Review of European Studies; Vol. 5, No. 5; 2013
ISSN 1918-7173 E-ISSN 1918-7181
Published by Canadian Center of Science and Education

Financial Crisis, Regulatory Changes and Bank Profit

Seok Weon Lee[1]

[1] Division of International Studies, Ewha Womans University, Seoul, Korea

Correspondence: Seok Weon Lee, Division of International Studies, Ewha Womans University, 11-1, Daehyun-dong, Seodaemun-gu, Seoul 120-750, Korea. Tel: 82-2-3277-4456. E-mail: seoklee@ewha.ac.kr

Received: September 12, 2013 Accepted: October 15, 2013 Online Published: November 6, 2013

doi:10.5539/res.v5n5p151 URL: http://dx.doi.org/10.5539/res.v5n5p151

Abstract

This paper attempts to identify empirically the profitability determinants of Korean banks over different regimes of regulations in the banking industry. Firstly, we examine whether the traditional determinants that have been suggested to be effective in explaining the determinants of non-financial firms' profitability can also explain the profitability of Korean banks. Secondly and more importantly, we partition the full sample period into three sub-periods based on the degree of banking regulation's strength and compare the explanatory power of the bank profitability determinants and examine how the changes in banking regulations affect the bank profitability.

Overall, we found that the profitability of Korean banks is positively related to asset size and capital ratio, and negatively related to the fixed asset ratio and nonperforming loans ratio. However, from the results for the partitioned sample periods, we found that the positive relationship between asset size (capital ratio) and profitability became weaker (stronger) after banking regulations became tightened with structural reform after Asian countries' financial crisis. The relationship between fixed asset ratio and profitability became more negative after banking regulations became tightened. Net interest margin was no longer a significant determinant of bank profitability under tightened banking regulations. These results could be understood as follows. Under tightened banking regulations, heavier regulatory costs would be imposed on the banks with riskier characteristics such as lower capital ratio, larger asset size, and higher loan ratio, etc. Thus, the profitability of these banks would be affected more adversely than the banks in safer characteristics.

Keywords: bank profitability, bank regulation, financial crisis, capital adequacy

1. Introduction

Sound and healthy banking system is the backbone of a national economy considering that banks play a pivotal role in the economy. Given that the growth of the economy is directly related to the soundness and profitability of the banking system, knowledge of the underlying determinants of banking sector's profitability has therefore attracted the attention of many researchers in the banking literature as well as many other parties concerned in banks' profitability such as bank managers, banking sector's regulators and investors in financial markets. Many theoretical and empirical studies already have been performed to identify and understand the underlying factors that influence the banks' profitability.

Though empirical evidences on the profitability determinants of banking institutions are rather mixed, there are some factors that are suggested by many researchers that can possibly influence bank profitability. Returns on bank assts, and equity, and net interest margins are the measures that have been most frequently used by the researchers.

Haslem (1968, 1969) found that capital ratios, interest paid and received, salaries and wages are significantly related to bank profitability based on balance sheet and income statement data for all the member banks ofthe US Federal Reserve System in a two-year study. He argued that expense management should be first emphasized; next fund source management and lastly funds use management.

Wall (1985) found that a bank asset and liability management, its funding management and the non-interest cost controls all have significant effects on the bank profitability.

Using the sample of U.S banks over the period of 1983-1989, Berger (1995) found that the profitability of the banks measured by the return on equity is positively related to the bank capital ratio. Higher capital ratio Granger-caused higher earnings and vice versa.This finding is suggested to support the expected bankruptcy

costs hypothesis for bank profitability suggesting that higher bank capital is leaded to lower bankruptcy cost and lower cost of capital, and higher profitability.

Zimmerman (1996) found that management decision, especially regarding loan portfolio concentration, isone of most significant factorsaffecting bank performance.

Stiroh and Rumble (2006) found a positive relationship between the degree of bank asset portfolios'diversification and bank profit using the sample of U.S. financial holding companies over the period of 1997-2002. Bank diversification strategies include various banking activities such as transaction fees, trading revenue, and other non-interest income, etc.

Hirtle and Stiroh (2007) found a negative relationship between the degree of retail banking and bank return for the U.S. banks. They argued that retail banking may be effective in maintaining stable bank profit, but it may decrease bank profit.

Naceur and Goaied (2008) found that bank profit is negatively related to asset size and positively related to stock market development for the Tunisian banking industry. They conclude that the negative relation between asset size profit implies that Tunisian banks are operating above the optimum level of asset size. The positive relation between stock market development and profit reflects the complementarities relationship between bank and stock market growth.

Alper and Anbar (2011) found that bank profitability s positively related to bank asset size, however, is negatively related to bank loans and size of credit portfolio.

Using the sample of Korean banks, Lee (2012) found that the profitability of regional banks is more positively related to the asset size, capital ratio and the loan ratio than that of the national banks. He concludes that this result possibly results from regional banks' having more profitable and stable structure and mechanism to generate higher profit due to the various advantages they have over national banks such as regulatory advantages and incentives, more loyal customer bases, easier and more efficient mechanism for information collection about customers, less competition and more protected market share, etc.

This paper is in the same line of researches as the above ones. However, this paper focuses on attempting to identify empirically the profitability determinants of Korean banks over different regimes of regulations in the banking industry. Some previous studies in Korea have already examined the issue of non-financial firms' profitability determinants in Korea. There were, however, very few studies focusing on banking industry. Furthermore, over the last few decades since the late 1990s, there were a number of significant changes in Korean banking industry's regulations as a result of structural reform after the financial crisis in 1997 that aggravated the profitability of Korean banks seriously. Korean government and financial supervisory service enforced structural reforms in financial system through the early 2000s to overcome the crisis and to recover the bank profitability. Reinforcing bank capital strength and adequacy was the core method of regulatory changes to recover bank profitability and soundness.

Firstly, we examine whether the traditional determinants that have been suggested to be effective in explaining the determinants of non-financial firms' profitability can also explain the profitability of Korean banks. Secondly and more importantly, by partitioning the sample period of the empirical analysis based on the degree of banking regulation's strength, this paper compares the explanatory power of the bank profitability determinants for the different regulations and examines how the changes in banking regulations affect the bank profitability. Understanding how bank profitability is determined and how this relationship between the profitability and the suggested determining factors is affected by banking regulations would be a very important issue in terms of deriving proper and effective policy implications for the sound and profitable banking system.

The structure of this paper is as follows. The next section describes the data and sample of the banks that are used in this study. Section 3 describes the estimation model and the hypotheses to be examined. Section 4 presents the empirical results, and section 5 offers concluding remarks.

2. Data and Summary Statistics

The financial data of the sample banks employed in this study was collected from the Statistics of Bank Management provided by the Korean Financial Supervisory Service. Sample period covered from 1994 to 2008. All the values are measured as year-end ones. Table 1 presents the summary statistics of the variables used in the study. Profitability of the bank is measured by the return on asset (ROA). ROA of the sample banks averages -0.1861. The average asset size of the banks is 405,710 million Korean won. Capital strength of the bank is measured by the total equity capital divided by the total asset, and the average capital ratio is 4.65%. Loan-to-asset ratio averages 47.33%. The ratio of nonperforming loans and the ratio of fixed assets to total asset

average 4.3369 and 46.2888, respectively. The ratio of net interest margins to total asset averages 0.0172.

Table 1. Sample descriptive statistics

	Mean	Median	Standard Deviation
ROA (return on asset)	-0.1861	0.3700	1.9846
Asset size	405,710	212,141	516,384
Capital-to-asset ratio	0.0465	0.0442	0.0210
Loan-to-asset ratio	0.4733	0.4642	0.0919
Nonperforming loans ratio	4.3369	2.8500	4.3182
Fixed asset ratio	46.2888	28.7000	159.60
Net interest margins ratio	0.0172	0.0183	0.0085
Number of observations264			

This table shows the descriptive statistics for the sample banks over the period 1994-2008.

3. Testing Model, Variables and Hypotheses

To examine the determinants of the profitability of Korean banks, the following multivariate pooled cross-sectional time-series regression equation is estimated over the sample period 1994-2008. To remedy a potential omitted latent-variable problem in OLS (ordinary least square) type estimation that could occur when the individual-specific component of the error term is correlated with the regressors in the model, we give FE (fixed-effect) specification to the model. Under this specification, FE estimation is known to be able to generate unbiased estimates.

Consider the linear unobserved effects model for N observations and T time periods:

$$y_{it} = X_{it}\beta + \alpha_i + u_{it} \text{ for } t = 1, .., T \text{ and } i = 1, ..., N$$

where y_{it} is the dependent variable observed for individual i at time t, X_{it} is the time-variant $1 \times k$ regressor matrix, α_i is the unobserved time-invariant individual effect and u_{it} is the error term. Unlike X_{it}, α_i is not observed. Common examples for time-invariant effects α_i are innate ability of individuals or historical and institutional factors for countries.

The FE model allows α_i to be correlated with the regressors x_{it}. Since α_i is not observable, it cannot be directly controlled for. The FE model eliminates α_i by demeaning the variables using the within transformation:

$$y_{it} - \overline{y_i} = \left(X_{it} - \overline{X_i}\right)\beta + (\alpha_i - \overline{\alpha_i}) + (u_{it} - \overline{u_i}) = \ddot{y_{it}} = \ddot{X_{it}}\beta + \ddot{u_{it}}, \text{ where } \overline{X_i} = \frac{1}{T}\sum_{t=1}^{T} X_{it} \text{ and } \overline{u_i} = \frac{1}{T}\sum_{t=1}^{T} u_{it}.$$

Since α_i is constant, $\overline{\alpha_i} = \alpha_i$ and hence the effect is eliminated. The FE estimator is then obtained by an OLS regression of $\ddot{y}$ on $\ddot{X}$.

As in the most previous studies in the literature, profitability of each bank, and therefore, the dependent variable of the regression model is measured as the ROA of the bank. As the explanatory variables affecting bank profitability, asset size (LogAsset), capital-to-asset ratio (Capital), loan-to-asset ratio (Loan), nonperforming loans-to-asset ratio (Npl), fixed asset-to-asset ratio (Fixed), and net interest margins-to-asset ratio (Nim) are used. These explanatory variables for bank profitability are chosen based on the previous studies such as Berger (1995), Stiroh and Rumble (2006), Hirtle and Stiroh (2007, Naceur and Goaied (2008), Alper and Anbar (2011), Samadi (2012), Lee (2012), and etc.

$$(Profit)_{i,t} = \lambda_0 + \lambda_1 (LogAsset)_{i,t} + \lambda_2 (Capital)_{i,t} + \lambda_3 (Loan)_{i,t} + \lambda_4 (Npl)_{i,t} + \lambda_5 (Fixed)_{i,t} + \lambda_6 (Nim)_{i,t} + \varepsilon_{i,t} \quad (1)$$

The expected sign based on the literature's suggestion between each of the explanatory variables and bank profitability is as follows.

Firstly, the effect of asset size (LogAsset) on bank profitability is ambiguous. Two conflicting effects are plausible. The first factor is the effect of larger asset size on achieving economies of scale and the consequent cost reductions in production and management. This may contribute to increasing the bank profitability. The second factor comes from the effect of larger asset size on achieving higher risk diversification of bank asset portfolios. Between these two conflicting effects, bank asset size would result in increasing bank profitability if the first factor dominates. If the second factor dominates, on the other hand, larger bank asset size would result in lower return and profitability because of lower risk.

The effect of bank capital strength (Capital), or financial leverage, on profitability is also ambiguous. Of the two conflicting effects, the positive relationship between capital ratio and profitability focuses on the effects of

higher capital ratio on the firm's being charged lower cost of capital and having lower bankruptcy costs. However, as the traditional corporate finance literature suggests, if lower equity capital, or higher financial leverage, gives greater motivation for the firm to increase risk, it could result in higher profitability.

Loan-to-asset ratio (Loan) is used as the proxy variable for the bank asset portfolio compositions. Of the various asset portfolio components, loans are classified as the highest risk categories. Furthermore, loans are the least liquid type of asset. If such high risk characteristics of higher loan ratio dominate, a negative relationship between loan ratio and profitability would be found. On the other hand, considering that the interest earnings from loans are generally the most profitable source of bank profit, a positive relationship between loan ratio and profitability could be found.

Nonperforming loans-to-asset ratio (Npl) is included to control for the current risk status of the bank on bank profitability.

The ratio of fixed asset to total asset (Fixed) is included as the measure of the bank overhead expenses.

Finally, the ratio of net interest margins to total asset (Nim) is included to control for the effect of the bank interest margin on bank profit, which is a relatively passive and direct channel for bank profit generation.

4. Empirical Results

4.1 The Results for Full Sample Period

Before estimating the fixed-effect panel regression model, we examine the correlation coefficients among the variables used in the study as a prerequisite test. Table 2 presents the Pearson correlation coefficients between the variables. It is shown that ROA is positively correlated with asset size, capital ratio and loan ratio, respectively. These results may support the following views for our hypotheses: Larger asset size of the firm would be associated with economies of scale and cost reduction, and the consequent higher profit. The banks with higher capital ratio would be charged lower cost of capital and have lower bankruptcy costs, and therefore, could generate higher profit. The positive correlation between loan ratio and ROA may suggest that the sample banks' loan assets are properly managed to contribute to generate higher profit. Also, it is shown in the table that ROA is negatively correlated with both nonperforming loan ratio and fixed asset ratio. Net interest margin ratio is positively correlated with ROA.

Table 2. Correlations

	ROA	LogAsset	Capital	Loan	Npl	Fixed	Nim
ROA	1						
LogAsset	0.2051	1					
Capital	0.5229	-0.1837	1				
Loan	0.3547	0.2396	0.1761	1			
Npl	-0.7490	-0.2552	-0.3793	-0.4108	1		
Fixed	-0.3304	0.0256	-0.2057	-0.0543	0.2651	1	
Nim	0.3871	-0.0362	0.4834	0.5634	-0.3888	-0.1182	1

This table shows the Pearson correlations among the variables over the period 1994-2008.

Table 3. Fixed-effect panel regression results (full sample period)

	Slope coefficient	t-statistics
Intercept	-2.8152***	-3.0398
LogAsset	0.1671***	2.6645
Capital	26.7282***	6.6591
Loan	1.0602	0.9570
Npl	-0.2573***	-12.139
Fixed	-0.0015***	-3.1448
Nim	-3.2934	-0.2756
F-statistic	80.272***	
Adjusted R2	0.64	
Number of observations	264	

This table shows the slope coefficients and t-statistics of the panel regression result for the full sample period 1994-2008. *, **, *** indicate statistical significance at the 10, 5, or 1% significance level, respectively.

Table 3 shows the results of the fixed-effect panel regression for all the sample banks over the full sample period (1994-2008). It is shown that asset size has a significantly positive effect on bank profitability. This result may support the view that for the Korean banks over the sample period of this study the positive effect of larger asset size on achieving economies of scale, lower cost, and therefore, higher profit seems to have dominated the effect of larger asset size on achieving better risk diversification, and therefore, lowering bank profit

It is shown that capital ratio also has a significantly positive effect on bank profitability. This result may support the view that the positive effect of higher capital ratio on lowering bank cost of capital and bankruptcy costs, and therefore, higher profit seems to have dominated the effect of higher (lower) capital on inducing the bank to pursue safer (riskier) activities, and therefore, lower (higher) profit.

Loan ratio has a positive effect on bank profitability, however, is not statistically significant. Both nonperforming loan ratio and fixed asset ratio have significantly negative relationships with bank profit.

4.2 Step-wise Regression Results

We run step-wise regressions after omitting the two insignificant explanatory variables from the above full sample estimation, the ratio of net interest margins and loan ratio, in turn, respectively, and examines the consistency of the estimation results. The first table 4.1 shows the result for which the ratio of net interest margins is omitted. The second table 4.2 shows the result for which both the ratio of net interest margins and loan ratio are omitted. It is shown that the estimation results are not influenced by these modifications.

Table 4. Step-wise fixed-effect panel regression results (full sample period)

	Slope coefficient	t-statistics
Intercept	-2.067***	-3.0378
LogAsset	0.1696***	2.7356
Capital	28.2708***	7.1122
Loan	0.8999	0.9562
Npl	-0.2568***	-12.1892
Fixed	-0.0015***	-3.1523
F-statistic	96.6574***	
Adjusted R2	0.64	
Number of observations	264	

This table shows the slope coefficients and t-statistics of the step-wise panel regression result for the full sample period 1994-2008. *, **, *** indicate statistical significance at the 10, 5, or 1% significance level, respectively.

Table 5. Step-wise fixed-effect panel regression results (full sample period)

	Slope coefficient	t-statistics
Intercept	-2.4883***	-2.8877
LogAsset	0.1794***	2.9345
Capital	28.5805***	7.2153
Npl	-0.2631***	-13.1535
Fixed	-0.0015***	-3.1049
F-statistic	120.63***	
Adjusted R2	0.64	
Number of observations	264	

This table shows the slope coefficients and t-statistics of the step-wise panel regression result for the full sample period 1994-2008. *, **, *** indicate statistical significance at the 10, 5, or 1% significance level, respectively.

4.3 The Results for Sub-sample Periods

Presuming that the profitability determinants of Korean banks could have been affected by the financial crisis that has swept over Asian countries around the late 1997, we partition the full sample period 1994-2008 into three sub-sample periods; 1994-1996 (pre-financial crisis and loose regulation period), 1997-2000 (the periods of financial crisis and tightened regulations with regulatory reform), and 2001-2008 (post-financial crisis and the period of tightened regulations with regulatory reform). Then we estimate the above multivariate fixed-effect

panel regression for each sample period, respectively, and examine whether there were any significant differences in the relationship between bank profitability and the explanatory variables.

The estimation results for the three sub-sample periods are presented in table 5. Firstly, it is shown that the coefficient on asset size is significantly positive over 1994-1996 period, however, is not significant during the two latter periods of strengthened regulations. This result can be understood as follows. In the process of overcoming the financial crisis since the late 1997, M&A (merger and acquisition) of inadequate capital ratio and unhealthy banks by larger banks is one of the main means of the Korean banking industry's structural reform. Thus, the capital strength of larger banks that acquired smaller, unhealthier banks deteriorated significantly. Therefore, other things being equal, under the regime of strict financial regulation strengthening capital adequacy of the banks, the degree of regulatory supervision would be heavier on the larger banks, which could affect bank profitability negatively. Considering that the banks with higher capital ratio would have significantly lower financial distress and bankruptcy costs under the tightened regulation, which would be associated with lower cost of capital, this result can be understood.

It is also shown that the coefficient on capital ratio is consistently positive over all the three periods, however, the magnitude and significance of the coefficient are greater and stronger for the latter two periods of strengthened regulations. This result suggests that the effect of higher capital ratio on contributing to higher profitability is more significant under the period of strengthened regulation. Thus capital adequacy plays a more significant role for the bank profitability under the regime of tightened bank regulations.

The coefficient on the loan ratio is significantly negative over the period of 2001-2008. As mentioned above, loans are classified as the highest risk category asset under tightened regulation. Thus, the degree of regulatory supervision on the banks with higher loan ratio would be heavier under tightened regulation, which could result in lower profitability.

The relationship between nonperforming loans and bank profitability is consistently negative for all the three periods.

The coefficient on fixed asset is negative for the two latter periods, though not statistically significant, while it is positive for the first period. This may indicate that the cost of paying larger overhead expenses is greater under the period of tightened regulation, and this results in lower profitability.

The coefficient on net interest margins is significantly positive only for the first period of loose regulation. Thus, the passive and direct effect of bank interest margin on generating profit gets weaker as the regulation gets tightened.

5. Discussion

The empirical findings for the sub-sample periods suggest that the positive association between bank asset size and profit gets weaker and that between bank capital ratio and profit gets stronger as banking regulation becomes tightened. Both results can be understood in terms of the more strengthened adequacy and requirement for bank capital ratio. Also, it is significantly observed that the greater the loan ratio, the lower the bank profitability under tightened banking regulations. The negative effect of larger overhead cost for bank profitability is greater under tightened banking regulations. Finally, the net interest margin is no longer a significant determinant of bank profitability under tightened banking regulations.

Overall, comparison of the results between a loose regulation period and a tightened regulation period suggests that the banks became more sensitive to maintain a fair level of capital ratio and became more reluctant to increase the cost of banking activities after banking regulation became tightened. Furthermore, it is shown that the risk-taking incentives of the banks reflected by the coefficients on each explanatory variable became weaker after regulation became tightened. Considering that the degree of regulatory supervision would be heavier on the banks with lower capital ratio, higher loan ratio, higher nonperforming loans and etc. under the period of tightened regulation, this result could be expected. However, if the effect of the tightened regulation is too excessive such that it discourages the banks' deliberate and profitable risk-taking incentives, it would ultimately cause the bank profit to be damaged and the soundness of banking industry is not guaranteed. Keeping the balance between risk-taking and profitability would be a very important issue. Banks, themselves, also need to seek diverse methods, mechanism and risk-management scheme to generate profits by minimizing the adverse consequences of tightened regulation.

Table 6. Fixed-effect panel regression results (Sub-sample periods)

	1994-1996		1997-2000		2001-2008	
	Slope coefficient	t-statistics	Slope coefficient	t-statistics	Slope coefficient	t-statistics
Intercept	-2.7646***	-4.1218	-4.6176	-1.4819	0.1527	0.1819
LogAsset	0.2575***	4.1192	0.1490	0.6545	0.0236	0.5034
Capital	9.1406***	3.4014	57.6871***	4.1989	20.9328***	3.5316
Loan	-1.0013	-1.2612	3.6751	0.9779	-1.6436**	-2.1099
Npl	-0.0737***	-4.8349	-0.2589***	-4.9177	-0.1344***	-2.4911
Fixed	0.0042	1.0355	-0.0011	-1.3976	-0.0005	-0.0023
Nim	16.0180*	1.6567	-15.47	-0.6368	16.573	1.1867
F-statistic	7.8548***		16.6905***		9.7709***	
Adjusted R2	0.36		0.54		0.32	
Number of observations	74		80		110	

This table shows the slope coefficients and t-statistics of the panel regression result for the sub-sample periods 1994-1996, 1997-2000, 2001-2008, respectively. *, **, *** indicate statistical significance at the 10, 5, or 1% significance level, respectively.

6. Concluding Remarks

This paper attempts to identify empirically the profitability determinants of Korean banks over different regimes of regulations in the banking industry. Firstly, we examine whether the traditional determinants that have been suggested to be effective in explaining the determinants of non-financial firms' profitability can also explain the profitability of Korean banks. Secondly and more importantly, we partition the full sample period into three sub-periods based on the degree of banking regulation's strength and compare the explanatory power of the bank profitability determinants and examines how the changes in banking regulations affect the bank profitability.

Overall, we found that the profitability of Korean banks is positively related to asset size and capital ratio, and negatively related to the fixed asset ratio and nonperforming loans ratio. However, from the results for the partitioned sample periods, we found that the positive relationship between asset size (capital ratio) and profitability became weaker (stronger) after banking regulations became tightened with structural reform after Asian countries' financial crisis. The relationship between fixed asset ratio and profitability became more negative after banking regulations became tightened. Net interest margin was no longer a significant determinant of bank profitability under tightened banking regulations. These results could be understood as follows. Under tightened banking regulations, heavier regulatory costs would be imposed on the banks with riskier characteristics such as lower capital ratio, larger asset size, and higher loan ratio, etc. Thus, the profitability of these banks would be affected more adversely than the banks in safer characteristics.

References

Alper, D., & Anbar, A., (2011). Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey. *Business and Economic Research Journal, 2*, 139-152.

Berger, A. N. (1995). The Relationship between Capital and Earnings in Banking. *Journal of Money, Credit and Banking, 27*, 432-456. http://dx.doi.org/10.2307/2077877

Haslem, J. (1968). A Statistical Analysis of the Relative Profitability of Commercial Banks. *Journal of Finance, 23*, 167-176. http://dx.doi.org/10.1111/j.1540-6261.1968.tb03004.x

Haslem, J. (1969). A statistical estimation of commercial bank profitability. *Journal of Business, 42*, 22-35. http://dx.doi.org/10.1086/295162

Hirtle, B. J., & Stiroh, K. J. (2007). The Return to Retail and the Performance of US Banks. *Journal of Banking and Finance, 31*, 1101-1133. http://dx.doi.org/10.1016/j.jbankfin.2006.10.004

Lee, S. W. (2012). Profitability Determinants of Korean Banks. *Economics and Finance Review, 2*, 6-18.

Naceur, S. B., & Goaied, M. (2008). The Determinants of Commercial Bank Interest Margin and Profitability: Evidence from Tunisia. *Frontiers in Finance and Economics, 5*, 106-130.

Samadi, M. T. (2012). An Empirical Study on the Impact of Operating Risk on Structure Capital and Profitability

in Iranian Banking Sector. *Management Science Letters*. http://dx.doi.org/10.5267/j.msl.2012.04.020

Stiroh, K. J., & Rumble, A. (2006). The Dark Side of Diversification: The Case of US Financial Holding Companies. *Journal of Banking and Finance, 30*, 2131-2161.

Wall, L. D. (1985). Why Are Some Banks More Profitable than Others? *Journal of Bank Research, 15*, 240-256.

Zimmerman, G. (1996). Factors Influencing Community Bank Performance in California. *Federal Reserve Bank of San Francisco, 1*, 26-41.