CORPORATE GOVERNANCE AND BANK PROFITABILITY: EVIDENCE FROM THE U.S.

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Abstract

This paper examines the effect of corporate governance on bank profitability using a panel of U.S. banks over the period 1990-2009. We measure corporate governance usingthe G-index developed by Gompers, Ishii, and Metrick (2003), and the E-index developed by Bebchuk, Cohen, and Ferrell (2009). We specify a dynamic model that allows for persistence in bank profitability, and estimate the model using the system GMM estimator. Overall, we find no evidence that corporate governance is related to bank profitability.In contrast, we find strong evidence that operation efficiency and credit risk affectbank profitability.

Keywords: Corporate Governance, Bank, Profitability, GMM, Index

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1. Introduction

In a widely cited paper, Macey and O'Hara (2003, p. 91) noted that "very little attention has been paid to the corporate governance of banks." Since then, bank governance has attracted considerable research attention (e.g., Kyereboah-Coleman and Biekpe, 2006; Caprio, Laeven, and Levine, 2007; Andres and Vallelado, 2008; Hau and Thum, 2009; Hagendorff, Collins, and Keasey, 2010; Adams and Mehran, 2011; Beltratti and Stulz, 2011). Moreover, regulators have published a set of principles for enhancing corporate governance at banking organizations (Basel Committee on Banking Supervision, 2010).

In this paper, we examine the effect of corporate governance on bank profitability using a sample of U.S. banks over the period 1990-2009. We focus on profitability because banks with higher profitability are less likely to experience financial distress in the upcoming years (e.g., Whalen, 1991; Kick and Koetter, 2007; Poghosyan and Cihak, 2011). For this reason, profitability and its determinants are closely watched by bank regulators (Morttinen et al., 2005).

We use two measures of corporate governance. The first measure is the G-index developed by Gompers, Ishii, and Metrick (2003), and the second measure is the E-index developed by Bebchuk, Cohen, and Ferrell (2009). Both measures have been widely used in the corporate governance literature. We measure profitability using both return on assets (ROA) and return on equity (ROE). Because bank profitability tends to persist over time (e.g., Berger et al., 2000; Goddard et al., 2011), we specify a dynamic model by including the lagged dependent variable among the regressors. The model controls for a number of bank characteristics, year fixed effects, and bank fixed effects.

We estimate the model using the system Generalized Method of Moments (GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). This estimator is able to produce consistent estimation results in the presence of lagged dependent variable and endogenous regressors. To control for the impact of the recent financial crisis on the determinants of bank profitability, we split the wholesample period into two periods: the pre-crisisperiod 1990-2006, and the crisis period 2007-2009. We estimate the model separately for each period.

Overall, we find no evidence that corporate governance is relate to bank profitability. This result holds regardless of whether we use data from the pre-crisis or the crisis period. The result is also robust to alternative measures of corporate governance or bank profitability. In contrast, we find strong evidence that operation efficiency and credit risk affectbank profitability. We discuss the policy implication of our results in the conclusion section.

The reminder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the empirical model and estimation method. Section 4 describes the data. Section 5 reports the estimation results. Section 6 concludes.

2. Corporate governance of banks

A large number of studies have examined the effect of corporate governance on bank performance. Researchers have paid particular attention to evidence from the recent financial crisis. In this section, we briefly summarize the related literature.

2.1 Insider ownership and bank performance

Several papers examinethe effect of insider ownership on bank performance. Griffith, Fogelberg, and Weeks (2002) find a nonlinear relationship between CEO ownership and bank performance. Hughes et al. (2003) find that higher managerial ownership can lead to entrenchment, which is often associated with poor performance. Barako and Tower (2007) find that both board ownership and government ownership are negatively related to bank performance. Westman (2011) finds that managerial ownership has a positive impact on profitability in non-traditional banks, while board ownership has a positive impact on profitability in traditional banks.

Researchers have also examinedthe effect of controlling shareholders on bank performance. Caprio, Laeven, and Levine (2007) find that larger cash-flow rights by the controlling owner boost bank valuations. Azofra and Santamaria (2011) find that whenever there is a gap between the controlling shareholder's cash flow rights and control rights, then the bigger the gap, the poorer the bank's performance. Elyasiani and Jia (2008) find that institutional ownership stability has a positive impact on bank performance. Haw et al. (2010) find that banks with concentrated control have poorer performance relative to widely held banks.

2.2 Board of directors and bank performance

A number of papers investigatethe effect of board size and composition on bank performance, and the results are mixed. Simpson and Gleason (1999) find that a bank is less likely to get into financial distress when the CEO is also the chairman of the board, while board size and independence have no impact on the probability of getting into financial distress. Mishra and Nielsen (2000) find that the relative tenure of independent outside directors has a positive impact on bank performance. Belkhir (2009a) finds a positive relationship between board size and bank performance as measured by Tobin's Q and return on assets. Belkhir (2009b) examines several governance mechanisms simultaneously, and finds no evidence that board size or composition is related to bank performance. Adams and Mehran (2011) find that board size is positively related to bank performance, while independence is not related to performance.

Researchers have also reported international evidence. Kyereboah-Coleman and Biekpe (2006) examine a sample of commercial banks in Ghana, and find a positive relationship between board size and bank performance. They also find a positive relationship between board independence and bank performance. Staikouras, Staikouras, and Agoraki (2007) examine a sample of European banks, and find that board size is negatively related to bank performance, while board composition has no impact on bank performance. Andres and Vallelado (2008) use a sample of banks from different countries. They find an inverted U-shaped relationship between bank performance and board size, and between bank performance and board independence. Kaymak and Bektas (2008) use a sample of Turkish banks, and find that the presence of insiders has a positive impact on bank performance, while duality and board tenure have a negative impact on bank performance. Hagendorff, Collins, and Keasey (2010) examine a sample of international banks, and find that board independence and diversity improve bank performance, but only in countries with strict banking regulation regimes. Chahine and Safieddine (2011) examine a sample of Lebanon banks, and find that board size is positively related to bank performance. Finally, using a sample of Chinese banks, Rowe, Shi, and Wang (2011) find that higher board ownership and more independence are related to better bank performance.

2.3 Evidence from the recent financial crisis

A number of papers have examined the effect of corporate governance on bank performance during the crisis period 2007-2009, and the results are mixed. Several papers conclude that banks with better corporate governance performed better during the crisis period. Hau and Thum (2009) find that the losses incurred by German banks were correlated with the financial incompetence of supervisory boards. Peni and Vahamaa (2011) find that banks with better corporate governance had higher profitability. Yeh, Chung, and Liu (2011) find that better crisis period performance was related to more independent directors on auditing and risk committees. Grove et al. (2011) find that corporate governance better explained bank performance than loan quality. Muller-Kahle and Lewellyn (2011) find that subprime lenders had boards that were busier, had less tenure, and were less diverse with respect to gender.

Other papers conclude that banks with better corporate governance did not perform better during the crisis period. Beltratti and Stulz (2011) construct a sample of large international banks, and find that banks with more shareholder-friendly boards performed worse during the crisis period than other banks. Erkens, Hung, and Matos (2010) find that banks with more independent boards and higher

institutional ownership experienced worse stock returns during the crisis period. Aebi, Sabato, and Schmid (2011) find that standard corporate governance variables were not related to bank performance during the crisis period. They also find, however, that banks in which the chief risk officer directly reported to the board of directors performed better.

3. Methodology

To investigate the effect of corporate governance on bank profitability, we specify the following empirical model:

$$\pi_{i,t} = \alpha + \beta\pi_{i,t-1} + \delta CG_{i,t} + \gamma x_{i,t} + \theta_t + \mu_i + \varepsilon_{i,t}$$

where $\pi_{i,t}$ is the profitability of bank *i* in year *t* and $\pi_{i,t-1}$ is the one-year lagged profitability; $CG_{i,t}$ is a measure of corporate governanceof bank *i* in year *t*; $x_{i,t}$ is a vector of bank-specific control variables; θ_t are year fixed effects; μ_i are bank fixed effect; $\varepsilon_{i,t}$ is the error term.

We include year fixed effects among the regressors to control for time variation in the market conditions of the banking industry. We include the one-year lagged profitability among the regressors because previous studies find that bank profitability tends to persist over time (e.g., Berger et al., 2000; Goddard et al., 2011). The coefficient on the lagged dependent variable, β, measures the degree of persistence. A value close to 0 indicates low degree of persistence, while a value close to 1 indicates high degree of persistence.[16]

Given the dynamic nature of the model, standard estimators (such as OLS or fixed effects) will produce inconsistent results. Therefore, we estimate the model using the two-step system GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). Robust standard errors are computed using the Windmeijer (2005) finite-sample correction for two-step GMM. The System GMM estimator is able to produce consistent results in the presence of lagged dependent variable, endogenous regressors, and bank fixed effects.

The consistency of the system GMM estimator depends on two critical assumptions: the instruments are valid, and the error term is not autocorrelated. To check the validity of these two assumptions, we conduct the following diagnostic tests. The first test is the Hansen test for over-identifying restrictions. If the instruments are valid, the null hypothesis of Hansen test should not be rejected. The second test is the Arellano-Bond test for no second-order autocorrelation in the differenced residuals (AR(2) test). If the error term is not autocorrelated, the null hypothesis of AR(2) test should not be rejected.

4. Data

In this section, we describe the data sources and variables used in this study. We also report the summary statistics.

4.1 Data sources

We start with a list of all the publicly-traded bank holding companies (hereafter banks) in the U.S. over the period 1990-2009.[17] We obtain the G-index from Professor Andrew Metrick's website at Yale University; the E-index from Professor Lucian Bebchuk's website at Harvard University; and year-end bank accounting data from the Federal Reserve's FR Y-9C report.

4.2 Measuring bank profitability

We measure bank profitability using both ROA and ROE. ROA is defined as net income divided by total assets; ROE is defined as net income divided by total equity capital. Both measures reflect bank profitability: ROA reflects net income produced per dollar of assets; ROE reflects net income produced per dollar of equity capital. We use both measures to ensure the robustness of our results.

4.3 Measuring corporate governance

We use two measures of corporate governance: the G-index developed by Gompers, Ishii, and Metrick (2003), and the E-index developed by Bebchuk, Cohen, and Ferrell (2009). Both measures have been widely used in the corporate governance literature.

There exists a variety of corporate-governance provisions that can protect managers from being removed. Since 1990, the Investor Responsibility Research Center (IRRC) has been tracking twenty-four distinct provisions for more than 1,500 firms. Gompers, Ishii, and Metrick (2003) construct the G-index by counting the number of distinct provisions that reduce shareholder rights for a given firm in a given year. The index has a possible range from one to twenty-four, with higher values indicating weaker corporate governance. Gompers, Ishii, and Metrick (2003) find that this index is negatively related tofirmperformance.

[16]Berger et al. (2000) find that impediments to competition and informational opacity are strong determinants of persistence of bank profitability. They also find that persistence is sensitive to macroeconomic shocks. Goddard et al. (2011) find that persistence tends to be weaker in countries where institutional development is more advanced and external governance mechanisms are strong.

[17]The list is obtained from the Federal Reserve Bank of New York website.

Bebchuk, Cohen, and Ferrell (2009) reduce the twenty-four corporate-governance provisions used in Gompers, Ishii, and Metrick (2003) to the following six: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. They show that these six provisions are the driving force behind the negative correlation between IRRC provisions and firm performance, and the remaining eighteen IRRC provisions are not important. Based on a count of these six provisions, Bebchuk, Cohen, and Ferrell (2009) construct the E-index. This index has a possible range from zero to six, with higher values indicating weaker corporate governance.

Because IRRC does not publish in each year, both the G-index and the E-index have gaps. Following the literature (e.g., Gompers, Ishii, and Metrick, 2003; Bebchuk, Cohen, and Ferrell, 2009), we fill the gaps by assuming that a firm's corporate-governance provisions do not change between two subsequent publications. For the years 2007-2009, we use the 2006 index values. This is consistent with Beltratti and Stulz (2011) and Peni and Vahamaa (2011).

4.4 Control variables

We control for a number of variables that are commonly used in studies on bank profitability (e.g., Athanasoglou, Brissimis, and Delis, 2008; Liu and Wilson, 2010; Goddard et al., 2010, 2011;Dietrich and Wanzenried, 2011). We briefly describe each variable below.

Bank size is an important determinant of profitability. Large banks may have higher profitability because of economies of scale and scope. In addition, large banks are better diversified and therefore better able to invest in high-risk, high-return projects. On the other hand, large banks may actually have diseconomies of scope and therefore lower profitability (Berger, Hanweck, and Humphrey, 1987). Thus, the relationship between bank size and profitability is indeterminate. We measure bank size using total assets expressed in billions of dollars.

Well-capitalized banks are less likely to default, and therefore pay lower borrowing cost. Consistent with this view, Berger (1995) find a positive relationship between bank capital and profitability. In contrast, Liu and Wilson (2010) find a negative relationship. They note that banks with higher capital may be operating overcautiously and ignoring potentially profitable investment opportunities. Thus, the relationship between capital and profitability is indeterminate. We measure capital using the ratio of total equity capital over total assets.

When banks borrow money, they can either borrow from depositors or creditors. Typically, the interest rates on deposits are lower than those on borrowed funds. Beltratti and Stulz (2011) find that banks with a higher proportion of deposits have better performance. Thus, we expect a positive relationship between deposits and profitability. We measure deposits using the ratio of deposits to total assets.

In addition to interest income, banks also have noninterest income, such as fee income from investment banking, asset management, and service charges on deposit accounts. Noninterest income is becoming increasingly important for banks (e.g., Stiroh, 2004; Baele, De Jonghe, and Vennet, 2007; Dietrich and Wanzenried, 2011). Dietrich and Wanzenried (2011) argue that profit margins of noninterest income operations are higher than those of interest income operations. Baele, De Jonghe, and Vennet (2007) argue that banks can achieve synergies between activities that generate interest income and noninterest income. Goddard et al. (2010) find that banks with a higher share of noninterest income are more profitable. Thus, we expect a positive relationship between noninterest income and profitability. We measure noninterest income using the ratio of noninterest income to total operating income, which is the sum of interest income and noninterest income.

Berger (1995) finds that more efficient banks earn higher profits. Following the literature (e.g., Goddard, 2010; Dietrich and Wanzenried, 2011), we measure operation efficiency using the cost-to-income ratio, which is defined as noninterest expense divided by total operating income. Banks with higher cost-to-income ratio are less efficient. Thus, we expect a negative relationship between cost-to-income ratio and profitability.

To measure the credit risk of a bank, we use loan loss provision. This is a noncashexpense reported on a bank's income statement, and is the current period allocation to cover expected credit losses in the future. Since loan loss provision reduces a bank's net income, we expect a negative relationship between loan loss provision and profitability. Following Athanasoglou, Brissimis, and Delis (2008), we use the ratio of loan loss provision divided by total loans.

Table 1 summarizes the definition of variables used in this study.

4.5 Summary statistics

Our sample consists of 1,507 observations on 167 unique banks over the period 1990-2009. Table 2 reports the number of banks in our sample by year. The number ranges from a low of 60 in 1999 to a high of 91 in 2006. These are the largest banks in the U.S. For example, in 2009 the 71 banks in our sample had combined assets of $10.3 trillion, which accounted for 85% of all the assets owned by FDIC-insured commercial banks in the U.S. Because the failure of a large bank can significantly affect financial markets and the real economy, the banks in our sample are of particular concern to regulators.

Table 3 reports the summary statistics of variables used in this study. Both ROA and ROE exhibit substantial variation as indicated by their standard deviations. The mean of size is much higher than the median, indicating that size is skewed to the right. This is because there are a few banks (such as Bank of America or JPMorgan Chase) that are much larger than others. The average bank in our sample has a capital to assets ratio of 0.089, a deposits to assets ratio of 0.667, a noninterest income to total operating income ratio of 0.244, a cost-to-income ratio of 0.429, and a loan loss provision to total loans ratio of 0.008.

Table 4 reports the pair-wise correlations among variables. The correlation between ROA and ROE is positive and significant. This is expected, because both variables measure bank profitability. The correlation between G-index and E-index is also positive and significant. This is also expected, because both variables measure corporate governance. Size is negatively correlated with deposits, indicating that large banks fund a smaller proportion of their assets using deposits. A possible reason is that large banks are better able to access credit markets;they thus use more borrowed funds (and less deposits). Size is positively correlated with noninterest income, indicating that large banks are better able to generate noninterest income. Finally, size is positively correlated with loan loss provision, indicating that large banks tend to hold riskier loan portfolios.

5. Empirical results

To control for the impact of the recent financial crisis on the determinants of bank profitability, we estimate the model separately for the pre-crisis and the crisis period. We treat all the regressors as endogenous.[18] To ensure that the system GMM estimator does not become unwieldy by too many instruments, we only use the second lag of contemporaneous variables as instruments. (Using all the available lags as instruments produces qualitatively similar results.)

Table 5 reports the system GMM estimation results for the pre-crisis period 1990-2006. In columns (1) and (2), the dependent variable is ROA, while in columns (3) and (4), the dependent variable is ROE. In columns (1) and (3), corporate governance is measured by the G-index, while in columns (2) and (4) it is measured by the E-index.

The coefficients on the lagged dependent variable are positive and significant in all of the regressions, indicating persistence in bank profitability. This result is consistent with a number of recent studies (e.g., Athanasoglou, Brissimis, and Delis, 2008; Goddard et al., 2010, 2011; Dietrich and Wanzenried, 2011), and justifies the use of a dynamic model.

The coefficient on either G-index or E-index is not significant in any of the regressions. This indicates that corporate governance is not related to bank profitability. In untabulated results, when we regress profitability only on its one-year lagged value, size, and corporate governance, we continue to find no association between corporate governance and bank profitability.

The coefficients on control variables are broadly consistent with our expectation. Specifically, the coefficients on deposits are positive and significant in all of the regressions, indicating that banks with a higher proportion of deposits are more profitable. This is consistent with the empirical fact that interest rates on deposits are usually lower than those on borrowed funds.

The coefficients on noninterest income are positive and significant in all of the regressions, indicating that banks with a higher share of noninterest income are more profitable. This result is consistent with Goddard et al. (2010) and Dietrich and Wanzenried (2011).

The coefficients on cost-to-income ratio are negative and significant in all of the regressions, indicating that more efficient banks are more profitable. This result is consistent with previous studies such as Goddard et al. (2010), Liu and Wilson (2010), and Dietrich and Wanzenried (2011).

The coefficients on loan loss provision are negative and significant in all of the regressions, indicating that banks with higher credit risk (as measured by loan loss provision) are less profitable. This result is expected, because loan loss provision is an expense that reduces a bank's net income.

Turning to the diagnostic tests, we find that the null hypothesis of Hansen test is not rejected in any of the regressions. Thus, the instruments appear to be valid. The null hypothesis of AR(2) test is not rejected in any of the regressions, suggesting that the error term of our empirical model is not autocorrelated. Taken together, these test results indicate that our system GMM estimator is well specified.

Table 6 reports the estimation results for the crisis period 2007-2009. The coefficient on either G-index or E-index is not significant in any of the regressions. Thus, corporate governance is not related to bank profitability even during the crisis period. In contrast, we continue to find a negative association between cost-to-income ratio and profitability, and between loan loss provision and profitability. Finally, the p-values of Hansen tests indicate that we cannot reject the null hypothesis that the instruments are

[18] The concern here is that some regressors may be jointly determined with the dependent variable of bank profitability. For example, high-ability managers may adopt better corporate governance arrangement and produce higher profitability. In this case, a correlation between corporate governance and profitability does not mean that better corporate governance causes higher profitability. (Both are determined by managerial ability.) Treating all the regressors as endogenous mitigatessuch concerns.

valid, and the p-values of AR(2) tests indicate that we cannot reject the null hypothesis that the error term is not autocorrelated. Thus,the system GMM estimator is well specified.

6. Conclusion

We have examined the effect of corporate governance on bank profitability using a panel of U.S. banks over the period 1990-2009. We specify a dynamic model that allows for persistence in bank profitability, and estimate the model using the system GMM estimator. To control for the impact of the recent financial crisis, we run separate regressions for the pre-crisis period 1990-2006 and the crisis period 2007-2009. Overall, we find no evidence that corporate governance is related to bank profitability. In contrast, we find strong evidence that bank profitability is higher when banks have higher operation efficiency and lower credit risk.

Our results have an important policy implication. To the extent that regulators want to improve bank profitability, they should push banks to increase operation efficiency and reduce credit risk. Pushing banks to improve corporate governance—as measured by the G-index and the E-index—will not improve their profitability.

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Table 1. Definition of variables

Variable	Definition
ROA	Net income / Total assets
ROE	Net income / Total equity capital
G-index	The corporate governance index developed by Gompers, Ishii, and Metrick (2003).
E-index	The corporate governance index developed by Bebchuk, Cohen, and Ferrell (2009).
Size	Total assets expressed in billions of dollars
Capital	Total equity capital / Total assets
Deposits	Deposits / Total assets
Noninterest income	Noninterest income / (Interest income + Noninterest income)
Cost-to-income ratio	Noninterest expense / (Interest income + Noninterest income)
Loan loss provision	Loan loss provision / Total loans

Table 2. Number of banks in our sample by year

Year	Number of banks
1990	80
1991	81
1992	81
1993	84
1994	81
1995	79
1996	70
1997	65
1998	66
1999	60
2000	66
2001	64
2002	76
2003	62
2004	86
2005	84
2006	91
2007	84
2008	76
2009	71

Table 3. Summary statistics

	Obs.	Mean	Median	Std. Dev.
Dependent variables				
ROA	1,507	0.011	0.011	0.012
ROE	1,507	0.112	0.135	0.213
Corporate governance variables				
G-index	1,507	9.733	10.000	2.734
E-index	1,507	2.700	3.000	1.412
Control variables				
Size	1,507	66.564	13.689	212.204
Capital	1,507	0.089	0.082	0.053
Deposits	1,507	0.667	0.707	0.175
Noninterest income	1,507	0.244	0.213	0.140
Cost-to-income ratio	1,507	0.429	0.418	0.116
Loan loss provision	1,507	0.008	0.004	0.011

Notes: Please see Table 1 for definition of variables.

Table 4. Correlation matrix

		1	2	3	4	5
1	ROA	1.0000				
2	ROE	0.5038*	1.0000			
3	G-index	-0.0435	0.0001	1.0000		
4	E-index	-0.0997*	-0.0313	0.7409*	1.0000	
5	Size	-0.0373	-0.0003	-0.1413*	-0.2391*	1.0000
6	Capital	0.6696*	0.0496	-0.0322	-0.0566	-0.0431
7	Deposits	-0.1936*	-0.0687*	0.0881*	0.2740*	-0.4251*
8	Noninterest income	0.4144*	0.1153*	0.0516	-0.0434	0.1779*
9	Cost-to-income ratio	-0.1018*	-0.1688*	0.0532	0.0704*	0.0384
10	Loan loss provision	-0.4191*	-0.5229*	-0.0078	-0.0244	0.1644*

		6	7	8	9	10
6	Capital	1.0000				
7	Deposits	-0.1818*	1.0000			
8	Noninterest income	0.3887*	-0.5099*	1.0000		
9	Cost-to-income ratio	0.1850*	-0.0862*	0.5751*	1.0000	
10	Loan loss provision	0.0647	0.0078	0.0076	0.1161*	1.0000

Notes: * indicates statistical significance at the 1% level. Please see Table 1 for definition of variables.

Table 5. System GMM estimation results for the period 1990-2006

	ROA		ROE	
	(1)	(2)	(3)	(4)
Lagged ROA	0.253***	0.257***		
	(0.080)	(0.088)		
Lagged ROE			0.164***	0.161***
			(0.053)	(0.059)
G-index	6.39e-05		2.38e-05	
	(1.25e-04)		(1.78e-03)	
E-index		-1.74e-04		2.22e-03
		(2.90e-04)		(3.58e-03)
Size	2.51e-06	1.83e-06	2.95e-05	2.54e-05
	(1.90e-06)	(1.97e-06)	(2.94e-05)	(2.88e-05)
Capital	0.115***	0.114***	-0.087	-0.093
	(0.012)	(0.013)	(0.061)	(0.065)
Deposits	0.007***	0.007***	0.095***	0.096***
	(0.002)	(0.003)	(0.032)	(0.035)
Noninterest income	0.026***	0.025***	0.339***	0.334***
	(0.005)	(0.004)	(0.067)	(0.072)
Cost-to-income ratio	-0.027***	-0.028***	-0.400***	-0.403***
	(0.005)	(0.004)	(0.084)	(0.089)
Loan loss provision	-0.217***	-0.217***	-3.411***	-3.238***
	(0.070)	(0.071)	(1.020)	(0.865)
Number of observations	1,092	1,092	1,092	1,092
Number of banks	147	147	147	147
p-value of Hansen test	1.000	1.000	1.000	1.000
P-value of AR(2) test	0.302	0.281	0.744	0.742

Notes: All regressions also include year-fixed effects but their coefficients are not reported. Robust standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Please see Table 1 for definition of variables.

Table 6. System GMM estimation results for the period 1990-2006

	ROA		ROE	
	(1)	(2)	(3)	(4)
Lagged ROA	0.162**	0.178**		
	(0.073)	(0.070)		
Lagged ROE			0.958	0.820
			(1.511)	(1.478)
G-index	-0.001		0.008	
	(0.001)		(0.035)	
E-index		-0.002		-0.001
		(0.001)		(0.051)
Size	9.72e-07	6.45e-07	-3.19e-05	-5.84e-05
	(3.17e-06)	(3.36e-06)	(1.76e-04)	(1.12e-04)
Capital	0.146***	0.139***	1.971	1.844
	(0.019)	(0.020)	(2.381)	(1.891)
Deposits	-0.007	-0.003	-0.721	-0.727
	(0.007)	(0.007)	(0.806)	(0.597)
Noninterest income	0.033***	0.034***	-0.157	-0.054
	(0.009)	(0.011)	(1.482)	(0.985)
Cost-to-income ratio	-0.043***	-0.043***	-0.680**	-0.585**
	(0.008)	(0.007)	(0.336)	(0.261)
Loan loss provision	-0.449***	-0.437***	-9.148**	-8.331***
	(0.057)	(0.059)	(3.722)	(2.597)
Number of observations	231	231	231	231
Number of banks	84	84	84	84
p-value of Hansen test	0.136	0.315	0.649	0.753
P-value of AR(2) test	0.422	0.463	0.902	0.898

Notes: All regressions also include year-fixed effects but their coefficients are not reported. Robust standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Please see Table 1 for definition of variables.