

## **CONSOLIDATION IN THE BANKING INDUSTRY: A HOMEWORK ASSIGNMENT**

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### **ABSTRACT**

This paper introduces ideas on how to incorporate the internet and spreadsheets as research tools in the study of the effects of consolidation, specifically the effects of consolidation in the banking industry. A homework assignment is described that can be used in any course dealing with consolidation (e.g. managerial economics or money and banking). The homework assignment outlines procedures that can be used to: access insured commercial bank data for a specific state, create a chart to plot return on assets by the natural log of total assets, and run a regression of return on assets as a function of the natural log of total assets using Microsoft Excel.

### **INTRODUCTION**

This paper describes a homework assignment aimed at introducing the internet as a source of information and spreadsheets as a tool of analysis for undergraduate students. This homework assignment can serve as a stand alone analysis or can be used as a starting point for further discussion and analysis. This paper provides an example of how to go about answering the following questions: is there a trend toward consolidation of banks in your state of interest, and do larger banks have a higher return on assets in your state of interest?

### **THE HOMEWORK ASSIGNMENT**

The instructor should hand out the assignment and then demonstrate each of the procedures in class. The assignment should be due at least two class sessions after distribution so that there would be an opportunity to address any questions related to the assignment at the next class session. When class size is less than 50 each student can have a different state. Students who are particularly interested in the assignment may choose to analyze more than one state. The homework assignment is provided in the appendix.

#### Question 1: Consolidation

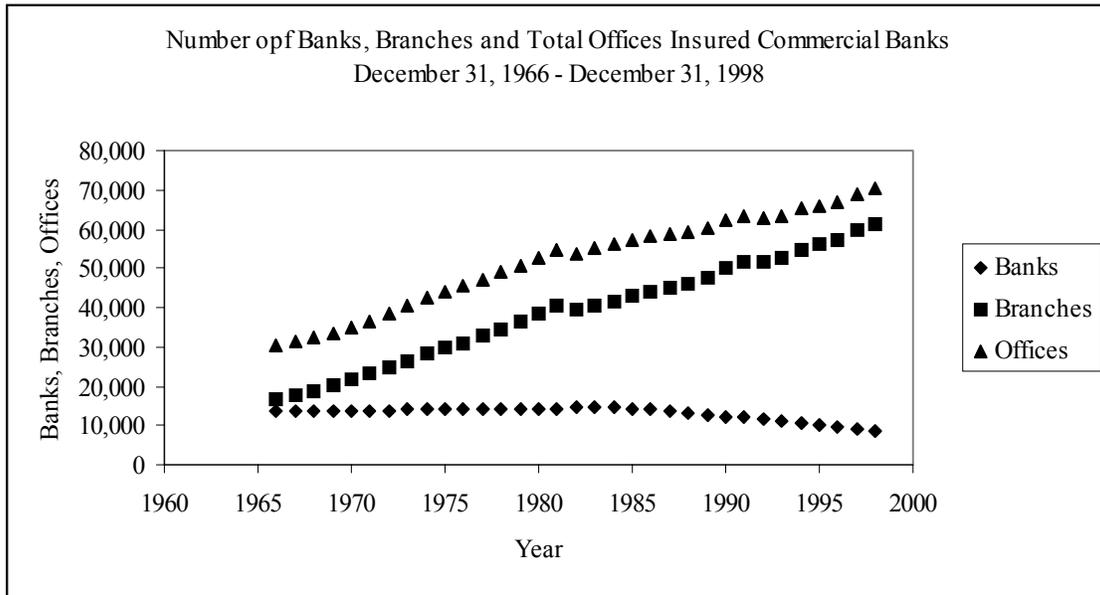
In recent years it would be hard not to notice the trend of consolidation in the banking industry. Banks are getting bigger. The FDIC provides numerical data that allows one to quantify this trend for the United States or for any state within the United States. The procedure described in the homework assignment will produce data on the number of banks, branches and total offices of insured commercial banks. Chart 1 displays two trends for the United States as a whole. First, the number of branches and offices has been growing over time and particularly since 1983. Second, the number of banks has been

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falling over time and particularly since 1985. An examination of Chart 1 can easily lead to a discussion of deregulation during the 1980s. It will be up to the students to determine if these national trends also prevail in their state of interest.

**CHART 1**



Students will need to enter the data from the FDIC web site into a spreadsheet program in order to create a chart similar to Chart 1. One way to place the data into an Excel 97 spreadsheet when using the internet Explorer browser would be to highlight and copy the table from the web site and then paste the table into the columns of an Excel 97 spreadsheet.

Question 2: Do Larger Banks Have Higher Return On Assets

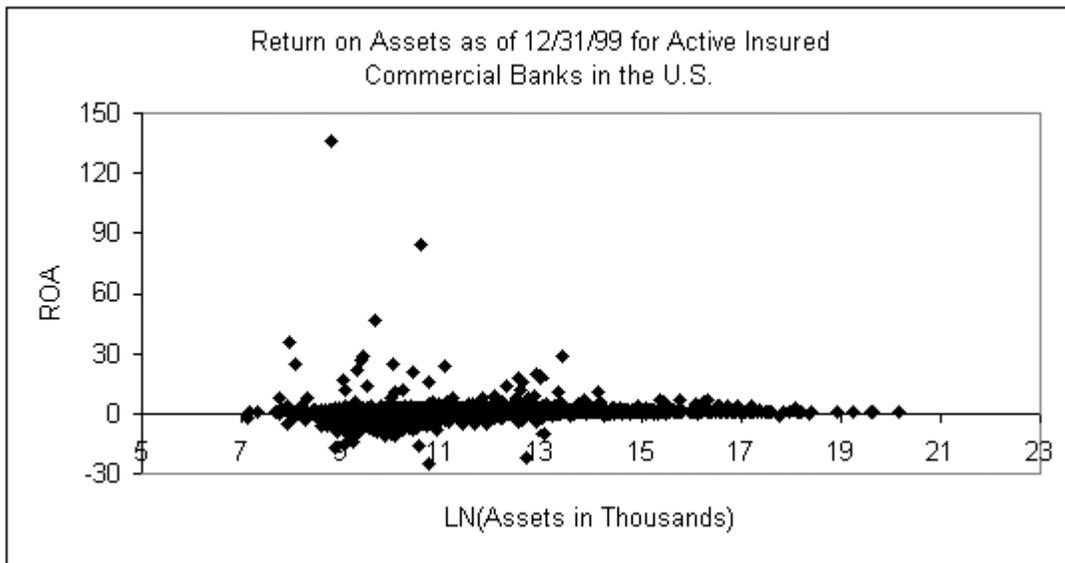
Students are asked to determine if larger banks have a higher return on assets for their state. If larger banks do have a higher return on assets one possible explanation is that there are economies of scale in the banking industry. An alternative explanation is that larger banks have more market power which leads to the increase in return on assets. The FDIC web site allows the download of numerous interesting data on an individual bank basis. There are plenty of questions that could be asked and analyzed with this data. The focus of this assignment is on the relationship between the size of assets and the return on assets. A procedure to access return on assets data is described in the homework assignment. It should be noted that the step-by-step procedure to access this data may change from time-to-time due to web site reorganization. However, the data should always be at the FDIC web site somewhere.

Once students have data on assets and return on assets they will need a tool to analyze this data. The tool described in the homework assignment is Microsoft Excel 97. Excel spreadsheets enable students to plot the data in charts and perform basic regression analysis. The text file with return on assets data can be opened directly into an Excel spreadsheet. It will be necessary to follow the steps for

the Text Import Wizard (the data is delimited by commas with a general format) to get the data into the appropriate columns.

Sometimes a graph will more easily illustrate a point or relationship that is not visible from looking at a table of data. Sometimes the reverse is true. Chart 2 displays a plot of return on assets against the natural logarithm of total assets for insured commercial banks in the United States in 1999. The natural log of total assets is selected rather than total assets due to a very wide distribution of bank size. Chart 2 displays a faint positive relationship between return on assets and bank size. Based solely on Chart 2 it would be hard to argue convincingly that larger banks had higher return on assets.

**CHART 2**



Two additional procedures may need class demonstration before students create their own versions of Chart 2. First, demonstrate how to create a column of the natural log of assets. To take the natural log of the contents of cell C1 you would type “=ln(C1)” in a empty column cell. Copying this formula down for the entire column would create a column of the natural log of column C. Second, the horizontal and vertical axis in the chart may need adjustment to illustrate a point or to ignore extreme values. To change the scale of a axis, double click on the axis and change the MIN and MAX from automatic to a defined value.

Excel allows a variety of statistical data analyses to be conducted. The procedure to conduct a simple linear regression is described in the homework assignment. Table 1 confirms statistically that there is a positive relationship between bank size and return on assets. The coefficient estimate of 0.158 has a t-test statistic of 5.36 and is significant at less than a one percent level. It should be noted that the overall measure of fit measured by the  $R^2$  is very low. The regression results taken together with Chart 2 show that larger banks do have higher return on assets. However, this is not a perfect relationship and there is a lot of variance in terms of return on assets and bank size.

TABLE 1

SUMMARY OUTPUT: Active Insured Commercial Banks in the U.S 12/31/1999				
<i>Regression Statistics</i>				
Multiple R		0.0581		
R Square		0.0034		
Adjusted R Square		0.0033		
Standard Error		3.5367		
Observations		8472		
ANOVA				
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	1	359.1267	359.1267	28.7115
Residual	8470	105943.5762	12.5081	
Total	8471	106302.7029		
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.7368	0.3373	-2.1845	0.0290
LN(Assets in Thousands)	0.1580	0.0295	5.3583	0.0000

## DISCUSSION AND EXTENSIONS

At the completion of this assignment students are better prepared to discuss and measure the causes and consequences of consolidation in the banking industry. Consolidation in the pursuit of economies of scale is socially desirable. Consolidation in the pursuit of increased market power is not necessarily socially desirable. It might be useful to introduce students to some recent academic research in this field. Prager (1998) examines the price effects resulting from bank mergers that substantially increase local market concentration and concludes that mergers do lead to increased market power. Berger and Hannan (1998) find that the reduction in cost efficiency from lack of competition is much larger than the social loss to society due to mispricing from the exercise of market power. The results of these two papers indicate that higher return on assets from consolidation is more likely caused by the exercise of market power than from economies of scale.

The data set accessed for this assignment is not ideal for isolating whether the positive relationship between bank size and return on assets is due to economies of scale or market power. A variable from this data set that can be used as a proxy for market power is the number of offices or the number of offices as a percentage of total state or total national offices. The number of offices variable was not significant for regressions using data from 1999. When controlling for bank size and market power in a multiple regression model, it will be important to discuss the possible effects of multicollinearity because bank size is likely to be highly correlated with other variables measuring market power. An additional concern that needs to be addressed when using the number of offices as a proxy for market power is the effect of technological advancement. The internet allows banks from all over the country to compete without necessarily having a nearby office. Moore (1998) argues that technological advancement will reduce the importance of geographic distance as a barrier to competition in the banking industry.

One final recent article that would aid further discussion of consolidation in the banking industry is the survey article by Berger, Demsetz and Strahan (1999) which details the causes, consequences and future implications of consolidation in the financial services industry.

## CONCLUSION

This paper introduced a homework assignment that incorporates the internet and spreadsheets as research tools in the study of the effects of consolidation. The homework assignment can be used wherever a discussion of consolidation is relevant (e.g. managerial economics or money and banking). At a minimum this assignment allows students to gather data, analyze data, and answer questions based on their analysis. Handouts of recent newspaper and magazine articles along with the academic articles cited previously allow the instructor to build this assignment into a very exiting and up-to-date discussion of the possible causes and consequences of consolidation.

## REFERENCES

- Berger, Allen N., Rebecca S. Demsetz and Philip E. Strahan (1999). "The Consolidation of the Financial Services Industry: Causes, Consequences, and Implications for the Future." *Journal of Banking and Finance*, Vol. 23, Num. 2-4, (February), 135-94.
- Berger, Allen N. and Timothy H. Hannan (1998). "The Efficiency Cost of Market Power in the Banking Industry: A Test of the "Quiet Life" and Related Hypotheses." *Review of Economics and Statistics*, Vol. 80, Num. 3, (August), 454-65.
- Moore, Robert R. (1998). "Concentration, Technology, and Market Power in Banking: Is Distance Dead?" *Financial Industry Studies*, (December), 1-10.
- Prager, Robin A. and Timothy H. Hannan (1998). "Do Substantial Horizontal Mergers Generate Significant Price Effects? Evidence from the Banking Industry." *Journal of Industrial Economics*, Vol. 46, Num. 4, (December), 433-52.

## APPENDIX

## HOMEWORK ASSIGNMENT

You have been assigned the state of \_\_\_\_\_. Your assignment is to use the procedures below to address the following two questions.

Question 1) Is There A Trend Toward Consolidation

- a) Create and turn in a chart illustrating the trends in terms of the number of banks, branches, and total offices for insured commercial banks in your state. For an example see the Chart 1 attachment.
- b) Is there a trend toward consolidation of banks in your state? Explain.

Question 2) Do Larger Banks Have Higher Return On Assets

- a) Create and turn in a chart plotting return on assets on the vertical axis and  $\ln(\text{assets})$  on the horizontal axis for your state. For an example, see the Chart 2 attachment.
- b) Create and turn in a regression summary output for a regression where return on assets is the dependent (y) variable and  $\ln(\text{assets})$  is the independent (x) variable. For an example, see the Table attachment.
- c) Do larger banks have higher return on assets in your state? Explain.

Procedure for getting data on the number of banks, branches and total offices for insured commercial banks

- 1) Start at the web address <http://www.fdic.gov/index.html>
- 2) From the Bank Data category, select "Historical" (<http://www.fdic.gov/bank/historical/index.html>)
- 3) Under the Banking History: Historical section, select "Historical Statistics on Banking" (<http://www2.fdic.gov/hsob/>)
- 3) Under the Select your historical data category, select "Commercial Banks"
- 4) In the Select Report Type box, select "Number of Banks, Branches and Total Offices of Insured Commercial Banks"
- 5) In the Select State box, select the state of interest (e.g. United States)
- 6) Click on Produce Report

Procedure for getting data on the return on assets data for insured commercial banks

- 1) Start at the web address <http://www.fdic.gov/index.html>
- 2) From the Bank Data category, select "Individual Banks" (<http://www.fdic.gov/bank/individual/index.html>)
- 3) Under the Find a Bank, Savings Association or Bank Holding Company category, select Institution Directory
- 4) Under the Use the FDIC Institution Directory to: category, select Find an Institution
- 5) Next to the Find Options, Click on Advanced
- 6) In the State box, select the state of interest (e.g. Anywhere in U.S.)
- 7) In the Charter Type box, select Insured Commercial Banks
- 8) Click on Find
- 9) To download the entire list, click on Download and save it to a disk as a text (csv) file. Do not try and open the file directly from the web site. Save the file first and then open it up with Excel.

\*\* Before beginning a procedure to create a chart or run a regression it is necessary to make sure that missing data are removed from the spreadsheet. The data can be sorted by assets and then the rows with missing assets can be deleted.

Procedure for creating a chart in Excel 97

- 1) Select Insert from the toolbar
- 2) Select Chart
- 4) Follow the 4 step Chart Wizard to select the Chart Type (XY Scatter Plot), Chart Source Data, Chart Options and Chart Location.

Procedure for performing a regression in Excel 97

- 1) Select Tools from the toolbar
- 2) Select Data Analysis: If Data Analysis is not an option, Select Add-Ins, Check Analysis Tool Pack, Click OK and go back to step 1)
- 3) Select regression
- 4) Input the data: Y-Range (e.g. ROA in AP1:AP8806), X-Range (e.g.  $\ln(\text{assets})$  in D1:D8806), Check labels if included in range
- 5) Check OK