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INTER-TEMPORAL PERFORMANCE: DOES BANK-SIZE MATTER? AN ANALYSIS OF UTAH BANKS

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Abstract

This paper evaluates the inter-temporal performance of commercial banks with headquarters in the State of Utah between 2000 and 2004. This analysis of performance of the banking industry in the State of Utah is based on three categories of bank size[1] by using two measures of performance – profits and quality of loans. T-tests and Kruskal-Wallis tests are applied to a variety of standard bank operations measures to determine whether there are significant differences in performance. Among the factors evaluated are Return on Assets (ROA), Return on Equity (ROE), loan loss reserve ratio, and loans past due 30-89 days as a percentage of total loans. This paper finds no significant difference in performance between small and large banks between the years 2000 and 2004. However, there is a significant difference between small and medium, and medium and large banks in their ROA. The ROA of medium banks is significantly higher than that of small and large banks.

Key words: Commercial banks, Bank performance and Utah
JEL classification: G20, G21, C12

Introduction

During the last five years of the 20th century, both the U.S. and Utah economy were extremely robust in terms of GDP growth and employment. However, after the turn of the millennium the economy was characterized by a series of dislocations associated with 9/11 and the war on Iraq. These episodes had an impact on the US and Utah economy resulting in declining GDP and increasing unemployment. At the same time, some sectors of the Utah economy, such as housing, sustained considerable growth generating an interesting contrast for economic analysis.

Commercial banking plays an important role in sustaining financial markets and has a significant impact on the success of the economy. It is within this context that the following analysis of the operations of commercial banks headquartered in Utah was conducted for the period from 2000 to 2004. During this period, commercial banking has undergone a significant structural shift as industry operational processes have changed and banks have sought mergers and other adjustments that create implications for bank depositors and bank customers seeking loans and related services. Bankers have argued that they need to become larger to take advantage of scale of operations, afford better information and infrastructure capabilities, and increase their competitiveness.

The study of Utah bank performance is interesting in several ways. Utah, is one of only a few states that allow interstate branch banking. It has an unusually homogeneous population dominated by a unique cultural bias. There is an unusual concentration of institutional economic power directly tied to commercial banking industry in the state. Finally, a survey of the bank performance literature reveals that the study of the Utah commercial banks performance has not been included in previous studies.

The paper is organized as follows: Section I will provide a brief survey of bank performance literature. Performance measures and methodology will be presented in section II. Data, empirical results and conclusions will be presented in section III.

[1] Small banks have assets of less than 100 million, medium banks have assets between 100 million and 1000 million, and large banks have assets more than 1000 million.

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I. Survey of literature

There is an extensive literature on the performance of commercial banks. Most of these studies have focused on describing the factors that determine the performance of banks. Heggestad mad Mingo (1977), Rhodes (1982), Gilber (1984) and William and Molyneux (1992) have identified what is characterized as a traditional structure conduct performance (SCP) hypothesis. Their work suggests that the industry structure including increasing market power through more growth and concentration is the major factor in determining profitability. In other words, there is monotonic relationship between firms' concentration and superior performance.

There are others who suggest an alternative hypothesis. These analysts, including Domsetz (1973), Carter (1978), Smirlock (1985) and Evanoff and Frontier (1988) Careletti, Hartmann, and Spagnolo (2001), argue that firm's expanded efficiency enables firms to reduce costs and thereby increase market share resulting in higher performance and greater profitability. Thus, according to the efficiency performance (EP) hypothesis an increased market share and an increased profitability of firms were a dominant factor for increasing profits in the U.S. banking industry. At the state level study, Pozenda (1985) found that the higher performance of California banking was associated with market concentration of banks.

Comparative studies of bank performance include, among others, Meinster and Elyasiani (1988), Sabi (1996), Samad (1999), Samad and Hassan (2001) and Samad, Gardner and Cook (2005). Meinster and Elyasiani examined the performance between foreign and domestic owned banks in U.S. and found no difference between them. Samad, Hassan and Ghani (2005) examined the performance of Bahrain commercial banks and found ROA, ROE and interest margin were comparable to those of banks in other countries. Samad (2004) studied interest free Islamic banks and interest based conventional banks of Bahrain and found that there were differences in some measures. Islamic banks were found to have greater liquidity reserves than conventional banks. A similar result was found in Samad (1999 and 2001).

II. Commercial Banks Performance Measures and Methodology

Commercial banks performance measures have several dimensions. One of the most important is profit. The profit of the commercial bank is a function of many variables. A usual form of the profit function of a commercial bank may be written as:

$$\ddot{y} = \{(r_L * L + f) - (r_D * D) + c\} \text{ subject to balance sheet constraint } L = D \quad (1)$$

where $\ddot{y}$ = bank profit,
r_L = interest rate earned on assets, loan in particular,
r_D = interest rate paid on deposits,
L = quantity of loans,
D = quantity of deposits
f = fee income from bank services,
C = operating expenses.

Assuming fee income (f) and operating cost (c) is a ratio of D (or L), the substitution of balance sheet constraint $D = L$ into equation 1 yields:

$$\ddot{y} = (r_L * + f) - r_D * + c)L \quad (2)$$

This means that bank profits are proportional to the profit margin, which is income minus cost per dollar loans ($(r_L - r_D - c)$ plus fee incomes (f). Given market interest rate on loans and deposits, and other constraints a bank faces, the profit maximization of a bank depends on the operational cost, and the quality of bank loans.

Methodology

Profit as a performance measure of a commercial bank can be analyzed in two ways.

Measures based on Return on Assets and Equity:

1. Return on Assets (ROA). The ROA is a good index for a bank performance. It is calculated by dividing profits by assets. The higher the ROA is, the higher the performance of a bank appears to be.

2. Return on equity (ROE). From an investment point of view, ROE is the best measure of performance. The shareholders of a bank are interested in the rate of return on their investment, capital stock, not on the ROA. The ROE is estimated as profits divided by equity capital. The higher the ROE is, the better the performance of a bank will be.

Measures based on loan quality:

Commercial bank performance is affected by the quality of its loan performance. Repayment of loans that are past due is an important signal for a bank's deteriorating quality of loans. There are several measures for the quality loan performance of a bank.

3. Ratio of nonperformance loans of 30-89 days (30NPL): We will define 30NPL as the amount of bank loans past due 30 to 89 days, divided by total loans. The higher the 30NPL, the poorer the quality of a bank's loan portfolio, and thus the lower the quality of the loan performance of a bank appear to be.

4. Loan loss reserve ratio (LLRSV): LLRSV is estimated as the amount of reserves kept for expected loan loss as a percentage of total loans. The higher the LLRSV is, the better the performance of a bank is.

Statistical tools

The null hypothesis of equality of mean performance between small, medium and large banks is tested by t-tests. The null and the alternative hypotheses are: $H_{0:}\ \mu_{sbk} = \mu_{mbk} = \mu_{lbk}$ and $H_a : \mu_{sbk} \neq \mu_{mbk} \neq \mu_{lbk}$ respectively. Where μ_{sbk} = Mean of small banks, μ_{mbk} = mean of medium bank and μ_{lbk} = mean of large bank. In order to reinforce the results of t-tests which assume normal distribution, Kruskal-Wallis non-parametric tests which does not restrict to normality assumption is applied.

III. Data and Empirical Evidence

The data in this study are composed from the balance sheet and the income statement of individual banks for the years 2000 and 2004. The data were obtained from the Department of Financial Institutions, State of Utah.

Table 1 shows the comparison of bank performance data for all banks in Utah between the years 2000 and 2004. This analysis shows there was no significant difference in bank performance between 2000 and 2004 for ROA, ROE, and LLRSV. The one exception of these performance indicators which was statistically significant was for loans past due 30 days.

Table 1

Utah Bank Performance Between 2000 and 2004

	2000		2004			
Performance measure	Mean (%)	SD	Mean (%)	SD	t-values	P-value
ROA	0.05	2.0	1.2	0.05	1.33	0.19
ROE	8.1	10.0	10.6	4.9	0.87	0.38
LLRSV	1.7	1.1	1.7	0.07	0.18	0.85
30NPL	2.8	2.3	1.0	1.1	2.70	0.011

Utah bank performance for the years 2000 and 2004 may be explained by the impact of the deteriorating U.S. economy after 9/11. The stock market shock reduced public confidence in bank borrow-

ing. The continuing concerns over the dot.com bubble reduced the level and activities of new and expanding businesses in a number of sectors. Much of the growth in the economy was driven by consumer as contrasted to business growth thus reducing the level of activity in commercial banks.

The next phase of this analysis is a comparison of performance measure statistics based on bank size of commercial banks. These data are categorized by small (less than $100 million in assets), medium ($100 million to $1 billion in assets) and large (with assets over $1 billion) banks.

Panel A. Summary Statistics of Comparative Performance between Small and Large Banks, 2000 ($000)

	Small Banks		Large Banks			
Variables	Mean	SD	Mean	SD	t-values	P-value
Cash	2,111	2,358	2,257,718	298,173	3.19	0.004
Securities	4,353	3,473	4,664,055	4,288,679	4.59	0.0001
Loans	26,294	16,515	29,668,499	30,168,629	4.15	0.0004
Total assets	37,405	20,679	42,523,390	43,410,799	4.13	0.0004
Deposits	30,360	18,322	1,599,548	2,022,918	3.27	0.003
Net income	374	461	498,279	624,122	3.37	0.002
Non interest income	444	685	1,129,788	1,692,259	2.82	0.009

Panel B. Summary Statistics of Comparative Performance between Small and Medium Banks, 2000 ($000)

	Small Banks		Medium Banks			
Variables	Mean	SD	Mean	SD	t-values	P-value
Cash	2,111	2,358	10,710	8,144	4.15	0.0003
Securities	4,353	3,473	36,163	22,773	5.70	0.0000
Loans	26,294	16,515	172,510	112,972	5.29	0.0000
Total assets	37,405	20,679	257,235	136,337	6.58	0.0000
Deposits	30,360	18,322	13,839	12,893	2.76	0.01
Net income	374	461	4,815	2,674	6.73	0.0000
Non interest income	444	684	7,083	12,726	2.15	0.039

Panel C. Summary Statistics of Comparative Performance between Medium and Large Banks, 2000 ($000)

	Medium Banks		Large Banks			
Variables	Mean	SD	Mean	SD	t-values	P-value
Cash	10,710	8,144	2,257,718	298,173	2.76	0.0120
Securities	36,163	22,773	4,664,055	4,288,679	3.95	0.0008
Loans	172,510	112,972	29,668,499	30,168,629	3.58	0.0020
Total assets	257,235	136,337	42,523,390	43,410,799	3.56	0.0020
Deposits	13,839	12,893	1,599,548	2,022,918	2.87	0.0097
Net income	4,815	2,674	498,279	624,122	2.89	0.0092
Non interest income	7,083	12,726	1,129,788	1,692,259	2.43	0.025

Panels A, B, and C show the means and standard deviations for the selected balance sheet and income statement items for seventeen small banks, eight large banks and thirteen medium banks. It is clear from the data that large banks have a significantly larger scale of operations. The mean assets, loans, and deposits for large bank are $42,523,390 billion, $29,668,499 billion and $1,599,548 billion, respectively. The same data for medium banks are $257,234 million, $172,509 million, and $13,838 million respectively. Finally, the mean, assets, loans, and deposits for small banks are $37,404 million, $26,294 million and $30,359 million, respectively.

Panels D, E, and F, present the performance measures in terms of the ratios defined in the four categories mentioned in Table 1. The ratio analysis compensates for disparities in bank sizes. In order to strengthen the statistical result, both t-statistics and Kruskal-Wallis K statistics are provided. The results of the Kruskal-Wallis K statistics show that even if the data utilized in this analysis are not normally distributed the results are still consistent in measuring the value of this analysis.

Panel D: Comparison of Large and Small Banks Financial Ratios, 2000

Performance measures	Small bank	Large bank	Test statistics	
	Mean (%)	Mean (%)	t-values	Kruskal-Wallis K[a]
ROA	0.04	1.0	0.72	0.66
ROE	7.6	12.6	1.14	0.48
LLRSV	1.8	1.4	0.87	1.67
30NPL	0.05	0.02	1.5	1.63

[a] Kruskal-Wallis K test statistics follow chi-square distribution.

The t-values and Kruskal-Wallis K statistics in Panel D indicate that there is no statistically significant difference in performance between small and large banks measured in ROA, ROE, LLRSV, and 30NPL.

Panel E: Comparison of Small and Medium bank Financial Ratio, 2000

Performance measures	Small bank	Medium bank	Test statistics	
	Mean (%)	Mean (%)	t-values	Kruskal-Wallis K[a]
ROA	0.04	2.1	2.64**	7.06**
ROE	7.6	16.5	2.48*	4.64*
LLRSV	1.8	1.7	0.11	0.41
30NPL	0.05	0.04	1.5	0.52

[a] Kruskal-Wallis K test statistics follow chi-square distribution.
* Difference in means: Significant at 5 % level
** Difference in means: Significant at 2 % level.

The t-values and Kruskal-Wallis K statistics in Panel E indicate there is a statistically significant difference between small and medium banks in their performance measured in terms of ROA and ROE. The Medium bank mean return on asset (ROA) is 2.1% and the return on equity (ROE) is 16.5%. They are significantly larger than the small bank mean return on asset (ROA), which is 0.04%, and equity (ROE), which is 7.6%. The low value of significance level substantiates this fact. So, the equality of null hypothesis cannot be substantiated with respect to ROA and ROE.

With regard to loan loss reserve ratio (LLRSV) and 30 day nonperformance loan (30NPL), there is significant difference between them.

Panel F: Comparison of Medium and Large banks Financial Ratio, 2000

Performance measures	Medium bank	Large bank	Test statistics	
	Mean (%)	Mean (%)	t-values	Kruskal-Wallis K[a]
ROA	2.1	1.0	2.46*	7.57**
ROE	16.5	12.6	1.08	2.09
LLRSV	1.7	1.4	0.63	0.89
30NPL	0.04	0.02	0.55	0.53

[a] Kruskal-Wallis K test statistics follow chi-square distribution.
* Difference in means: Significant at 5 % level
** Difference in means: Significant at 2 % level.

The t-values and Kruskal-Wallis K statistics in Panel F indicate that there is statistically significant difference between medium and large banks in their performance measured in ROA. The Medium bank mean return on asset (ROA) is 2.1%, and is significantly larger than the large bank mean return on asset (ROA), which is 1.0%. The low value of significance level substantiates this fact. So, the equality of mean ROA for medium and large bank cannot be substantiated with reasonable probability.

With regard to loan loss reserve ratio (LLRSV) and 30 day nonperformance loan (30NPL), there is significant difference between them.

Conclusion

Comparisons of Utah commercial banks reveal no significant differences in their performance. There were no statistical differences for banks mean return on assets (ROA) and mean return on equity (ROE) for the years 2000 and 2004. Similarly, there was no difference in the quality of loans measured in loan loss reserve ratio (LLRSV) and 30 day non-performance loans (30NPL).

The comparison of performance by bank size reveals significant difference between small banks with asset less than $100 million and medium banks with assets between $100 million and $1 billion, and large bank with assets more than $1 billion. The mean ROA of medium bank was significantly larger than that of large bank and small bank.

The mean ROE of medium bank was significantly larger than that of large bank.

With regard to the management of loan quality, the paper finds no significant differences between small and medium bank, small and large bank, and medium and large bank.

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