on local conditions. In addition, many local firms that banks lend to may be diversified from local shocks by selling their products to different regions of the U.S. or to different nations altogether. A local downturn, therefore, may not affect many of the bank's loan customers. The vulnerability of community banks to local economic conditions, then, is an empirical issue.

We test the hypothesis that community banks with geographically concentrated operations are vulnerable to county-level economic shocks by comparing bank performance before and after a local unemployment shock. We find that about 20 percent of community banks respond negatively to local economic shocks, but the negative response is not significantly different from a randomly chosen peer group of banks that were not exposed to local economic shocks. In short, banks with geographically concentrated offices do not appear to have significant exposure to local market risk, but they do appear to be exposed to significant idiosyncratic risk.

These findings have three policy implications. First, bank supervisors need not require geographically concentrated community banks to take additional measures relative to more diversified banks to reduce local market risk. Second, as community banks take advantage of the recent relaxation of U.S. branching restrictions, risk reduction through geographic diversification is likely to be small. Third, bank supervisors should not rely systematically on county economic data to conduct bank surveillance. County economic data add few marginal benefits in predicting or even explaining community bank performance.

II. Literature Review

Few researchers have addressed the vulnerability of community banks to local market risk. Meyer and Yeager (2001) find little evidence to support the hypothesis that small banks located in the Federal Reserve's Eighth District are vulnerable to local economic downturns. Specifically, they find that county economic data were weakly correlated with small rural bank performance between 1990 and 1997. Meyer and Yeager's conclusions, however, rely heavily on the quality of local economic data. Noisy economic data may disguise the true correlation. In addition, the authors look at the *average* relationship between local economic data and bank performance variables without separately analyzing the outliers. The relationship between bank performance and county economic conditions may be nonlinear such that banks can reasonably manage minor economic shocks but performance deteriorates rapidly as the economic shocks become more severe.

Emmons, Gilbert and Yeager (2001) examine the risk-reduction effects from simulated community bank mergers. They find that bank risk is reduced significantly as merged banks grow larger, but the risk reduction is driven by scale effects, not geographic diversification. Indeed, the degree of geographic diversification in the post-merger bank does not contribute significantly to risk reduction. The results suggest that community bank idiosyncratic risk is significant but local market risk is not.

Several researchers have focused on a broader geographic area, detecting a correlation between regional economic conditions and bank performance. Zimmerman (1996) finds that in the early 1990s banks in southern California performed worse than those in the Central Valley and northern California because southern California was hit

much harder by the 1990-1991 recession. Neely and Wheelock (1997) find that bank earnings are still correlated significantly with state economic activity despite recent branching restrictions.

A few researchers argue that the vulnerability of banks to regional economic markets has declined over the last few decades, either because banks or regional economies have become more diversified. Gunther and Robinson (1999) find that banks faced less risk from variations in regional economic performance in 1996 than in 1985 in part because of industry diversification at the state level. Petersen and Rajan (2000) find that community banks increased their lending to more distant borrowers over the last few decades. In particular, the distance between small firms and lenders grew from an average of 51 miles in the 1970s to 161 miles in the 1990s. The authors attributed most of the gain to improvements in gathering and analyzing information. Banks reduced the importance of person-to-person contact by relying increasingly on financial statements and credit reports to evaluate potential borrowers. Credit markets have also become more efficient. Banks can engage more easily in financial diversification through loan participations or collateralized mortgage obligations, which offset some of their credit risk. Because of the decreased costs to diversification without geographic expansion, banks may have reduced or eliminated the risk exposures that previous intrastate branching restrictions imposed.

III. Selection of Banks and Counties with Economic Shocks

We wish to analyze the performance of geographically concentrated banks that were exposed to large negative local economic shocks. Unlike Meyer and Yeager (2001), our analysis is not distorted by potential random variations in the unemployment

data because we focus exclusively on banks that were exposed to severe local economic shocks rather than focusing on all banks and all counties within a geographical area. If the performance of community banks located in counties that suffered significant economic distress show little correlation with local economic activity, then we can be quite confident that local market risk is not significant at community banks.

The first step is to identify counties that suffered economic shocks sometime between the fourth quarter of 1990 and the third quarter of 1998. The sample does not precede 1990 because reliable county labor data are not available. This time period allows observations of bank performance up to three quarters before and two years after the economic shock to give a reasonable time period to compare pre- and post-shock performance.

We define local economic shocks two different ways, using a 50 percent change rule and a total cost rule. The 50 percent change rule requires a 50 percent or greater increase in the seasonally-adjusted county unemployment rate between the rate in a given quarter and the average rate over the following year, given that the initial unemployment rate was 6 percent or higher. The six-percent cutoff captures the assumption that unemployment rates below this level represent a fully employed or more-than-fully employed labor force so that increases in unemployment rates up to 6 percent are not as costly as unemployment rate increases above 6 percent. Suppose, for example, that the seasonally-adjusted unemployment rate in the fourth quarter of 1991 was 6 percent. The average unemployment rate in 1992 had to be at least 9 percent to qualify as a shock.

The 50 percent change rule has two shortcomings. First, it misses counties that had large unemployment rate increases but began with unemployment rates under six

percent. A county would not be classified as experiencing a shock, for example, if the unemployment rate rose from 5 percent to 10 percent. Another shortcoming is that the 50 percent change rule requires counties with initially high unemployment rates to past a stricter test to be counted as an economic shock than counties that begin with lower unemployment rates. That is, an increase in the unemployment rate from 6 percent to 9 percent qualifies as a shock but an initial unemployment rate of 7 percent must increase to 10.5 percent to qualify. In fact, a rate increase from 7 percent to 10 percent may be more harmful than an increase from 6 percent to 9 percent.

The total-cost rule is a more comprehensive definition of an economic shock which accounts for the shortcomings of the 50 percent change rule. We define a total cost variable (TC) based on the following formula, and define a shock as one in which TC exceeds six:

$$TC = TC_1 + TC_2 \qquad (1)$$

where $TC_1 = \max [\min [U_{t+1}, 6] - U_t, 0]$

$TC_2 = (\max [U_{t+1}, 6] - 6)^{1.5} - (\max [U_t, 6] - 6)^{1.5}$

U_t = current quarter's unemployment rate

U_{t+1} = average unemployment rate over the next four quarters

Given this definition, the first cost component, TC_1, rises linearly as the unemployment rate rises to 6 percent, the implicit natural rate of unemployment. If U_t is 4 and U_{t+1} is 9, TC_1 is two (6 – 4). Because we assume that the hardships of unemployment on a bank increase as unemployment rises above the natural rate, the second cost component, TC_2, increases exponentially with a rise in the unemployment rate above 6 percent. A rise in the rate from 4 percent to 9 percent results in a value for TC_2 of 5.2 ($(9 - 6)^{1.5}$), for a total cost of 7.2 (2 + 5.2). Figure 1 illustrates the calculation of total cost given an initial

unemployment rate of 4 percent. If the leading unemployment rate exceeds 8.52 percent, the change qualifies as an economic shock. Finally, because the first component of TC_2 calculates the cost of unemployment assuming that the initial unemployment rate was 6 percent, the second component of TC_2 subtracts the amount by which the initial unemployment rate exceeds 6 percent. If, for example, the unemployment rate rises from 8 percent to 11 percent, TC_1 is zero, but TC_2 is $(11 - 6)^{1.5} - (8 - 6)^{1.5}$, or 8.35. This increase also qualifies as a shock.

Although our definition of an economic shock is somewhat arbitrary, we define a shock such that by most subjective measures, a large change in the county unemployment rate occurs over a relatively short period of time. We are confident, therefore, that we are isolating counties that have suffered serious setbacks; the changes in unemployment rates are not driven simply by noisy data. We assessed the vulnerability of community banks to local economic shocks using both the total-cost rule and the 50 percent change rule. Because the total-cost definition of a shock is more sophisticated and because the results from both rules were similar, we report only the results from the total-cost definition of an economic shock.

After defining an economic shock, we selected a sample of counties from across the U.S. that suffered an economic shock some time in the 1990s. To reduce the sample size to a manageable level and to ensure a national sample, we selected counties from only one state in each of the nine Census divisions.[3] The states (arbitrarily) chosen were Arizona, California, Connecticut, Georgia, Illinois, Iowa, Mississippi, Oklahoma and

[3] The nine Census Divisions are New England, Middle Atlantic, East North Central, West North Central, South Atlantic Division, East South Central, West South Central, Mountain and Pacific.

Pennsylvania. If a county suffered from two or more economic shocks in the 1990s, we used the time period of the first shock.

Additional qualifications were placed on the selection of counties even if they experienced an economic shock. Each county chosen had to have at least two headquarter banks with all of their deposits derived from offices in that county in every quarter throughout the 1990s.[4] These criteria allowed us to identify banks with geographically concentrated operations and to exclude banks with merger activity outside of county boundaries because such mergers may make a bank less vulnerable to a county economic shock. The requirement that each county have at least two geographically concentrated banks reduced the possibility that random bank-specific factors affected bank performance measures, and it allowed us to conduct intra-county bank comparisons. Finally, the restrictions ensured that each bank selected from a given county existed at least one year before and two years after the economic shock so that we could adequately measure the bank's performance before and after the shock.

Our selection criteria produced 103 banks from 38 counties. The counties are listed in Table 1 with the number of banks chosen from each county, the seasonally-adjusted county unemployment rates both before and after the economic shocks, the total cost of the shock, and the county labor force in the quarter of the shock. Despite screening the sample on all nine Census divisions, just five states—California, Georgia, Illinois, Iowa and Oklahoma—are represented in the final sample. Most of the shocks occurred in Georgia counties in 1990 and 1991 during the U.S. recession, though every year between 1990 and 1997 except 1994 is represented.

[4] We used Summary of Deposit data from the FDIC and OTS to isolate banks with all deposits in offices in a single county.

IV. Bank Performance Following Local Economic Shocks

The vulnerability of geographically concentrated banks to local market risk can be measured by comparing pre- and post-shock bank performance. We must specify the criteria to assess bank performance. We focus primarily on asset quality measures because, all else equal, geographically concentrated banks are likely to have higher credit risk than more diversified banks. Three ratios that bank examiners routinely use to assess asset quality are provision expense to total assets (earnings set aside to cover loan losses), nonperforming loans to total assets (loans 90 days or more past due and nonaccruing), and loan losses to total assets (charge-offs less recoveries). We also examine one common income measure, return on assets (ROA), which is net income divided by assets. Earnings may capture performance trends broader than asset quality trends. Although theoretical reasons exist to believe that a bank's liquidity position will deteriorate after a local economic shock, we exclude liquidity ratios because the common ratios from the call reports are too blunt to draw any meaningful conclusions. Liquidity ratios often fail to capture important information about a bank's true liquidity exposure.

We first assess the vulnerability of banks exposed to economic shocks by aggregating the accounting data of the sample banks in a given county. Aggregation of the banks has the advantage of dampening idiosyncratic bank factors and allows us to more easily illustrate the impact of economic shocks on bank performance by reducing the number of sample banks from 103 to 38.

To control for factors such as bank location and the state of the business cycle, we compare changes in the four key bank performance ratios relative to peer bank ratios. The peer bank ratios for a sample bank in a given county are asset-weighted averages of

ratios from banks with less than $250 million in assets with headquarters in the same state as the sample bank, excluding banks located in the same counties as the sample banks. Each of the sample banks has less than $250 million in assets; therefore, the peer banks are selected to be similar in size so that the peer ratios are not influenced by financial data from larger banks. Subtracting the peer banks' ratios from the sample banks' ratios in a given quarter controls for location and business cycle factors. For example, Greene County, Georgia suffered an adverse economic shock in the fourth quarter of 1991. The aggregated ratio of nonperforming loans to total loans of the three sample banks in that county was 4.70 percent in 1991:4 and 2.54 percent a year earlier. In contrast, nonperforming loans at peer Georgia banks were 1.77 percent in 1991:4 and 1.73 percent a year earlier. The change in nonperforming loans at Greene County banks relative to peer banks is (4.70 – 1.77) – (2.54 – 1.73), or 2.12 percentage points. In other words, we measure bank deterioration following an economic shock relative to the deterioration of peer banks.

To illustrate the diversity in county-aggregated bank performance before and after an economic shock, we plot in Figure 2 the performance ratios of two of the worst performing banks (Greene and Meriwether, Georgia) and two of the best performing banks (Lake California, and Calhoun Illinois) following economic shocks. Time period '0' is the quarter of the shock. The vertical axis represents the difference between the sample bank ratios and peer bank ratios. Banks in Greene and Meriwether counties react to the economic shock with falling ROA, increased provision expense and higher nonperforming loans and loan losses. Calhoun County banks seemed to have suffered deteriorating performance before the economic shock. Earnings and asset quality

deteriorated at least a year prior to period 0. Perhaps Calhoun County suffered an economic or idiosyncratic shock prior to the fourth quarter of 1990 that our sample excludes. Finally, Lake County appears unfazed and even thrives during and after the economic shock. Earnings and asset quality remain strong and even improve somewhat for the two years following the shock.

Rather than plotting and analyzing time series graphs for all 38 counties (and 103 banks), we need a way to synthesize and quantify the impact of the shocks on bank performance. For each performance measure, we compute the average ratio differences between the sample banks and peer banks for the nine quarters during and following the economic shock (time periods 0 through 8) and subtract from that value the average differences between the sample banks and peer banks one year prior to the shock (time periods –4 through –1).[5] For example, the average difference in nonperforming loans between sample and peer banks after the shock in Greene County is 2.84 percent, while the average difference in nonperforming loans between sample and peer banks one year before the shock is 1.29 percent. We conclude, therefore, that the local economic shock in Greene County caused nonperforming loans to rise by 1.55 percentage points (2.84 – 1.29) relative to peer banks. This method assumes that bank performance reacts contemporaneously with economic performance, an assumption that seems to hold quite well for most of the banks and counties as observed in time series plots. The performance ratio differences before and after the economic shock are listed in Table 2 along with the relative rank of each of the county-aggregated banks. Counties are listed

[5] We also constructed rankings using the quarter before and the quarter after as the dividing dates to compute the deterioration in asset quality. Although the rankings were slightly altered, the same clusters of banks remained in the top and bottom portions of the rankings.

by the sum of ranks of the four performance ratios, ranked from the most affected banks to the least affected banks.

The vulnerability of banks to local economic shocks varies widely across the sample. Greene County ranks first in provision expense, nonperforming loans and ROA, and second in loan losses to receive the top ranking overall. Georgia counties occupy the top seven spots in the list. At the bottom of the list are banks from McIntosh County in Oklahoma, Lake County in California and Calhoun County in Illinois. In each of these cases asset quality improves and earnings are either unchanged or improved after the economic shock. As Figure 2 illustrates, however, the results from Calhoun County are driven by an apparent recovery from a previous shock prior to the county economic shock that we capture in the third quarter of 1992.

Besides knowing the relative vulnerability of geographically concentrated banks to local economic shocks, we also would like a measure of economic significance. Just how big are the differences in performance ratios before and after the economic shocks? Provision expense at Green County banks relative to peer banks, for example, increases 80 basis points after the shock; is this a large increase?

Bank examination ratings guide our assessments of large changes in bank performance ratios. CAMELS is an acronym that stands for Capital adequacy, Asset quality, Management, Earnings, Liquidity and Sensitivity (to market risk). Each time a bank is examined, regulators assign a composite rating and an individual rating to each of the CAMELS components. CAMELS ratings range from 1 (the safest banks) to 5 (the riskiest banks). Banks with composite ratings of 1 and 2 are considered to exhibit "strong" and "satisfactory" performances, respectively. Banks that fall below a 2 rating

may prompt supervisory action, which could include a board resolution, a memorandum of understanding, a written agreement, or a cease and desist order. Hence, regulators consider a drop from a 2 rating to a 3 rating to be a significant change.

Median differences in bank performance ratios between 2- and 3-rated banks serve as our benchmarks for evaluating economic significance. To be consistent with our sample, we constructed the benchmarks using examination ratings and performance ratios of banks with less than $250 million in assets in the states of California, Georgia, Illinois, Iowa, and Oklahoma between 1990 and 1997. We used only bank performance ratios at the time of the bank examination instead of using all performance ratios for 2- and 3-rated banks to avoid endogeneity issues that might arise if supervisors required 3-rated banks to improve performance. Inclusion of all the ratios would potentially decrease the differences between 2- and 3-rated banks. Table 3 lists the median performance ratios for 2- and 3- rated banks. For banks with a CAMELS asset-rating of 3 (the 'A' rating), the median provision expense was 16 basis points higher, nonperforming loans were 117 basis points higher, and loan losses were 32 basis points higher than 2-rated banks. For banks with a CAMELS earnings rating of 3 (the 'E' rating), ROA was 31 basis points lower than 2-rated banks.

To obtain our measures of economic significance, we divide the difference in each performance ratio in Table 2 by the benchmark differences between CAMLES 2- and 3-rated banks. A ratio of one or greater means that the performance ratio relative to the peer group deteriorated more than the benchmark difference between a 2- and 3-rated bank. For example, provision expense increased 81 basis points at our sample banks in Greene County, 4.3 times the benchmark difference. Nonperforming loans increased 1.2

times, loan losses 1.5 times, and ROA 1.93 more than the benchmark differences. Asset quality and earnings, therefore, deteriorated more than enough relative to peer banks to increase Greene County asset quality and earnings CAMELS ratings by at least one full point, an economically significant change. Economically significant differences in ratios are shaded in gray in Table 2.

A relatively small amount of banks appear to be affected by the local economic shocks. Table 2 shows that 13.8 percent (21 of 152) of the changes in county-aggregated bank performance measures were economically significant. Looked at another way, just six of the 38 counties (15.8 percent) had two or more performance ratios with economically significant changes.

In addition to analyzing the county-aggregated bank performance, we analyzed each of the 103 sample bank's performance separately. The analysis was identical to that of the county-aggregated analysis except that we calculated and ranked the pre-shock and post-shock differences between performance ratios on a bank-by-bank basis. The sensitivity of banks to local economic shocks increased slightly relative to the county-aggregated results. Indeed, 19.7 percent (81 of 412) of the performance measures showed economically significant deterioration. In addition, 19.4 percent of the banks had two or more performance ratios with economically significant changes. In sum, up to about 20 percent of the sample banks seemed to react significantly to local economic shocks.

The relatively weak correlation between county economic shocks and bank performance could be due to survivorship bias. Local economic shocks may lead banks to fail, which eliminates them from our sample. Fortunately, banking data allow us to

investigate the importance of this bias. We obtained a list from the FDIC of every bank that failed between 1990 and 1999 in each of the nine states.[6] In total there were 109 bank failures, nearly half of which were in California. We then screened those banks on two criteria: each bank had to have all of its deposits in a single county just before failure, and it had to have its headquarters in a county that suffered an economic shock in the same year or the year prior to the failure. Although 62 banks passed the deposit screen, just one bank from Marion County, Mississippi passed both screens. We conclude, therefore, that survivorship bias is not influencing our results.

V. Bank Performance in the Absence of Economic Shocks

Although we have demonstrated that up to one-fifth of the sample banks in the counties that experienced economic shocks experienced significant economic deterioration, we still must show that this deterioration was more than the deterioration that we would observe from banks in a randomly chosen set of counties that did not experience economic shocks. Arguing that perhaps 20 percent of community banks with geographically concentrated offices are vulnerable to local economic shocks is potentially misleading because it assumes that banks in counties without economic shocks did not suffer any adverse economic consequences.

We paired each of the 38 counties that experienced an economic shock with a matching county from the same state that did not suffer an economic shock. Matched counties had to have a total cost of unemployment as defined by the total cost rule less than two for each quarter between 1990 and 1997. This requirements eliminates the possibility that a matched county suffered an economic shock just before or after the

[6]Failure data are available at the FDIC web site at www.fdic.gov.

quarter the matched sample bank suffered the shock. In addition, matched counties had to have at least two banks with all their deposits derived from offices in a single county. Finally, banks in matched counties had to exist throughout the entire sample period to avoid performance measure distortions from merger activity. The 38 matched counties are listed in Table 4 along with their current and leading unemployment rates as of the date of the economic shock of their paired sample counties. As the table illustrates, each of the matched counties had a total cost of unemployment less than two. The 38 matched counties contain a total of 135 community banks.

As with the sample banks, we wish to assess bank performance after the "no-shock" date relative to bank performance prior to the no-shock date, where the no-shock date is the date of the economic shock of the paired sample county. We first aggregated the accounting data of the banks in the matched counties to reduce idiosyncratic risk and simplify the exposition of the results. Next, we constructed a peer group in the identical manner that was used for the banks that experienced county economic shocks, except that we also excluded the matched banks from the peer group. We then computed for each aggregated bank the difference between the matched bank ratio and peer bank ratio for each of the four performance ratios. We averaged the differences in time periods 0 to 8 and subtracted from that the average differences in time periods –4 to –1. The performance ratio differences before and after the "no-shock" date are listed in Table 5 along with the relative rank of each of aggregated banks in the counties. Counties are listed by the sum of ranks of the four performance ratios, ranked from the most affected banks to the least affected banks.

Surprisingly, the matched banks show some sensitivity to the "no-shock" dates, suggesting that some of the deterioration of the sample banks in shock counties is driven by factors other than the economic shocks. Fully 11.8 percent (18 of 152) of the performance measures of matched banks exhibit economically significant deterioration as measured by the CAMELS benchmarks, compared with 13.8 percent for the sample banks. Matched banks in just three of the 38 counties (7.9 percent), however, have two or more performance ratios with economically significant deterioration, compared with six of 38 sample banks.

Results of the bank-level analysis show even stronger reaction to the "no-shock" event. Indeed, 15.7 percent (85 of 540) of the matched bank performance measures showed economically significant deterioration. In addition, 15.6 percent of the banks had two or more performance ratios with economically significant changes. In sum, up to 20 percent of the sample banks responded negatively to a local economic shock; however, up to about 15 percent of matched banks responded negatively to a "no-shock event." These results suggest that factors other than the local economic shocks themselves account for most of the deterioration in bank performance following the shocks.

A plot of the sum of ranks for the sample and matched banks helps us to visualize the performance differences between the two groups. Figure 3 charts the sum of ranks for each set of county-aggregated sample and matched banks. We order the county-aggregated banks for each group from lowest to highest by sum of rank and plot on the vertical axis the cumulative percent of the sum of ranks and plot on the horizontal axis the cumulative percent of counties. The "no effect" line is a 45 degree line in which the cumulative percentage of rank-sums is equivalent to the cumulative percentage of

counties (or county-aggregate banks). For example, if performance of all banks were equal so that each bank had the same sum of ranks, then the cumulative percent of the sum of ranks would correspond exactly to the cumulative percent of counties. The impact of the economic shock (or no economic shock) is measured by the degree that the lines bow outward because banks that are affected the most by local economic shocks account for a smaller share of the cumulative sum of ranks. As Figure 3 illustrates, the curves for both the "shock" counties and the matched or "no-shock" counties bow outward. The curve for the shock counties bows outward slightly more than the curve for the no-shock counties, but the difference appears small. A nearly identical chart emerges when bank-level sum of ranks are plotted.

Are the sum of ranks of banks in counties that suffered economic shocks and the banks in counties that did not suffer economic shocks statistically different? To answer this question, we conduct a Wilcoxon rank-sum test on the sum of ranks of the sample banks versus the matched banks. In contrast to the Figure 3, the rank-sum test requires that both the sample and matched banks be ranked as one data set. Intuitively, if local economic shocks affect sample banks in shock counties while matched banks in counties without economic shocks are largely unaffected, the sample banks should have the lowest sum of ranks. The null hypothesis, however, that the sum of ranks of the sample versus matched banks are equal cannot be rejected at any reasonable level of significance. This result suggests that bank performance in counties that suffered economic shocks is no different from bank performance in counties that did not suffer economic shocks.

Additional t-tests confirm the result that the performance of sample and matched banks are statistically indistinguishable. For each of the four bank performance ratios,

we computed the means of the ratio differences one year before and two years after the economic shocks reported in Table 2 and 5. The null hypothesis is that the mean differences between the sample and matched banks are equal. Each of the four t-tests are statistically insignificant, implying that the null hypothesis cannot be rejected. In other words, performance of geographically concentrated banks exposed to local economic shocks is no different than performance of geographically concentrated banks not exposed to local economic shocks. Simply put, banks with geographically concentrated operations are not vulnerable to local economic shocks. Again, these results hold for the county-aggregated ratios and the individual bank ratios.

VI. What Accounts for the Heterogeneity of Post-Shock Bank Performance?

If performance of geographically concentrated banks exposed to local economic shocks is essentially no more volatile than performance of geographically concentrated banks not exposed to local economic shocks, why does performance at some banks deteriorate significantly while other banks are unfazed? Moreover, why do some of the banks in the counties without economic shocks fare poorly?

To address these questions, we more closely analyzed the performance of some of the outlier banks. In particular, we examined the eight sample banks from Greene and White counties in Georgia, and Lake County in California. As Table 2 indicates, aggregate performance of banks in Greene County deteriorated the most of all the banks observed after its economic shock in the fourth quarter of 1991. In contrast, banks in Lake County were among the least insensitive to the economic shock in the third quarter of 1991. Finally, aggregate bank performance in White County deteriorated significantly

after the fourth quarter of 1991 despite the absence of a local economic shock. We may be able to observe reasons for these disparate performances both within and across counties by analyzing more closely the banks' financial statements around the date of the economic shock.

The deterioration in performance across the eight sample banks varied widely, as illustrated in Figure 4. Greensboro Bank in Greene County suffered the worst performance, with ROA less than zero in each of the eight quarters following the economic shock. In addition, loan losses surged to a peak of 4.2 percent in the second quarter of 1993. The other two banks in Greene County—Citizens Union and Farmers Bank—had relatively modest reactions to the economic shock. Farmers Bank seemed to have more difficulties before the economic shock; its loan losses and nonperforming loans were relatively high prior to the fourth quarter of 1991. The three banks in Lake County California—Clear Lake Bank, Lake Community Bank, and Bank of Lake County—sailed right through the local economic shock in the third quarter of 1991. Earnings and asset quality were not affected. Finally, performance of one the two banks in White County, White City Bank, did deteriorate significantly after the fourth quarter of 1991, despite the lack of a local economic shock. Loan losses surged about two years after the "no-shock" date. The bank began setting aside large amounts of provision expense in the middle of 1992, anticipating the losses. The other bank in White County—First National Bank of White County—had no deterioration in performance after the fourth quarter of 1991.

Different responses of banks in the three counties to local economic shocks may be driven partly by differences in the severity and persistence of the unemployment rate

shocks. Several contradictions arise, however, with this explanation. First, by construction, banks in White County did not suffer a local economic shock. The poor performance of White County Bank had to be driven by some other factor. Second, as Figure 5 illustrates, the economic shock in Lake County was just as severe as the one in Greene County. Seasonally adjusted quarterly unemployment rates in Lake County increased from 10 percent in the third quarter of 1991 to a peak of 14 percent in the fourth quarter of 1992, and they did not drop under the 1991 level until the third quarter of 1998. The unemployment rate in Greene County stood at 6.4 percent in the fourth quarter of 1991 and increased to a maximum of 11.2 percent in 1993. The unemployment rate fell under 6.4 percent in the first quarter of 1997. Clearly both counties encountered a severe and prolonged economic shock. Finally, the persistence of the unemployment shock had different effects on the banks within Greene County. Greensboro Bank had a sharp drop in profitability and asset quality, yet deterioration in performance at Citizens Union and Farmers Bank was much less severe. Clearly other factors were important in leading to the variation in performance across banks.

Another factor that might account for the differences in performance both within and across counties is the credit risk exposure of each bank at the beginning of the local economic shock. Many of the asset quality problems that banks suffered in the late 1980s into the early 1990s were in commercial real estate (identified in the call reports as construction and land development and non-family non-residential loans secured by real estate). Perhaps banks with heightened exposure to commercial real estate performed the worst. Table 6 lists the loan composition of each of the eight banks as of their respective dates of economic shocks. The two banks that had the worst deterioration in

performance—Greensboro and White County Banks—had ratios of commercial real estate to total loans of 15 percent and 25 percent, respectively. Other banks, however, had similar or higher percentages of commercial real estate. Indeed, the Bank of Lake County and Lake Community Bank had 63 percent and 30 percent ratios, respectively. Performance of those banks was not affected by the high concentration of commercial real estate. In addition, the two other banks in Greene County had loan portfolios similar to that of Greensboro Bank. Initial loan concentrations cannot explain the divergent performances. The poor performance of Greensboro Bank can be traced primarily to loan losses in commercial real estate and commercial loans (commercial and industrial loans not secured by real estate). Figure 6 plots loan loss rates by loan category. Despite being as heavily (or more heavily) exposed to commercial and commercial real estate lending, both Citizens Union and Farmers Bank avoided the loan losses of Greensboro Bank.

A final possibility that we consider is the organizational structure of the banks. Banks that are part of multi-bank holding companies might behave differently than other banks. Holding company management, for example, may allow one bank to operate in a specialized manner, knowing that other banks serve as natural hedges. Holding company affiliation, therefore, may make the bank more vulnerable to local market risk.[7] Of the eight sample banks, four were part of multibank holding companies as of December 31, 1991. These included Greensboro, Farmers, Bank of Lake County, and First National Bank of White County. Of those four, Greensboro is the only one that experienced poor performance after the economic shock. In addition, Greensboro Bank was part of a two-bank holding company; the other bank was located in Baldwin County Georgia, just

south of Greene County. The possibility is remote that such a small holding company could afford to have its banks specialize to such a degree.

In addition to looking at patterns at outlier banks, we ran regressions on all the 103 sample banks to attempt to explain the variations in performance. In particular we ran four regressions of the following type:

$$BankPerf = \beta_0 + \beta_1 TC + \beta_2 BHC + \beta_3 Share + \beta_4 CRE + \varepsilon \qquad (2)$$

where *BankPerf* is the average value of each of the nine bank performance ratios less the peer ratios two years after the economic shock, minus the average value of each of the four bank performance ratios less the peer ratios one year before the shock. *TC* is the total cost of the economic shock as measured in equation (1). *BHC* is an indicator variable of the holding company status of each bank at the time of the shock with a value of 1 indicating a multibank holding company affiliation and a value of 0 indicating either no holding company affiliation or a single-bank holding company affiliation. *Share* is a measure of the concentration of the loan portfolio at the time of the shock. It is the sum of squares of the real estate, consumer, commercial and agricultural loan shares. Higher values of *Share* result from less diversified loan portfolios. Finally, *CRE* is the percentage of commercial real estate loans in the loan portfolio at the time of the shock. We expect each of these variables to be positively correlated with deterioration in asset quality and earnings.

Regression results confirm the randomness in post-shock bank performance. None of the regression results (not reported) are robust. Variables are never statistically significant across the regressions. Even the variables that are statistically significant have

[7] Of course, a multibank holding company affiliation may also make a bank less vulnerable to local market

the theoretically unexpected signs. In addition the r-squared values are low, ranging from 1 percent to 12 percent.

In sum, the weight of the evidence points to idiosyncratic risk as the key factor explaining the divergent performance patterns of the sample banks exposed to economic shocks. Neither the length nor severity of the economic shock, the initial exposure to credit risk, nor the holding company structure of the bank accounts for the observed differences. Five of the six banks in Greene and Lake counties fared the downturn (reasonably) well. Only Greensboro Bank suffered significant deterioration. The indication is that Greensboro Bank was exposed to commercial lending projects that defaulted. It appears, however, that any of the banks in Greene or Lake counties could have fared just as poorly if a few loan customers had defaulted. Indeed, despite the absence of a local economic shock, White County Bank suffered high losses from commercial and commercial real estate lending. On the other hand, the First National Bank of White County avoided such high losses. Additional insights could be gleaned if we knew whether the loans that defaulted in Greene and White County banks were local loans. Unfortunately, records with the relevant information no longer exist at the appropriate supervisory agencies.

VII. Conclusion

Community banks with geographically concentrated operations may be exposed to significant local market risk. We find, however, that this risk factor is small. Performance at geographically concentrated banks that suffered local economic shocks is

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risk because the bank can engage more easily in loan participations and other measures of financial diversification.

no worse than the performance of banks that did not experience local economic shocks. About 20 percent of the banks exposed to negative economic shocks suffered significant deterioration in asset quality and earnings performance—about the same percentage of deterioration at banks not exposed to local economic shocks.

The difference in performance between banks with good and poor post-shock performance is not attributable to the length or severity of the economic shock, the initial exposure of the bank to credit risk, nor the holding company structure of the bank. Because the performance of community banks varies so widely, we conclude that idiosyncratic risk is a more important risk factor than local market risk. That is, banks are exposed to default risk from at any given time from their loan customers. If a few large customers default, bank performance may deteriorate significantly, regardless of the local economic conditions.

These findings have three policy implications. First, bank supervisors need not require geographically concentrated community banks to take additional measures relative to more diversified banks to reduce local market risk. Second, as community banks take advantage of the recent relaxation of U.S. branching restrictions in the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, risk reduction through geographic diversification is likely to be small. This result is similar to the study from Emmons et al. (2001), which finds that risk-reduction from bank mergers comes from scale effects, not geographical diversification. Third, bank supervisors should not rely systematically on county economic data to better understand bank performance. County economic data add few marginal benefits in predicting and even explaining community bank performance. A steep rise in county unemployment rates may or may not lead to a

deterioration in bank performance. In addition, a bank may deteriorate even if local unemployment rates remain stable. Broader economic data appear to be more useful to supervisors than county-level data.

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Table 1
Selected Counties with an Economic Shock

This table lists the selected counties that suffered economic shocks sometime in the 1990s, sorted by the quarter of the shock. At least two community banks with all deposits derived from a single county had to reside in a given county. The shock year and shock quarter indicate the quarter in which the leading unemployment rate--the average unemployment rate over the next four quarters--exceeded the current unemployment rate such that the total cost of unemployment as described in equation (1) was 6 or greater. The size of the labor force in the quarter of the economic shock is also listed. Most of the shocks occurred in the state of Georgia around the 1990-1991 recession.

	County	State	Shock Year	Shock Quarter	Number of banks in county	Current unemployment rate	Leading unemployment rate	Total cost	Labor force
1	Edwards	IL	1990	4	2	6.00	10.64	9.99	3,568
2	Johnson	IL	1990	4	3	10.61	12.76	7.66	4,168
3	Union	IL	1990	4	4	9.98	12.19	7.43	8,016
4	Murray	OK	1990	4	2	7.48	10.28	7.04	5,302
5	Pawnee	OK	1990	4	4	6.25	9.48	6.37	7,527
6	Gallatin	IL	1991	1	2	9.02	11.05	6.10	2,965
7	Jefferson	IL	1991	1	5	11.29	13.10	6.78	17,470
8	Okfuskee	OK	1991	1	3	7.31	9.97	6.42	4,341
9	Calhoun	GA	1991	2	3	5.20	11.01	12.01	2,115
10	Elbert	GA	1991	2	2	6.18	9.53	6.55	8,723
11	Lake	CA	1991	3	3	9.97	11.99	6.74	23,657
12	Early	GA	1991	3	2	6.05	9.93	7.77	5,236
13	Meriwether	GA	1991	3	3	6.18	9.98	7.87	9,326
14	Mitchell	GA	1991	3	3	7.01	10.73	9.25	9,034
15	Polk	GA	1991	3	2	7.97	11.39	9.76	16,066
16	Seminole	GA	1991	3	2	5.60	10.07	8.60	4,107
17	Telfair	GA	1991	3	4	5.04	9.02	6.20	4,724
18	Troup	GA	1991	3	4	6.51	9.47	6.12	24,668
19	Atkinson	GA	1991	4	2	5.10	9.44	7.29	2,461
20	Bacon	GA	1991	4	2	4.75	8.88	6.14	4,291
21	Crisp	GA	1991	4	2	5.52	9.30	6.47	8,562
22	Franklin	GA	1991	4	4	5.72	9.44	6.65	8,195
23	Gilmer	GA	1991	4	2	6.92	9.78	6.45	6,231
24	Greene	GA	1991	4	3	6.37	10.24	8.50	5,182
25	Rabun	GA	1991	4	3	5.21	9.94	8.61	5,678
26	Talbot	GA	1991	4	2	5.30	9.30	6.68	2,638
27	Terrell	GA	1991	4	2	4.80	9.60	8.02	4,631
28	Toombs	GA	1991	4	3	6.14	9.76	7.24	10,750
29	Clarke	IA	1992	2	2	5.07	9.04	6.22	4,383
30	Calhoun	IL	1992	3	2	10.09	14.87	18.11	2,754
31	Pulaski	IL	1992	4	3	11.77	14.57	11.23	2,816
32	Mcintosh	OK	1992	4	2	8.23	10.53	6.31	6,573
33	Evans	GA	1993	1	2	6.37	10.11	8.10	4,128
34	Adams	IA	1995	4	2	3.23	9.40	9.03	2,356
35	Wilcox	GA	1996	2	5	6.46	10.62	9.62	3,302
36	Towns	GA	1996	3	2	6.35	9.38	6.01	3,511
37	Jasper	IL	1996	3	3	6.99	10.82	9.59	4,475
38	Washington	GA	1997	1	2	6.20	9.88	7.55	9,528

Table 2

This table lists the key performance ratios of banks (aggregated by county) from the 38 sample counties that experienced economic shocks in the 1990s. The banks are ranked in ascending order by the sum of ranks. The four performance ratios are provision expense, nonperforming loans to total loans, loan losses to total loans, and return on assets. The difference reported for each ratio is the average value of the performance ratio relative to the peer value in the quarter of the shock and two years following the shock, minus the average performance ratio relative to the peer value four quarters prior to the economic shock. Larger values (larger negative values for ROA) indicate that the economic shock led to greater deterioration at the sample bank. We measured economic significance by comparing the difference in the ratio to the difference between the median performance ratio of a CAMELS 2-rated bank and a CAMELS 3-rated bank as listed in Table 3. Differences in performance ratios that are greater than or equal to one are shaded in gray, suggesting that performance of banks in those counties deteriorated significantly following the economic shock.

			Provision Expense		Nonperf. Loans		Loan Losses		ROA		Sum of
	County	State	Difference	Rank	Difference	Rank	Difference	Rank	Difference	Rank	Ranks
1	Greene	GA	0.8	1	1.6	1	0.5	2	-0.9	1	5
2	Meriwether	GA	0.4	4	0.6	10	1.1	1	-0.7	2	17
3	Calhoun	GA	0.4	3	1.4	4	0.4	3	-0.3	7	17
4	Gilmer	GA	0.3	8	1.2	6	0.2	14	-0.4	5	33
5	Wilcox	GA	0.1	16	1.5	2	0.4	4	-0.3	11	33
6	Talbot	GA	0.2	9	0.9	7	0.1	20	-0.5	3	39
7	Elbert	GA	0.2	12	0.6	9	0.2	11	-0.31	8	40
8	Gallatin	IL	0.3	5	0.4	13	0.3	7	-0.22	15	40
9	Jefferson	IL	0.6	2	0.0	23	0.4	5	-0.23	13	43
10	Okfuskee	OK	0.1	17	1.5	3	0.21	8	-0.20	17	45
11	Bacon	GA	0.3	6	0.2	18	0.21	9	-0.22	14	47
12	Johnson	IL	0.3	7	0.21	15	0.15	15	0.01	26	63
13	Mitchell	GA	0.15	14	-0.38	32	0.35	6	-0.26	12	64
14	Rabun	GA	0.17	10	0.07	20	0.14	17	-0.19	18	65
15	Washington	GA	-0.02	29	0.14	19	0.21	10	-0.16	19	77
16	Atkinson	GA	0.08	22	0.20	16	0.06	21	-0.13	20	79
17	Early	GA	0.09	20	0.16	17	0.10	18	-0.06	24	79
18	Towns	GA	0.00	25	0.52	11	0.02	24	-0.12	21	81
19	Crisp	GA	0.16	13	0.43	12	-0.09	30	0.04	27	82
20	Terrell	GA	-0.01	28	-0.39	33	0.17	13	-0.30	9	83
21	Troup	GA	0.06	23	0.63	8	0.02	23	0.10	30	84
22	Edwards	IL	-0.07	32	1.31	5	-2.64	38	-0.28	10	85
23	Pulaski	IL	-0.06	31	0.01	24	0.01	27	-0.44	4	86
24	Telfair	GA	0.08	21	-0.04	25	0.02	25	-0.21	16	87
25	Jasper	IL	0.09	19	-0.20	29	0.17	12	0.13	32	92
26	Seminole	GA	0.05	24	-0.13	27	0.04	22	-0.11	22	95
27	Union	IL	0.10	18	-0.13	28	-0.03	28	-0.07	23	97
28	Murray	OK	0.17	11	0.03	21	-0.44	35	0.11	31	98
29	Toombs	GA	-0.01	27	-1.05	37	-0.13	32	-0.33	6	102
30	Adams	IA	0.00	26	0.02	22	0.01	26	0.04	29	103
31	Polk	GA	-0.45	37	0.26	14	0.14	16	0.32	36	103
32	Clarke	IA	-0.03	30	-0.30	31	0.08	19	0.04	28	108
33	Pawnee	OK	0.15	15	-0.68	36	-0.41	34	0.19	35	120
34	Franklin	GA	-0.08	33	-0.10	26	-0.10	31	0.15	34	124
35	Evans	GA	-0.12	34	-0.20	30	-0.09	29	0.13	33	126
36	Mcintosh	OK	-0.20	35	-0.44	34	-0.57	36	-0.02	25	130
37	Lake	CA	-0.24	36	-1.45	38	-0.32	33	0.55	37	144
38	Calhoun	IL	-1.13	38	-0.56	35	-1.51	37	0.63	38	148

Table 3
CAMELS Benchmarks for Economic significance

This table computes benchmarks for economic significance by calculating the median differences in performance ratios between CAMELS 2-rated banks and CAMELS 3-rated banks. Economic significance benchmarks for the asset quality ratios--provision expense, nonperforming loans, and loan losses--are derived by separating banks in the sample based on the 'A' (Asset quality) rating, while the earnings ratio benchmark--return on assets--is derived by separating banks in the sample based on the 'E' (Earnings) rating. The results suggest that a 19 basis point difference in provision expense, a 134 basis point increase in nonperforming loans, and a 35 basis point increase in loan losses are economically significant changes in asset quality. In addition, a 47 basis point decline in ROA is an economically significant change in earnings.

		Performance Ratio (%)		
CAMELS 'A' Rating	**Number of Observations**	**Provision Expense**	**Nonperforming Loans to Total Loans**	**Loan Losses to Total Loans**
2	8231	0.15	1.10	0.13
3	2698	0.34	2.44	0.49
Difference		*0.19*	*1.34*	*0.35*

		Performance Ratio (%)
CAMELS 'E' Rating	**Number of Observations**	**ROA**
2	9511	1.07
3	3194	0.59
Difference		*-0.47*

Table 4
Matches for Counties with an Economic Shock

This table matches each of the 38 selected counties that suffered an economic shock with a county that did not suffer an economic shock during the 1990s. Each county selected as a match had to be from the same state as the sample bank, had to have two banks with all deposits in the county, and had to have a total cost from unemployment of less than two. The date of the economic "no-shock" for the matched counties is the same as the their sample counterparts. For example, the three banks in the county of Brown, Illinois are assumed to have experienced a "no-shock" event during the fourth quarter of 1990, the same as the shock date of Edwards County, Illinois. Bank performance ratios are then computed two years ahead of the "no-shock" date and compared with performance ratios one year before the "no-shock" date.

	Sample Counties				Matched Counties					
	County	State	Shock Year	Shock Quarter	County	State	Number of banks	Current unemployment rate	Leading unemployment rate	Total cost
1	Edwards	IL	1990	4	Brown	IL	3	6.10	6.44	0.26
2	Johnson	IL	1990	4	Henderson	IL	4	6.40	7.26	1.16
3	Union	IL	1990	4	Jo Daviess	IL	7	5.11	6.39	1.14
4	Murray	OK	1990	4	Alfalfa	OK	4	2.90	2.66	0.00
5	Pawnee	OK	1990	4	Canadian	OK	9	4.93	4.82	0.00
6	Gallatin	IL	1991	1	Carroll	IL	7	6.87	7.74	1.49
7	Jefferson	IL	1991	1	Cass	IL	6	9.73	8.78	0.00
8	Okfuskee	OK	1991	1	Beaver	OK	2	3.08	3.56	0.48
9	Calhoun	GA	1991	2	Bleckley	GA	2	5.18	4.55	0.00
10	Elbert	GA	1991	2	Dade	GA	2	6.15	5.61	0.00
11	Lake	CA	1991	3	San Luis Obispo	CA	7	6.23	6.85	0.68
12	Early	GA	1991	3	Catoosa	GA	2	4.49	5.12	0.64
13	Meriwether	GA	1991	3	Jenkins	GA	2	4.97	5.61	0.64
14	Mitchell	GA	1991	3	Laurens	GA	5	3.84	5.07	1.24
15	Polk	GA	1991	3	Lumpkin	GA	2	6.28	4.85	0.00
16	Seminole	GA	1991	3	Putnam	GA	2	6.30	4.37	0.00
17	Telfair	GA	1991	3	Pulaski	GA	2	5.89	5.07	0.00
18	Troup	GA	1991	3	Brooks	GA	3	3.11	4.04	0.92
19	Atkinson	GA	1991	4	White	GA	2	6.33	4.81	0.00
20	Bacon	GA	1991	4	Wilkinson	GA	3	5.31	6.03	0.70
21	Crisp	GA	1991	4	Bryan	GA	2	4.25	5.49	1.25
22	Franklin	GA	1991	4	Habersham	GA	3	4.64	5.04	0.39
23	Gilmer	GA	1991	4	Henry	GA	3	3.98	5.13	1.14
24	Greene	GA	1991	4	Irwin	GA	2	4.25	5.54	1.29
25	Rabun	GA	1991	4	Oconee	GA	2	2.89	3.85	0.96
26	Talbot	GA	1991	4	Upson	GA	2	4.67	5.03	0.36
27	Terrell	GA	1991	4	Stephens	GA	3	6.41	6.26	0.00
28	Toombs	GA	1991	4	Tift	GA	4	7.44	7.38	0.00
29	Clarke	IA	1992	2	Pottawattamie	IA	7	4.92	4.40	0.00
30	Calhoun	IL	1992	3	Richland	IL	2	5.39	5.01	0.00
31	Pulaski	IL	1992	4	Morgan	IL	5	5.73	4.89	0.00
32	Mcintosh	OK	1992	4	Osage	OK	4	5.43	5.72	0.29
33	Evans	GA	1993	1	Jackson	GA	3	5.01	4.46	0.00
34	Adams	IA	1995	4	Kossuth	IA	5	3.52	2.81	0.00
35	Wilcox	GA	1996	2	Berrien	GA	3	4.32	5.42	1.10
36	Towns	GA	1996	3	Bartow	GA	3	5.25	5.02	0.00
37	Jasper	IL	1996	3	Scott	IL	2	6.02	6.65	0.52
38	Washington	GA	1997	1	Bulloch	GA	4	2.72	3.28	0.55

Table 5

This table lists the key performance ratios of county-aggregated banks from the 38 match counties that did not experienced economic shocks in the 1990s. The banks are sorted in ascending order by their sum of ranks. The four performance ratios are provision expense, nonperforming loans to total loans, loan losses to total loans, and return on assets. The difference reported is the average value of the performance ratio relative to the peer value in the quarter of the "no-shock" and two years following the no-shock, minus the average performance ratio relative to the peer value four quarters prior to the economic no-shock. Larger values (larger negative values for ROA) indicate that the no-shock event led to greater deterioration at the match bank. We measured economic significance by comparing the difference in the ratio to the difference between the median performance ratio of a CAMELS 2-rated bank and a CAMELS 3-rated bank as listed in Table 3. Differences in performance ratios that are greater than or equal to one are shaded in gray, suggesting that performance of banks in those counties deteriorated significantly following the economic no-shock.

			Provision Expense		Nonperf. Loans		Loan Losses		ROA		Sum of
	County	State	Difference	Rank	Difference	Rank	Difference	Rank	Difference	Rank	Ranks
1	White	GA	0.59	1	0.77	6	0.42	8	-0.69	1	16
2	Lumpkin	GA	0.37	2	1.80	2	0.28	9	-0.23	8	21
3	Osage	OK	0.36	3	0.06	25	0.65	7	-0.61	2	37
4	Morgan	IL	0.12	10	0.86	3	0.00	18	-0.09	15	46
5	Tift	GA	0.15	8	0.59	9	0.20	10	0.05	24	51
6	Cass	IL	0.05	14	-0.20	32	0.99	2	-0.47	4	52
7	Beaver	OK	0.16	7	-1.53	37	0.82	5	-0.30	6	55
8	Dade	GA	0.18	6	0.38	12	-0.17	27	-0.15	13	58
9	Stephens	GA	0.04	16	0.84	4	0.00	19	0.04	23	62
10	Brown	IL	-0.01	24	-0.18	31	0.94	3	-0.42	5	63
11	Upson	GA	0.03	18	0.76	7	0.11	12	0.09	26	63
12	Jo Daviess	IL	-0.02	26	-0.11	29	1.24	1	-0.23	9	65
13	Bleckley	GA	0.19	5	0.47	10	-0.08	25	0.07	25	65
14	Canadian	OK	0.19	4	0.03	26	-0.25	29	-0.27	7	66
15	Brooks	GA	0.08	12	0.32	14	0.09	13	0.14	28	67
16	Alfalfa	OK	0.00	22	0.59	8	-0.72	36	-0.50	3	69
17	Irwin	GA	0.01	19	0.37	13	0.01	17	0.00	22	71
18	Wilkinson	GA	0.04	17	0.44	11	-0.12	26	-0.01	20	74
19	Habersham	GA	0.01	20	0.19	18	0.03	15	-0.01	21	74
20	Richland	IL	-0.03	27	0.12	22	0.04	14	-0.17	12	75
21	Catoosa	GA	0.09	11	0.19	19	0.02	16	0.19	30	76
22	Kossuth	IA	0.05	15	0.07	24	-0.03	22	-0.08	16	77
23	Carroll	IL	-0.04	28	0.00	27	0.71	6	-0.07	18	79
24	Scott	IL	0.14	9	0.19	20	-0.02	21	0.15	29	79
25	Pulaski	GA	0.07	13	-0.28	34	-0.05	23	-0.20	11	81
26	Pottawattamie	IA	0.01	21	0.08	23	0.12	11	0.13	27	82
27	Putnam	GA	-0.09	30	2.48	1	-0.57	35	-0.06	19	85
28	Jackson	GA	-0.57	34	0.79	5	-0.47	32	-0.07	17	88
29	Oconee	GA	-0.01	23	0.20	17	-0.01	20	0.20	31	91
30	Laurens	GA	-0.01	25	0.26	16	-0.17	28	0.23	32	101
31	Bulloch	GA	-0.43	32	-0.07	28	-0.49	33	-0.23	10	103
32	Bartow	GA	-0.61	35	0.13	21	-0.52	34	-0.09	14	104
33	Bryan	GA	-0.63	36	-3.92	38	0.89	4	0.41	34	112
34	Jenkins	GA	-0.21	31	0.32	15	-0.39	30	0.63	37	113
35	Henry	GA	-0.06	29	-0.17	30	-0.07	24	0.25	33	116
36	San Luis Obispo	CA	-0.52	33	-0.94	35	-0.41	31	0.53	35	134
37	Berrien	GA	-1.01	37	-0.22	33	-0.86	37	0.60	36	143
38	Henderson	IL	-1.67	38	-1.41	36	-2.71	38	1.21	38	150

Table 6
Loan Composition as a Percent of Total Loans of Selected Banks

Loan composition on the eve of an economic shock may help to explain why performance of certain banks deteriorated in response to the economic shock while other banks were unaffected. Because commercial real estate was hit particulary hard during the late 1980s and early 1990s, we might expect banks with heavy reliance on commercial real estate loans to perform worse than banks with less exposure to that market. However, the worst performing bank--Greensboro Bank--had a modest concentration of commercial real estate loans. In addition, banks in Lake County were heavily exposed to commecial real estate and commercial and industrial loans, yet performance of those banks remained strong during the local economic downturn.

	Commercial Real Estate	Commercial & Industrial	Consumer	1-4 Family	Other
Greene County (December 31, 1991)					
Greensboro Bank	15	6	33	41	5
Citizens Union Bank	14	6	11	66	3
Farmers Bank	19	14	20	33	14
Lake County (September 30, 1991)					
Bank of Lake County	63	11	8	3	15
Lake Community Bank	30	11	12	41	6
Clear Lake Bank	20	10	20	43	7
White County (December 31, 1991)					
First National Bank of White County	32	4	12	30	22
White County Bank	25	26	23	22	4

Figure 1
The Total Cost Rule of an Economic Shock

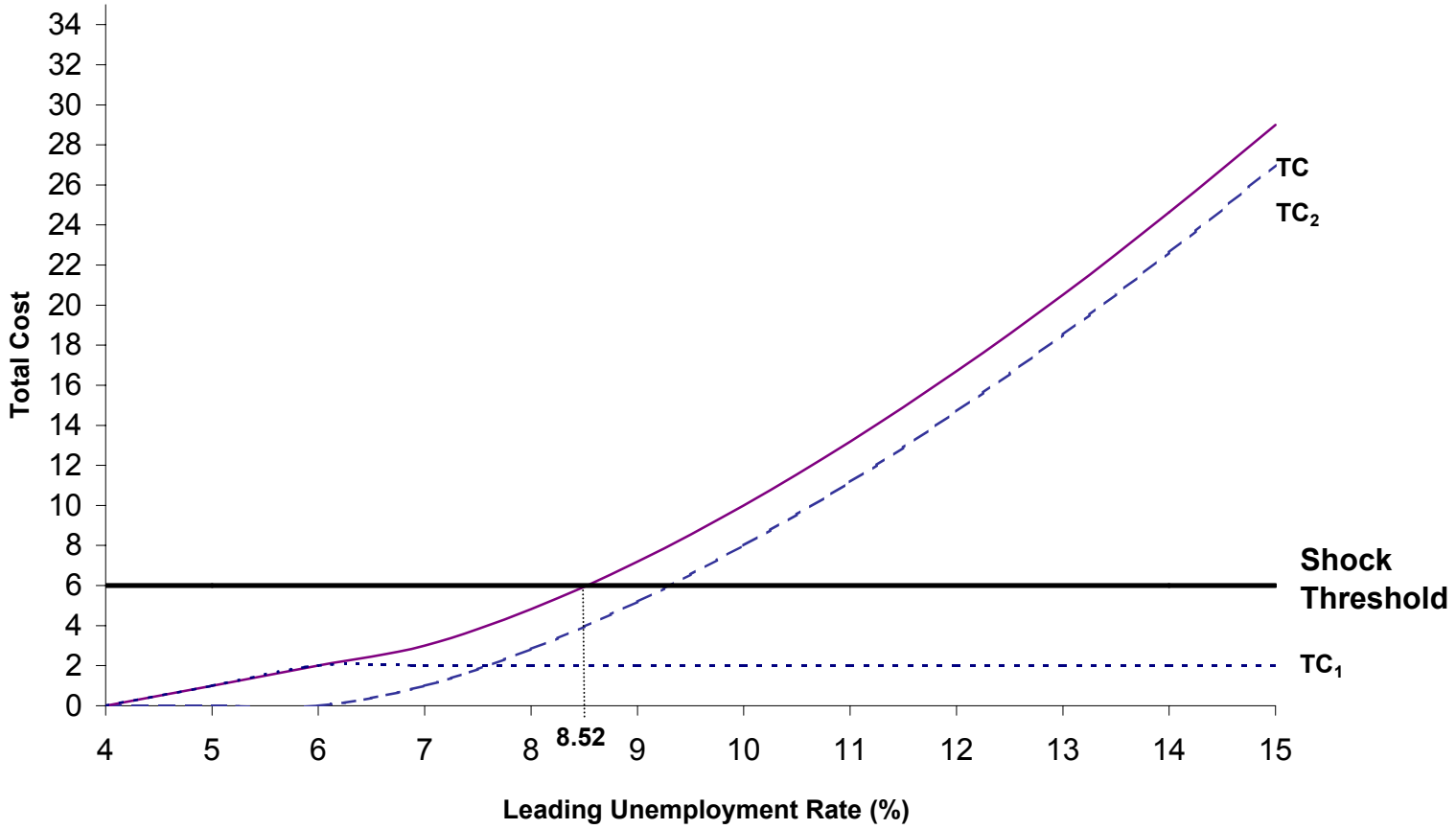
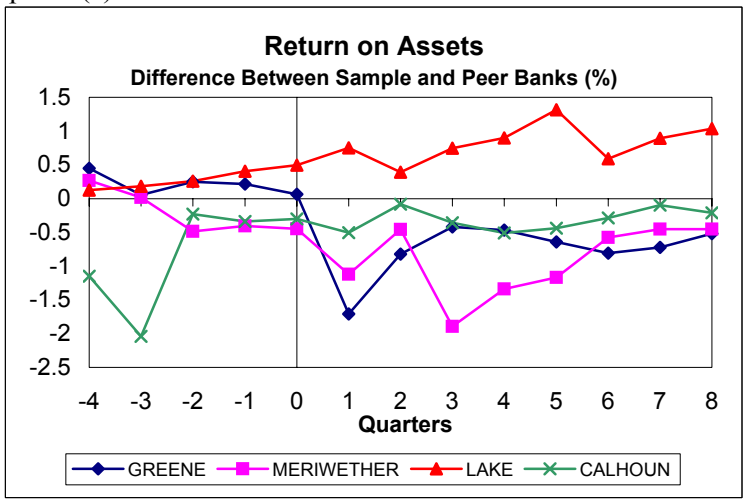


Figure 1 plots the total cost of the change in the unemployment rate from four percent in a given quarter to the leading unemployment rate as measured along the horizontal axis. In this example, TC_1 rises to 2 as the leading unemployment rate increases from 4 percent to 6 percent and above. TC_2 increases exponentially as the unemployment rate rises above 6 percent. If the unemployment rate rises from 4 percent to 9 percent, for example, TC_2 is (9-6)1.5, or 5.2. The total cost from the increase in unemployment (TC) is the sum of TC_1 and TC_2, or 2 + 5.2 = 7.2. In this case, the county would be classified as having suffered an economic shock because the total cost exceeds the threshold value of 6. Given an initial unemployment rate of 4 percent, if the leading unemployment rate increases to 8.52 percent or above, we classify the unemployment rate change as a shock.

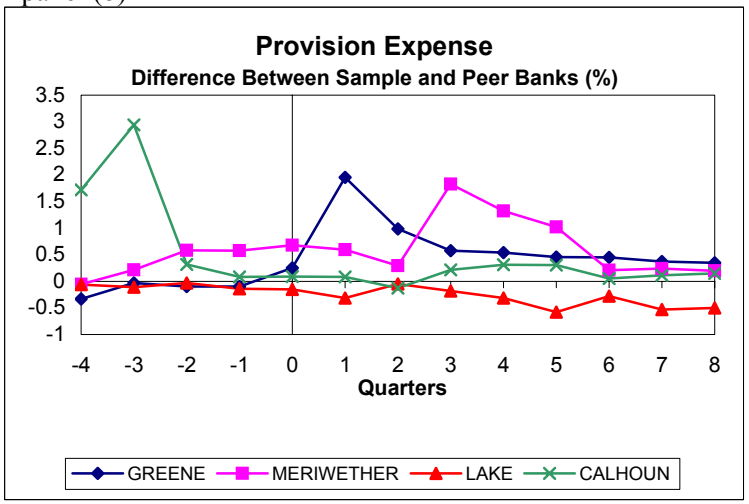
Figure 2

Bank Performance from Selected Counties Before and After an Economic Shock

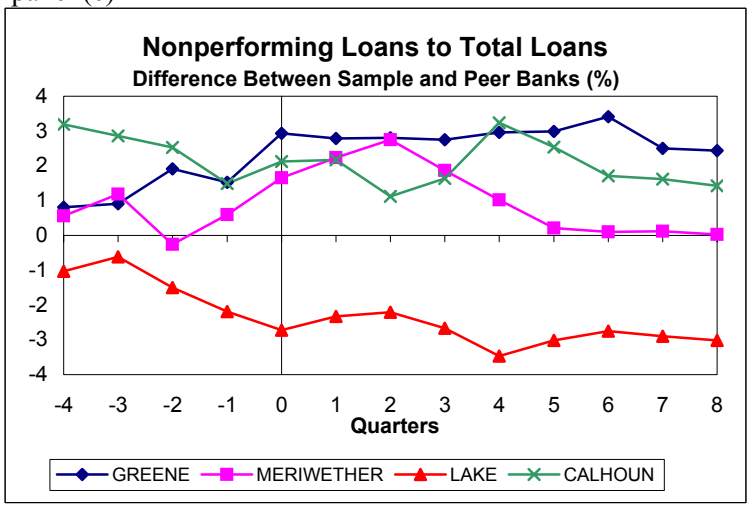
panel (a)



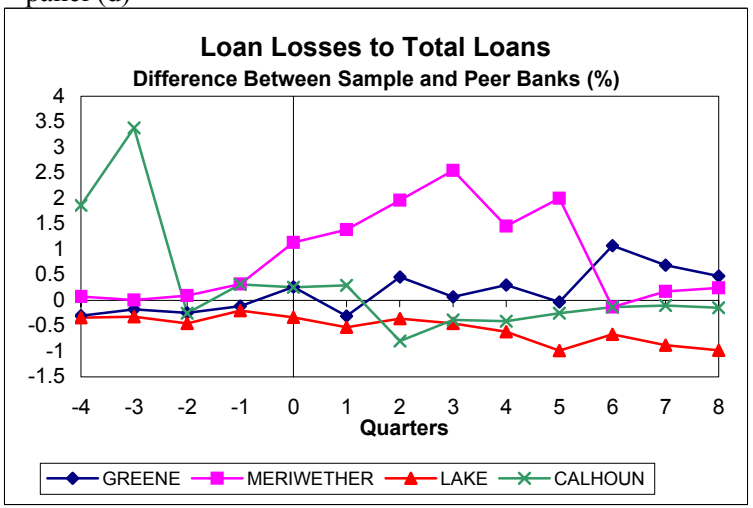
panel (b)



panel (c)



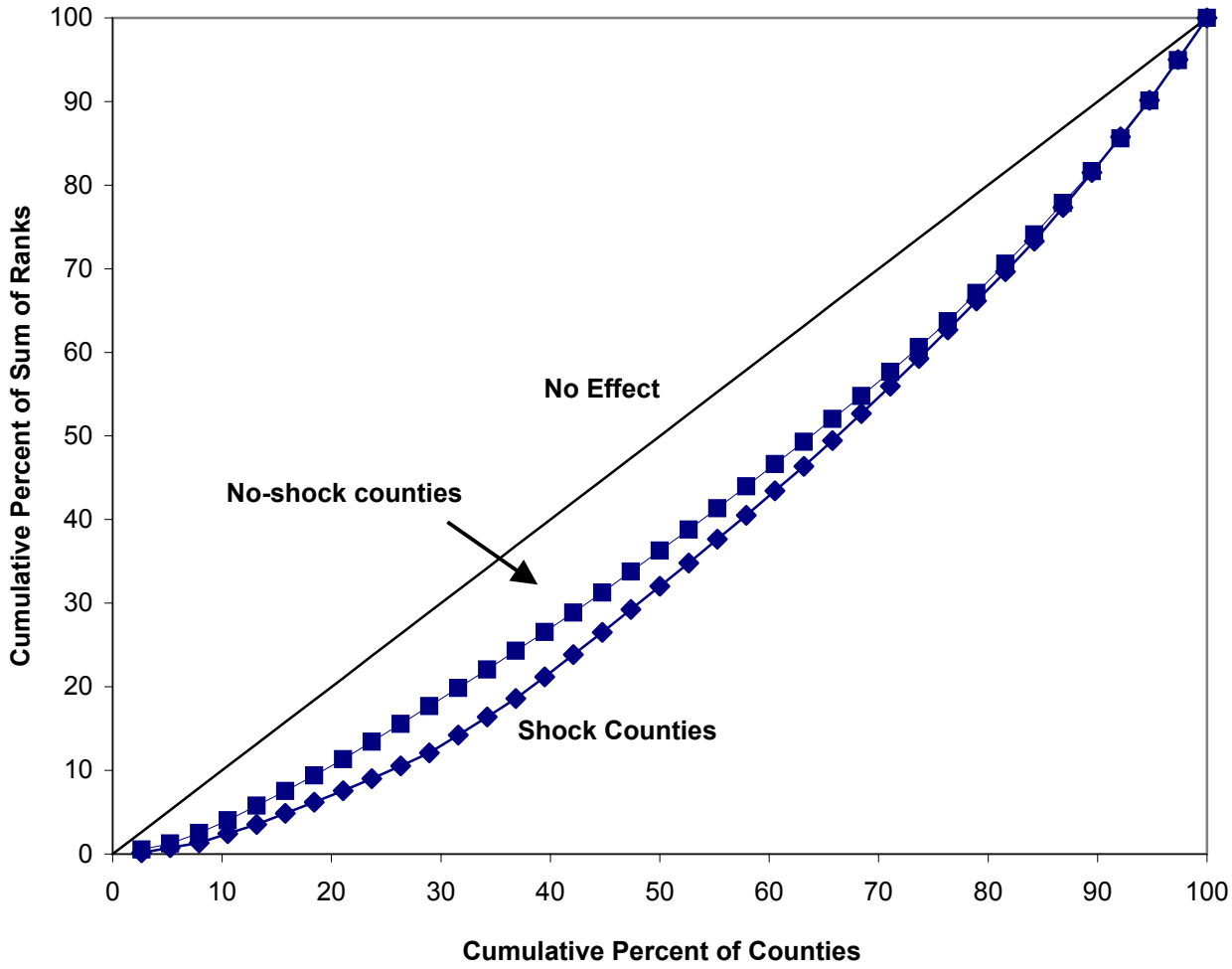
panel (d)



Each of the panels in Figure 2 plots the difference between county-aggregated bank performance ratios and peer bank ratios both before and after a local economic shock for the counties of Greene, Meriwether, Lake and Calhoun. The economic shock occurs at quarter '0.' An increase in asset quality ratios and a decrease in ROA following the shock indicates greater deterioration in bank performance. These charts show that banks in Greene and Meriwether counties deteriorated the most following the economic shock. Banks in Lake County were seemingly unaffected. Banks in Calhoun County appear to have deteriorated before the economic shock.

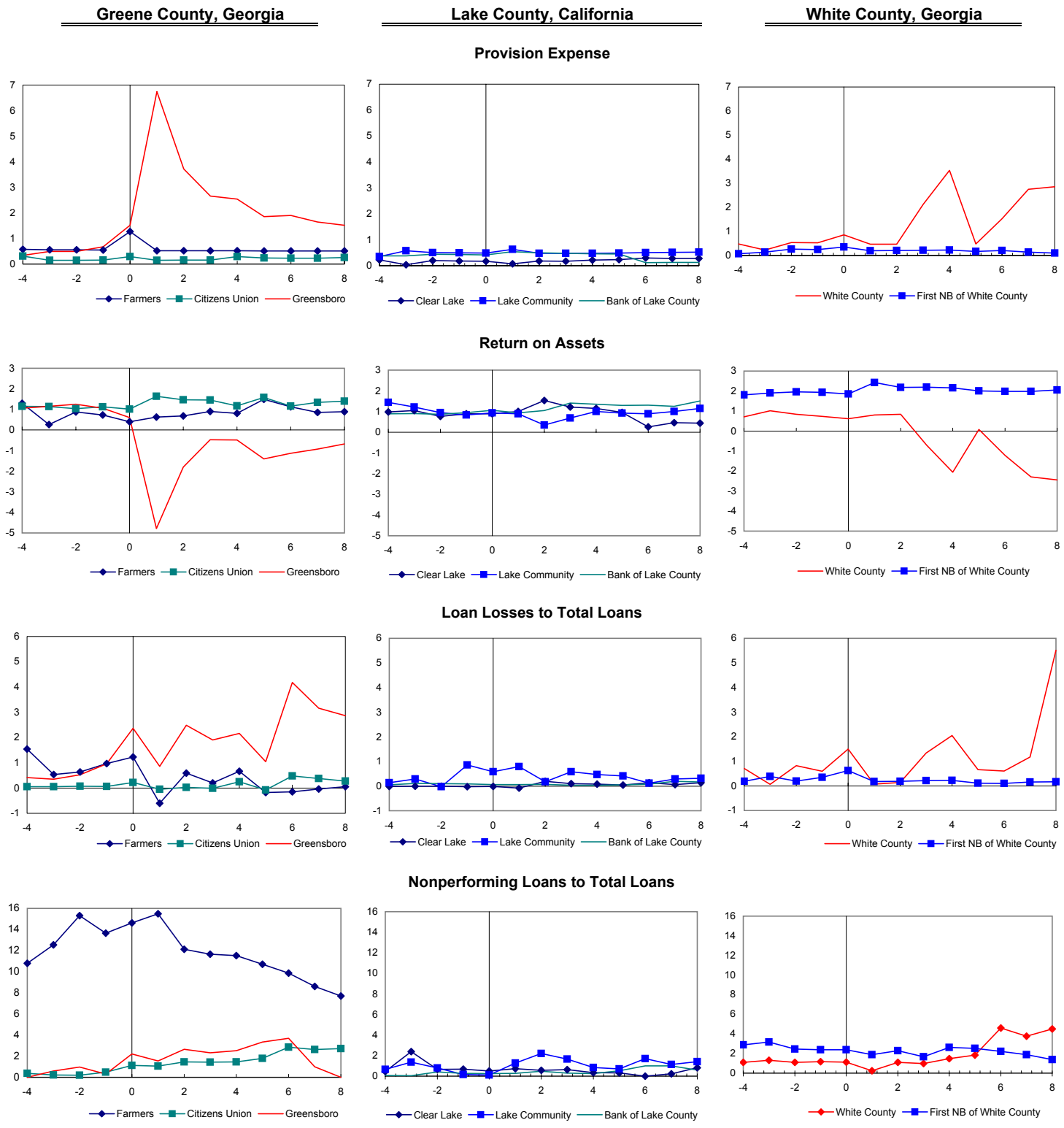
Figure 3

Sum of Ranks Depiction of the Impact of Local Economic Shocks on County-Aggregated Banks



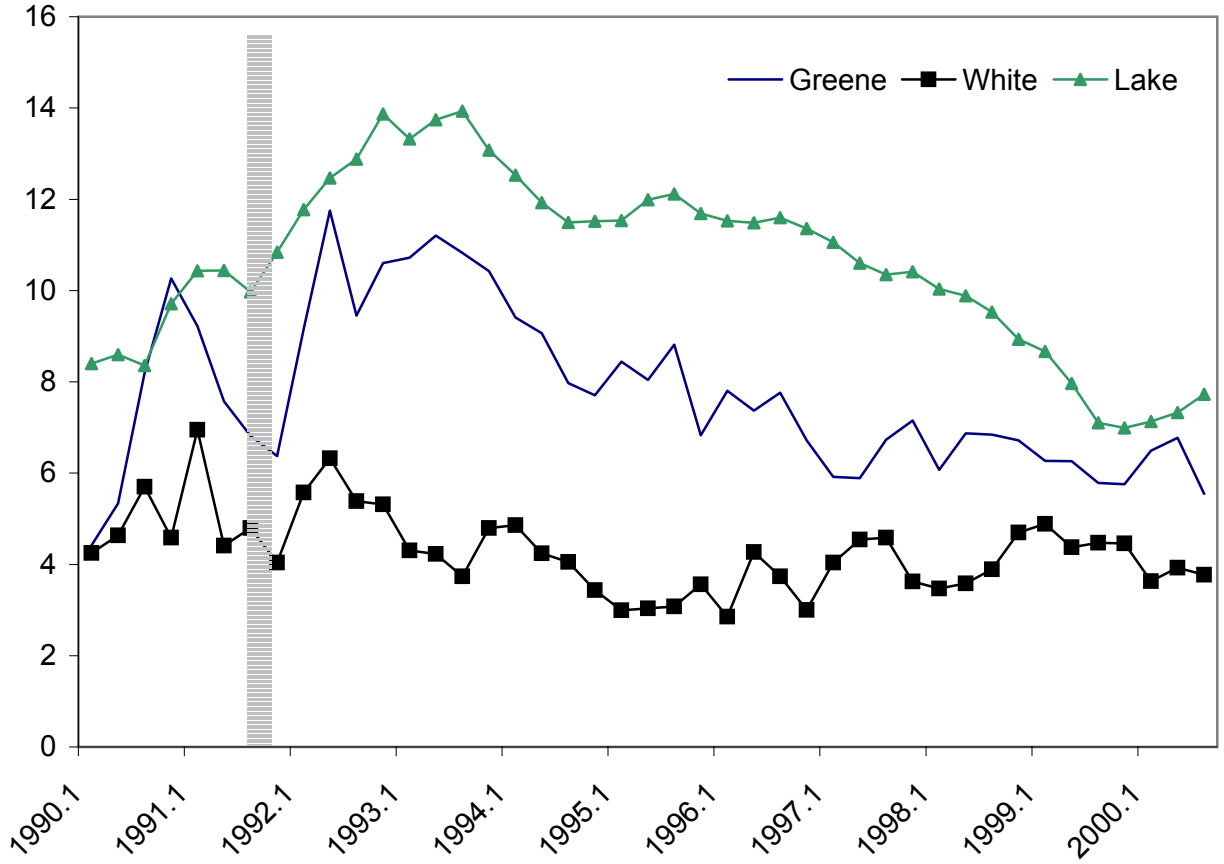
As Tables 2 and 5 show, county-aggregated banks in the sample and matched counties were ranked based on four performance measures. The ranks were then summed. Lower ranks indicate worse performance. If banks were not affected at all by local economic performance, then the cumulative sum of ranks would correspond exactly with the cumulative percent of counties, resulting in the 45 degree line titled "No Effect." In other words, 10 percent of the counties would account for 10 percent of the sum of ranks, and so on. If banks are affected by local economic performance, then the ones that are affected the most account for a smaller share of the cumulative sum of ranks, making the curve bow downward. We find that the cumulative sum of ranks curve for the banks in the shock counties does bow downward slightly more than the sum of ranks for the banks in the shock counties, but the Wilcoxon rank-sum test shows that the difference between the curves is statistically insignificant.

Figure 4



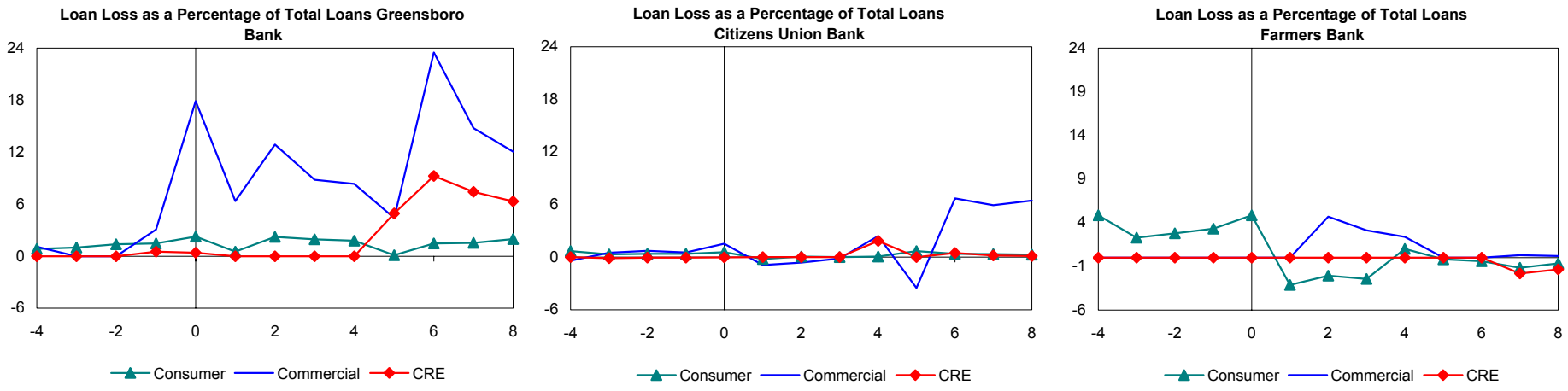
These charts plot the time series of bank performance ratios in selected counties one year before and two years following a local economic shock for banks in Greene, White and Lake counties. These banks and counties are chosen to contrast the variation in bank performance both within and across counties. Of the three banks in Greene County, only Greensboro bank showed significant deterioration in performance. All three banks in Lake County were essentially unaffected by the local downturn. One bank in White County· White County Bank--experienced deterioration in performance despite the absence of a local economic shock; the other bank in that county showed no signs of deterioration.

Figure 5
Unemployment Rates in Selected Counties



This chart plots seasonally-adjusted quarterly unemployment rates for the counties of Greene and White Georgia and Lake California. The local economic shock, which is indicated by the gray vertical bar, appears to beat least as intense and persistent in Lake County as in Greene County. Indeed, White County did not suffer a local economic shock. The length and persistence of the shock, therefore, cannot explain the relatively poor performance of banks in Green and White counties.

Figure 6
Loan Loss Ratios by Type of Loan for Banks in Greene County, Georgia



Of the three sample banks in Greene County, only Greensboro Bank experienced significant deterioration following the local economic shock, which occurred at time 0 in the charts above. Plots of the loan losses by loan type reveal that high charge-offs in both commercial and commercial real estate accounted for poor perforamance at Greensboro Bank. Citizens Union and Farmers had commercial loan concentrations equal to or exceeding that of Greensboro Bank, yet their performance remained sound through the local economic shock.