BANK SIZE AND BANK VALUATION

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Abstract

This paper studies the relation between bank size and bank valuation. We use Tobin's Q and market-to-book ratio as measures of bank valuation, and another two variables—natural logarithm of total assets and natural logarithm of total operating income—as measures of bank size. Using a sample of publicly-traded U.S. bank holding companies from 2002 to 2014, we find a quadric relation between bank size and bank valuations. Bank valuations will rise and then fall as bank size increases. This finding holds in different sample periods: before, during, and after the financial crisis of 2007-2009.

Keywords: Bank; Valuation; Size

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1. Introduction

During the financial crisis of 2007-2009, several famous banks, for instance, Merrill Lynch, Lehman Brothers and Bear Stearns collapsed. Lehman Brothers went bankrupt. Later, its North American investment-banking and trading divisions along with its New York headquarters building were purchased by Barclays. And its franchise in the Asia Pacific region as well as its investment-banking and equities business in Europe and the Middle East were acquired by Nomura Holdings. Similarly, Merrill Lynch and Bear Stearns were taken over by Bank of America and JP Morgan Chase, respectively. It is surprising that Merrill Lynch and Lehman Brothers had been the third and fourth largest investment bank in the US, respectively, behind Goldman Sachs and Morgan Stanley. Bear Stearns was the seventh-largest securities firm in terms of total capital. Looking back into the past, Merrill Lynch was founded in 1914. After making several successful investments, Merrill Lynch became famous. It developed in the next several decades. Then, in 1941, Merrill Lynch, E. A. Pierce and Cassatt merged with Fenner & Beane. And later, in 1952, the company formed Merrill Lynch & Co. as a holding company. Merging other companies, Merrill Lynch continued to grow to become the third largest investment bank in the US in 2007. On the process of developing, the size of Merrill Lynch grew and its business lines expanded. The complex operation of Merrill Lynch included investment banking, equity and fixed-income sales and trading, research, investment management, private equity and private banking. This eventually contributed to annually increasing profits before the crisis. Things were similar in Lehman Brothers and Bear Stearns. Thus, this phenomenon raised our concerns about the effects of bank size on bank valuation. For example, what's the impact of bank size on valuation? Does the impact change during financial crisis? To answer these questions, we regress bank valuation on bank size while control for other variables.

In this paper, we empirically study the relation between bank size and bank valuation. Our sample contains annual observations on a large number of publicly-traded U.S. bank holding companies

(hereafter banks) from 2002 to 2014. We use Tobin's Q as a measure of bank valuations (e.g. Laeven and Levine, 2007) and the natural logarithm of total assets as a measure of bank size (e.g. Laeven and Levine, 2007).

We find a quadric relation between bank size and bank valuations. At the beginning, a positive relation exits between those two variables. However, as banks grow to some extent, bank valuations are inversely related to bank size. Therefore, bank valuations will rise and then fall as bank size increases. After controlling for various bank characteristics such as capital, loans, deposits and asset diversity, as well as time fixed effects, we find this relation holds true. The effect is economically large and statistically significant.

Next, we run three separate regressions for the periods before, during, and after the financial crisis of 2007-2009 to see whether the relation between bank size and bank valuations is stable under different market conditions. We find that increasing size causes higher valuations firstly and lower valuations secondly in each period.

We use alternative measures of valuations and bank size. Market-to-book ratio (Caprio, Laeven and Levine, 2007) is used to replace Tobin's Q to measure bank valuations. Natural logarithm of total operating income is used as another measure of bank size (Goetz, Laeven and Levine, 2013). Finally, we find the above-mentioned relation between bank size and bank valuations remain unchanged under different measurements.

On the one hand, this paper relates to the literature that studies the relations between several bank-specific characteristics and bank performance (e.g. Laeven and Levine, 2007; Beltratti and Stulz, 2012;

Calomiris and Nissim 2014; Hovakimian, Armen and Kane 2000; and Goetz, Laeven and Levine 2013). On the other hand, we add to the literature that gives indirect support to our expectation of the relation between bank size and bank valuation (e.g. Demsetz and Strahan, 1997; Stiroh, 2000; Huang and Ratnovski, 2011; Kashyap, Raghuram and Stein, 2002; Penas and Unal, 2004; Kashyap, Stein and Hanson, 2010; Demirguç-Kunt and Huizinga, 2010; and Farhi and Tirole, 2012).

Our paper contains five parts. The first part is the introduction shown as Section 1. Then, Section 2 reviews some recent relevant literature and outlines some theoretical considerations. Section 3 describes the sample data, independent and dependent variables as well as four control variables. Section 4 presents the main empirical results and tries to give a reasonable explanation to these results. Section 5 draws the conclusion.

2. Literature Review

We expect a quadric relation between bank size and bank valuation. At the beginning, a positive relation exits between those two variables. However, as the banks grow to some extent, bank valuation is inversely related to bank size. Therefore, bank valuation will rise and then fall as bank size increases. According to the existing literature, there was no direct theory proving such a relation between bank size and bank valuation. Nevertheless, various studies provided us with the hints to this conjecture. Three reasons for assuming this relation between bank size and bank valuation will be discussed as followings.

First, size is usually considered to have an effect on bank performance through economies of scale or scope (Demsetz and Strahan, 1997). As size increases, the average cost decreases. This is scale economies. Stiroh (2000) finds that the degree of scale economies is typically strong for large banks. We

could understand it from several perspectives. Suppliers are willing to trade with big retailers, customers are willing to shop in big stores. This is due to their trust on the strength of big companies. Similarly, with the increasing size, banks may find it easier to attract customers to open accounts and put money into accounts. As a result, the sources of funding in big banks are stable and safe and their costs of funding are low. Furthermore, big banks could have lower information risks and higher stock liquidity. However, scale economies could have negative impact on bank valuation beyond an optimal bank size. At that time, bank wholesale funding could be a major source of vulnerability (Huang and Ratnovski, 2011), which leads to low bank valuation. The debt of large banks could include more short-term funding than that of small banks. Consequently, large banks are more exposed to liquidity shocks and market failures such as liquidity shortages and fire sales (Kashyap, Raghuram and Stein, 2002).

Second, banks could benefit from increased diversification (Penas and Unal, 2004). Structural transformations frequently happened in the financial intermediation industry over the past several decades. The organization of banks has become more complex as banks have expanded size. Then, banks have gone from engaging mostly in traditional commercial banking activities to engaging mostly in non-traditional activities such as investment banking and proprietary trading. Some products (e.g. mortgage backed securities, or MBS) that are related to non-traditional activities give banks exposure to allured profits. Big banks have greater abilities such as advanced operation system and excellent professional team to engage in non-traditional activities compared to small banks. Accordingly, some argument against the restrictions on risky bank activities like non-traditional activities is rational. It would distort the allocation of resources, hurting the efficiency of capital allocation and imposing substantial costs to the real economy (Kashyap, Stein and Hanson, 2010). It is no doubt that to some extent, engaging in non-traditional activities is a fortune for banks. However, the degree to which banks engage in non-traditional activities could not exceed an optimal value. For example, Demirguç-Kunt and

Huizinga (2010) find that banks which rely to a larger extent on non-deposit funding and non-interest income are more profitable but also riskier. If the profits are not sufficient to compensate for the risks, revenue diversification generated along with size growth will reduce bank valuation.

Third, we refer to the too-big-to-fail hypothesis (e.g., Farhi and Tirole, 2012). Large banks with more deposits are more likely to get low-cost and government-subsidized funding. Large banks have more advantages over small banks in acquiring and using such cheap funding. Conversely, if large banks excessively exploit such cheap funding to take on risks, their valuation may decrease. Although there might be the expectation of government bailouts given the regulators' reluctance to close large banks, the reduction of bank valuation could be inevitable.

3. Sample and variables

3.1 Sample

This paper uses a panel data set of publicly-traded banks in the U.S. from 2002 to 2014. From the Federal Reserve's Y-9C reports, we obtain yearly accounting data for each listed bank. Then, we get stock data from the Center for Research in Security Prices (CRSP). Our sample consists of 4,529 observations of the listed banks. As shown in table 1, during the initial four years, there were between 438 and 454 banks each year. The number of banks dramatically declined to 376 in 2006 and kept declining at a low pace until 2014. This might be due to mergers and acquisitions.

3.2 Variables

We use two different ways to measure bank valuation: Tobin's Q (Laeven and Levine, 2007) and market-to-book ratio (Caprio, Laeven and Levine, 2007). We also use two different ways to measure the size of

banks: natural logarithm of total assets and natural logarithm of total operating income (Goetz, Laeven and Levine, 2013). In addition, we pick four control variables—capital, loans, deposit and asset diversity—to control for their effects on bank valuation. Furthermore, we control for common factors which influence the valuation of all banks in a given year.

3.2.1 Measures of Bank Valuation

In this paper, Tobin's Q is one of the measures of bank valuation. Tobin's Q is the sum of the market value of common equity, the book value of preferred shares and the book value of total debt divided by the book value of total assets. It specifically measures the present value of future cash flows divided by the replacement cost of tangible assets. Nevertheless, there are two weaknesses when using Tobin's Q as the measure of bank valuation. One weakness is that banks usually have high leverage. The other weakness is that tangible assets of banks mostly are financial assets. Thus, we also use market-to-book ratio as alternative measure of bank valuation to confirm the relation between bank size and bank valuation. Market-to-book ratio is the ratio of market value of equity to book value of equity. Market value of equity is determined in the stock market.

3.2.2 Measures of Bank Size

We use natural logarithm of total assets and natural logarithm of total operating income to measure bank size. Natural logarithm of total assets is an asset-based measure. Total assets include loans, securities, investments and other assets. Natural logarithm of total operating income is an income-based measure. Total operating income includes interest income and noninterest income (e.g., fee income, trading revenue and commission income). A specialized loan-making bank will have a large ratio of interest income to total operating income. Total operating income could capture the importance of

banks' off-balance-sheet items. However, loans could also generate fee income, and thus the income-based measure could overestimate the degree to which specialized loan-making banks engage in non-lending activities. Although the asset-based measure suffers from less problems, we use both the asset-based and the income-based measures of bank size to confirm the relation between bank size and bank valuation.

3.2.3 Control Variables

Previous studies find that several bank-specific characteristics affect bank valuations. Although the focus of our paper is on the relation between bank size and bank valuation, to remove the effects of other characteristics, we control for four characteristics including capital, loans, deposits and asset diversity. Following Laeven and Levine (2007), we use four proxies to represent these four characteristics.

First, we use equity divided by assets to control for capital. Better capitalized banks performed better during the crisis (Beltratti and Stulz, 2012). On the one hand, this could be explained by higher costs of taking on risks for banks with higher capital. On the other hand, capital plays an important role on absorbing losses. Better capitalized banks are less likely to fail. The positive effects of capital on bank valuation illustrate that the equity holders' investment could reduce the banks' risk and boost their performance.

Second, we use the ratio of net loans to total earning assets to control for loans. Loans, securities and investments are included in total earning assets. If the profits of banks generated from loan-making activities take a main proportion in the total profits, the values of loans are high. On the other hand, banks that specialize in non-lending activities could have low values of loans. Asset securitization has pervaded. Some products (e.g., MBS) have been more appealing to banks than loans. Consequently,

being used as a “loss leader’’ to increase opportunities of engaging in more lucrative products, loans could be a negative earning assets and have negative relation with bank valuation (Calomiris and Nissim 2014).

Third, we use the ratio of total deposits to total liabilities to control for deposits. Deposits are a kind of cheap source of funding for banks, because the interest rates on deposits are usually lower than those on borrowed funds. Moreover, Hovakimian and Kane (1990) show that because of deposit insurance, banks are able to extract substantial net subsidies. Therefore, banks with high deposits can get more low-cost and government-subsidized funding. That is why such banks could have high valuations.

Fourth, we use the difference between one and the ratio of net loans minus other earning assets to total earning assets to control for asset diversity (Laeven and Levine, 2007). Securities and investments belong to other earning assets. The sum of loans and other earning assets composes of the total earning assets. The values of this ratio vary from zero to one. Highly diversified banks engage in both commercial banking activities such as lending and investment banking activities such as fee-generating activities. Laeven and Levine (2007) find that revenue diversification reduces bank valuation. Goetz et al. (2013) find that geographic diversification also reduces bank valuations.

Table 2 lists the definition for each variable.

Table 3 shows summary statistics for all the variables. We winsorize all the variables at the 1% and 99% levels to reduce the outliers’ impact. Tobin’s Q has a mean of 1.044, suggesting that the sum of the market value of common equity, the book value of preferred shares and the book value of total debt exceeds the book value of total asset by 4.4% on average for banks in our sample. Market-to-book ratio

has an average of 1.4958, with a standard deviation of 0.7817, which suggests that market-to-book ratio varies substantially across banks in our sample. The bank size measured by natural logarithm of total assets in thousands at end of each year from 2002 to 2014 has an average of 14.65, higher than the average amount calculated by natural logarithm of total operating income in thousands, which is 11.8487. The ratio of equity to total assets has a mean of 0.09 and a low standard deviation, indicating that around 91% of sources of funding come from debt and only 9% come from equity for an average bank in our sample. Asset diversity has a mean of 0.4821 but with a high standard deviation, showing that banks are well diversified on average but the assets diversity varies.

Table 4 presents the correlation matrix of the all the variables. As is shown in the table, both Tobin's Q and market-to-book ratio are highly correlated with log of total assets and log of total operating income. That is to say, the correlation between bank size and bank valuation is high regardless of the measures of bank size and valuation. Turning to the correlation between bank valuation and control variables, we find that Tobin's Q is not significantly correlated with capital, while the correlation between market-to-book ratio and capital is significant at the 1% level. Besides, both Tobin's Q and market-to-book ratio are significantly and negatively correlated with loans and deposit, and significantly and positively correlated with asset diversity.

3.3 Empirical model

We assume that there is a quadric relationship between size and bank valuation, which means that bank valuation will increase with the size of a bank first and will decrease when the size is larger than a threshold. To examine the relationship between bank valuation and size, we regress bank valuation on size as well as the square of bank size. Because we measure bank valuation and size through two different ways respectively, we do the linear regression using ordinary least squares (OLS) four times.

The models we build are as follow:

(1) $Tobin's\ Q_{i,t} = \beta_0 + \beta_1 * log\ of\ total\ assets_{i,t} + \beta_2 *\ log\ of\ total\ assets\ squared_{i,t} + \beta_3 * capital_{i,t} + \beta_4 * loans_{i,t} + \beta_5 * deposits_{i,t} + \beta_6 * asset\ diversity_{i,t} + \theta_t + \varepsilon_{i,t}$

(2) $Tobin's\ Q_{i,t} = \beta_0 + \beta_1 * log\ of\ total\ operating\ income_{i,t} + \beta_2 *\ log\ of\ total\ operating\ income\ \text{squared}_{i,t} + \beta_3 * capital_{i,t} + \beta_4 * loans_{i,t} + \beta_5 * deposits_{i,t} + \beta_6 * asset\ diversity_{i,t} + \theta_t + \varepsilon_{i,t}$

(3) $Market\text{ - }to\text{ - }book_{i,t} = \beta_0 + \beta_1 * log\ of\ total\ assets_{i,t} + \beta_2 *\ log\ of\ total\ assets\ squared_{i,t} + \beta_3 * capital_{i,t} + \beta_4 * loans_{i,t} + \beta_5 * deposits_{i,t} + \beta_6 * asset\ diversity_{i,t} + \theta_t + \varepsilon_{i,t}$

(4) $Market\text{ - }to\text{ - }book_{i,t} = \beta_0 + \beta_1 * log\ of\ total\ operating\ income_{i,t} + \beta_2 *\ log\ of\ total\ operating\ income\ squared_{i,t} + \beta_3 * capital_{i,t} + \beta_4 * loans_{i,t} + \beta_5 * deposits_{i,t} + \beta_6 * asset\ diversity_{i,t} + \theta_t + \varepsilon_{i,t}$

θ_t in the model represents year fixed effects, which is used to control for year fixed effects that change overtime in these regressions. Adding year fixed effects to our models will make our models more reasonable.

4. Empirical results

4.1 Regression results under full sample

4.1.1 Independent control variables regression results

Table 5 presents the regression results between bank size and bank valuation. Column (2) and (4) shows the regression results using Tobin's Q and column (6) and (8) shows the regression results using market-to-book ratio.

When utilizing Tobin's Q as a measure of bank valuation, the coefficient on logarithm of total assets is positive while the coefficient on its squared term is negative. Both coefficient are significant at the 1% level. The results turn out to be the same when using another way to measure bank size, which is logarithm of total operating income. When utilizing market-to-book ratio as a replace of Tobin's Q to measure the bank valuation, we find that the coefficient of logarithm of total assets is still positive and significant and the coefficient of logarithm of total assets squared is still negative and significant.

The result above is consistent with our expectation that there is a quadric relationship between size and bank valuation, and the results are robust to different measures of bank size and bank valuation. Thus, we can conclude that bank valuation will first increase and then decrease when bank size increases.

4.1.2 Control variables regression results

In terms of the control variables, capital is positively and significantly related to Tobin's Q. This is coincident with the theories we discussed in the previous section. Both loans and asset diversity are negatively related to Tobin's Q. In the meantime, there is a negative relation between loans and asset diversity according to table 4. Deposit is positively and significantly related to Tobin's Q.

Although the relationship between bank size and valuations remains robust regardless of how we measure valuations, the relation between capital and bank valuation is not the same using different measures. Capital becomes negatively and significantly related to market-to-book ratio. This result

shows the importance of using two measures of bank valuations. The relationship between bank valuations and other control variables remains the same under different measures.

4.1.3 Compare the results with Laeven and Levine (2007)'s result

Laeven and Levine (2007) regress Tobin's Q on asset diversity, and they use bank size, capital, loans, and deposits as control variables. Their results show that Tobin's Q is positively and significantly associated with bank size. In contrast, we estimate a quadratic relation between bank size and valuations. As regards other control variables, we obtain qualitatively similar results.

4.2 Regression results: time period controls

4.2.1 Crisis's impact on relation between bank size and valuation

We want to test the influence of financial crisis on the relationship between bank valuation and bank size and other control variables, and thus we divide our sample into three time periods. Table 6 illustrates the regression results before the crisis (2002-2006), table 7 shows the regression results during the crisis (2007-2009), and table 8 presents the regression results after the crisis (2010-2014). As we can see from the tables above, the relationship between bank size and valuations remains robust in each sample period, which suggests that financial crisis has no effect on the relation between bank size and valuation.

4.2.2 Crisis's impact on relation between control variables and valuation

According to table 6, 7, 8, financial crisis has impact on some control variables. When measuring the bank valuation using Tobin's Q, the relationship between deposit and bank valuation was positive and significant before the crisis, while it became negative and significant after the crisis. During the crisis, there was no significant relation between deposit and bank valuation. A possible reason is as follows. Before the crisis, the difference between the interest rates on loans and deposits was high. Hence a bank would have higher valuation if it was able to fund a higher portion of its assets with deposits. After the crisis, the difference between the interest rates on loans and deposits was very low. Hence having more deposits did not result in a higher valuation.

When measuring bank valuation by market-to-book ratio, the relationship between capital and bank valuation was negative and significant at the 1% level before the crisis. But the relationship became positive and significant during and after the crisis. The relationship between deposits and market-to-book ratio remained the same under the impact of financial crisis, as did the relation between deposits and Tobin's Q.

Overall, we find that the relationship between control variables and bank valuation are mostly significant before the crisis, and the significance of relationship decreased a lot during the crisis. However, the significance increased after the crisis.

5. Conclusion

Understanding the relationship between bank size and bank valuation is important, because it can help bank managers to decide whether to increase bank size. During the crisis, several large and famous banks collapsed, and this phenomenon raised our concerns about the effects of bank size on bank valuation.

In this paper, we empirically examine the relationship between bank size and bank valuation. We also examine whether the relationship changed over time. Our assumption is that there is a quadric relation between size and bank valuation. We use yearly observations on a large number banks from 2002-2014, and regress bank valuations on bank size and its squared term. In order to check the robustness, we use two different ways to measure bank size and two different ways to measure bank valuation. We find that bank valuations will rise and then fall as bank size increases. This result holds regardless of the measures of bank size and valuation, which is consistent with our expectation. We also examine whether this quadratic relationship holds before, during and after the crisis, and find that it does. To sum up, our result suggests that size is an important determinant of bank valuation, but it is not the bigger the better.

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Table 1: Number of banks in our sample by year

Year	Number of Banks
2002	444
2003	454
2004	438
2005	448
2006	376
2007	355
2008	339
2009	345
2010	329
2011	317
2012	313
2013	315
2014	300

Table 2: Variable definitions

Variable	Definition
Tobin's Q	(market value of common equity + the book value of preferred shares + the book value of total debt) / book value of total assets
Market-to-book ratio	market value of bank's assets / book value of bank's assets.
Log of total assets	The natural logarithm of total assets in thousands at end of each year from 2002 to 2014.
Log of total operating income	Another way to measure size of the bank. The natural logarithm of total operating income in thousands during each year from 2002 to 2014.
Capital	equity / total assets.
Loans	net loans / total earning assets, where total earning assets include net loans, securities, and investments.
Deposits	total deposits / total liabilities.
Asset diversity	1 – |(net loans – other earning assets)/total earning assets|, where other earning assets include securities and investments, and total earning assets is the sum of net loans and other earning assets.

Table 3: Summary statistics

	Obs.	Mean	Std. Dev.
Dependent variables			
Tobin's Q	4529	1.0447	0.0688
Market-to-book ratio	4529	1.4958	0.7817
Independent Variables			
Log of total assets	4529	14.6502	1.6141
Log of total assets squared	4529	217.2317	51.3228
Log of total operating income	4529	11.8487	1.6510
Log of total operating income squared	4529	143.1173	43.3819
Control Variables			
Capital	4529	0.0947	0.0264
Loans	4529	0.7429	0.1412
Deposits	4529	0.8347	0.1183
Asset diversity	4529	0.4821	0.2247

Table 4: Correlation matrix

		1	2	3	4	5	6	7	8
1	Tobin's Q	1	.956**	.076**	.130**	.014	-.143**	-.101**	.084**
2	Market-to-book ratio	.956**	1	.067**	.110**	-.094**	-.145**	-.090**	.099**
3	Log of total assets	.076**	.067**	1	.987**	.114**	-.229**	-.421**	.083**
4	Log of total operating income	.130**	.110**	.987**	1	.134**	-.216**	-.467**	.048**
5	Capital	.014	-.094**	.114**	.134**	1	-.012	.012	-.017
6	Loans	-.143**	-.145**	-.229**	-.216**	-.012	1	.350**	-.776**
7	Deposits	-.101**	-.090**	-.421**	-.467**	.012	.350**	1	-.100**
8	Asset diversity	.084**	.099**	.083**	.048**	-.017	-.776**	-.100**	1

Note: ** indicates correlation is significant at the 0.01 level (2-tailed).

Table 5: Regression results using full sample

Tobin's Q				market-to-book ratio			
Log of total assets	.092 ***	Log of total operating income	.067 ***	Log of total assets	1.002 ***	Log of total operating income	.749 ***
Log of total assets squared	-.003 ***	Log of total operating income squared	-.002 ***	Log of total assets squared	-.029 ***	Log of total operating income squared	-.025 ***
Capital	.171 ***	Capital	.150 ***	Capital	-1.315 ***	Capital	-1.546 ***
Loans	-.091 ***	Loans	-.086 ***	Loans	-.948 ***	Loans	-.906 ***
Deposits	.035 ***	Deposits	.049 ***	Deposits	.503 ***	Deposits	.634 ***
Asset diversity	-.038 ***	Asset diversity	-.034 ***	Asset diversity	-.354 ***	Asset diversity	-.306 ***
Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes
Observations	4529	Observations	4529	Observations	4529	Observations	4529
R-squared	.466	R-squared	.471	R-squared	.488	R-squared	.491

Note: The sample period is from 2002 to 2014. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 6: Regression results using before the crisis sample

Tobin's Q				market-to-book ratio			
Log of total assets	.081 ***	Log of total operating income	.059 ***	Log of total assets	.904 ***	Log of total operating income	.674 ***
Log of total assets squared	-.002 ***	Log of total operating income squared	-.002 ***	Log of total assets squared	-.025 ***	Log of total operating income squared	-.021 ***
Capital	.178 ***	Capital	.149 ***	Capital	-6.076 ***	Capital	-6.377 ***
Loans	-.093 ***	Loans	-.095 ***	Loans	-1.113 ***	Loans	-1.132 ***
Deposits	.116 ***	Deposits	.129 ***	Deposits	1.262 ***	Deposits	1.401 ***
Asset diversity	-.056 ***	Asset diversity	-.053 ***	Asset diversity	-.665 ***	Asset diversity	-.630 ***
Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes
Observations	2148	Observations	2148	Observations	2148	Observations	2148
R-squared	.207	R-squared	.219	R-squared	.222	R-squared	0.234

Note: The sample period is from 2002 to 2006. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 7: Regression results using during the crisis sample

Tobin's Q				market-to-book ratio			
Log of total assets	.077 ***	Log of total operating income	.067 ***	Log of total assets	.771 ***	Log of total operating income	.652 ***
Log of total assets squared	-.002 ***	Log of total operating income squared	-.002 ***	Log of total assets squared	-.023 ***	Log of total operating income squared	-.023 ***
Capital	.088	Capital	.073	Capital	1.311 **	Capital	1.159 *
Loans	-.145 ***	Loans	-.142 ***	Loans	-1.418 ***	Loans	-1.389 ***
Deposits	-.022	Deposits	-.010	Deposits	.204	Deposits	.306
Asset diversity	-.018	Asset diversity	-.016	Asset diversity	-.076	Asset diversity	-.050
Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes
Observations	1039	Observations	1039	Observations	1039	Observations	1039
R-squared	.218	R-squared	.222	R-squared	.230	R-squared	.235

Note: The sample period is from 2007 to 2009. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 8: Regression results using after the crisis sample

Tobin's Q				market-to-book ratio			
Log of total assets	.136 ***	Log of total operating income	.093 ***	Log of total assets	1.324 ***	Log of total operating income	.905 ***
Log of total assets squared	-.004 ***	Log of total operating income squared	-.003 ***	Log of total assets squared	-.039 ***	Log of total operating income squared	-.032 ***
Capital	.116 **	Capital	.119	Capital	1.211 **	Capital	1.240 **
Loans	-.068 ***	Loans	-.054 ***	Loans	-.612 ***	Loans	-.496 ***
Deposits	-.068 ***	Deposits	-.055 ***	Deposits	-.448 ***	Deposits	-.351 **
Asset diversity	-.022 **	Asset diversity	-.015	Asset diversity	-.147	Asset diversity	-.086
Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes	Year fixed effects	Yes
Observations	1342	Observations	1342	Observations	1342	Observations	1342
R-squared	.284	R-squared	.266	R-squared	.279	R-squared	.261

Note: The sample period is from 2010 to 2014. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.