Contents

Assessment of the Funding Structure of the US Banks

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Abstract

In this study, evolution of funding structure and riskiness of the banks in the US since 1990 is discussed via graphs and empirical application. To examine the funding structure of the banks deposits, non-deposit debt variables as well as bank size and profitability in the empirical application are used.

As for the evolution of the risk level, risk weighted asset divided by total assets and non-performing loans divided by total loans are employed and then OLS method is run to explore the association between bank risk and bank equity.

1   Introduction

Global financial crisis occurred in 2007-2008 raised some questions on the funding structure of the banks. Liquidity which is an elusive concept has turn out to be a key to funding structure. As one immediate response to the illiquidity in the market, wholesale funding, utilizing of deposits and liabilities banks or other financial institutions, has been replaced to the more stable funding source. This is partly due to increased counterparty risk. Last financial crisis and liquidity problem related to it reshape the banking industry and thereafter some key banking activities including funding structure should be reconsidered.

Remainder of the study is as follows. In the second chapter, following the theoretical framework, cross-sectional average of deposits/assets and non-deposit debt/assets across time is calculated via following formula:

Non-Deposit Debt = Assets - Deposits - Equity

In the third part of the study, OLS regressions to explore the relationship between loan growth and non-deposit debt/assets while controlling for bank size and profitability during 2008Q1-2010Q1.In the fourth part, bank risk measures are defined and computed. These risks are:

- Risk weighted asset divided by total assets

- Non-performing loans divided by total loans

These measures are interpreted via plot of the cross-sectional average of the above two measures. In the fifth part, other regression analysis is done to unfold the association between bank risk and equity. To do this, two ex-post measures of bank risk is regressed on equity over assets. In this regression, bank size and profitability are controlled for.

In the conclusion, findings as well as possible drawback of the empirical application are discussed.

2 Theoretical Background and Cross-Sectional Average of Deposits/Assets and Non-Deposit Debt/Assets

The celebrated paper of Modigliani and Miller (1963) triggered a series of research about capital structure in corporate finance theory. How a firm is being financed is of great importance to both the managers and the providers of capital. Many studies have developed theoretical background and conduct empirical tests to explain how banks chose between debt and equity in their financing.

Some of these studies belong to Meier and Tarhan (2007), Baker and Wurgler (2007), and Dittmar and Thakor (2007). Some researchers appraise the merits of equity while others favor the debt-financing. Theories developed by these researchers can be divide into three:

- Trade-Off Theory

- Agency Theory

- Pecking Theory

2.1 Trade-Off Theory

This theory of capital structure hightlight that a firm's preference of its debt-equity ratio is a trade-off between its interest tax shields and the costs of financial distress. Trade-off theory states that firms in the same sectors should have similar debt to equity ratio so that they maximize tax savings. However, Modigliani and Merton (1958) asserts that, in a World without tax, the value of a firm is independent of its capital structure

2.2 Agency Theory

Jensen and Meckling (1976) work has been a starting point of the agency cost theory of capital structure originating from the principal-agent relationship. According to this theorem, managers do not always pursue shareholders interest. The main contribution of this theory is that leveraged firms are better for shareholder in that debt canbe a tool to monitor managerial behavior.

2.3 Pecking Theory

Pecking theory suggests financing from funds generated internally in that these funds do not imply something negative that may be harmful for the stock performance of the related firm. If it is inevitable to finance its operation externally then firms prefer issuing debt rather than issuing equity (Anarfo, 2015).

Bank funding has experienced difficulty due to the global mortgage crisis emanated from USA. Major banks suffered from short of liquidity during this financial crisis. Interbank lending slowed to a halt and wholesale funding was almost stopped. Conditions on bank funding remain tight for a long period of time (Babihuga, 2014). Therefore it is important to analyze pre and post-crisis period in terms of funding structure of banks.

It is worthwhile to define deposit which is placement of funds in a bank account with a bank or other financial institution and non-deposit fund of banks. Deposits are kind of debt for a bank in that it is money that the banks owe to its customer but they differ from debt in that the addition or withdrawal of money is at the discretion of the depositor.

Deposit funding is considered as a tool for funding by international institutions, legislators and regulators, rating agencies and academics. This feature of deposit funding is crucial for deposit-funded banks which are more responsive to decreasing deposit ratios (Kohler, 2014, p. 212).

Non-deposit funding consists of following sources:

- Repo which is an agreement to sell/ repurchase securities and

- Bills and receipt of loans from central banks;

- Sale of bankers' acceptances;

- Issuance of commercial paper;

- Borrowing Eurodollar market;

- Issuance of capital notes and bonds.

In the Table-1, descriptive statistics of the variables used in this analysis is provided. Accordingly, mean of non-deposit/asset is 10.4 and minimum and maximum values are -.16 and 222978. The standard deviation of total asset is very high compared to other variables while

standard deviation of profitability is the lowest.

Table 1: Descriptive Statistics

|	(1) Mean	(2) Std.Dev	(2) Minimum	(2) Maximum
Non-deposit debt/assets	10.42389	1278.519	-.161284	222978.7
Profitability	.0079892	4.576989	-2.3393	8.517692
Deposit/Asset	.8206382	.1367892	0	1.15905
Bank Size	5.202681	.5860083	3	9.247644
Loan Growth	.0081101	.1115157	-4.1990	4.866446
Total Asset	1199924	2.49e+07	1000	1.77e+09
Total Loans	670313.4	9656246	0	7.03e+08

2.4 Average of Deposits/Assets

In this part of the study, evolution of funding structure of banks is examined via deposit/assets and non-deposit Debt/asset. Non-deposit debt is defined as Non-Deposit Debt = Assets - Deposits- Equity.

To do that, average of deposit/ asset is calculated annually. So, I have 96 value of deposit/assets. Same is applied to non-deposit debt. After calculating the non-deposit debt/asset, average of this ratio is taken annually.

In the Figure-1 below, average of deposits/assets is depicted for the period of 1993 quarter 1-2016 quarter 4. Before the financial crisis. it is readily observable that deposits/assets is on the decline indicating that deposit per asset increases which is good for a bank in that ability of asset to cover the liability increases. If the ability of assets to cover the deposit increases, then the profitability of a bank enhances. This ratio gets its lower values of 0,79 in the third quarter of 2008 but after this point, deposit/asset started to raise. This increase has continued until first quarter of 2014 and then it followed a unstable path.

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A deposit to assets ratio typically leads to an overall lower cost of funds, assuming that the deposits program is cost efficient in its operational and financial expense of deposits ratios. The higher the deposit to assets ratio, the more a bank relies on external funding, which is, by and large, more costly source of funding than deposits. To this end, it can be stated that global financial crisis urges banks to finance its operation by external sources due to the low deposits. So banks have lost its cheaper source of funds after the financial crisis and it seems that it will take time to restore the previous deposit to asset position.

Figure 1: cross-sectional average of deposits/assets
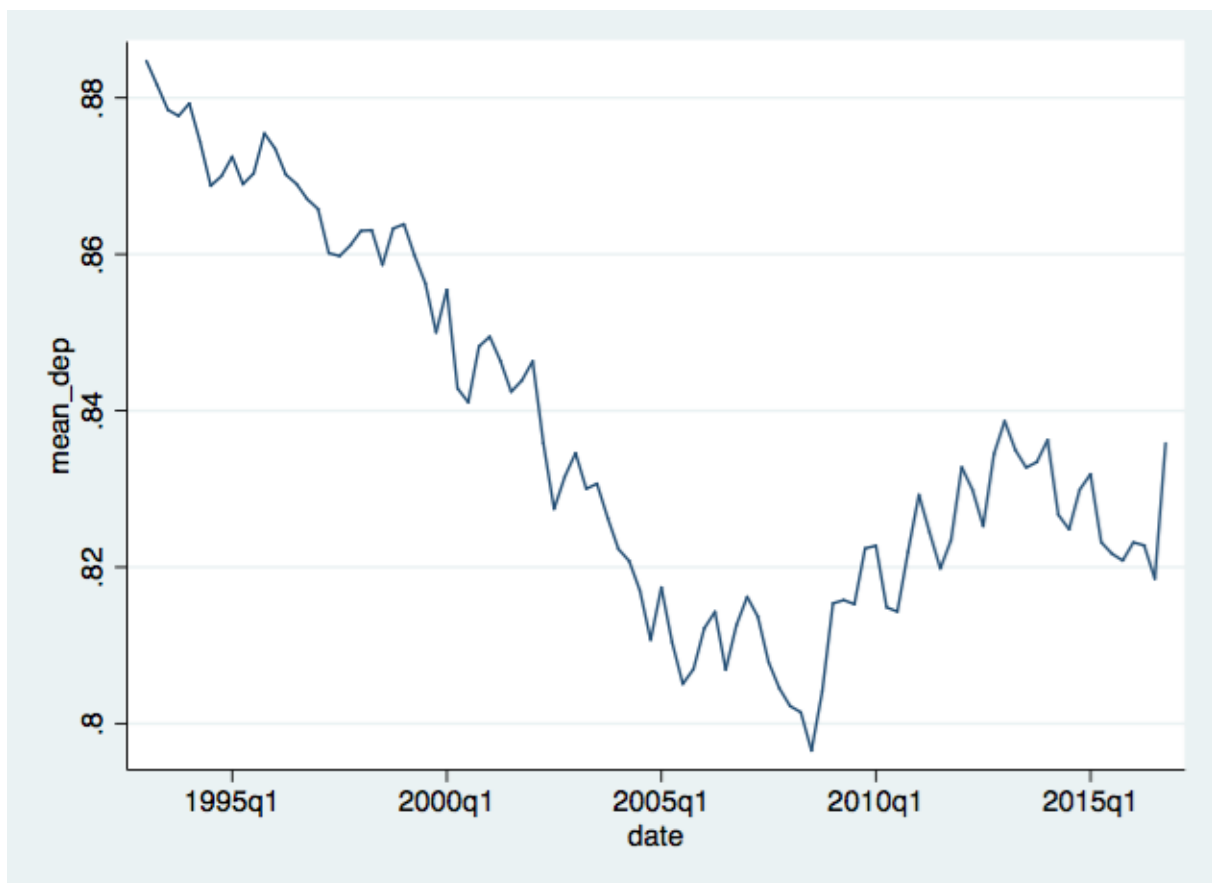
2.5 Average of Non-Deposits/Assets

Before a financial crisis, banks are on average financing their balance sheet increasingly with non-deposit funding. But after the crisis, banks increasingly turn to deposits as a source of funds and it is empirically shown that liquidity indicators such as the loan-to-deposit ratio

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and the share of non-deposit funding do signal financial fragility (Jorda, 2017:14)

It is quite natural to expect high non-deposits debt/asset ratio in an environment where deposit/assets is low, or vice versa. As is explained above, non-deposit fund is riskier than the deposit funds.

Figure-2 tells, therefore, non-deposits debt/assets was low prior to global financial crisis but in the time of crisis non-deposits debt/assets started to increase indicating that banks tend to search for non-deposit fund no matter high riskier and expensive they are. So, below-given plot is somewhat the reverse of the deposits/assets plot.

According to the data, non-deposits debt/assets was around 0.02 in the beginning of 1993 and then the ratio was on the rise until the mid-2008, at this time non-deposits debt/assets reached record high (above 0.08). Then the ratio has a downward sloping between 2010-2014. During 2014-2016 non-deposits debt/asssets remains stable indicating that banks started to incline to less risky funds such as deposits.

Figure 2: cross-sectional average of non-deposits debt/assets
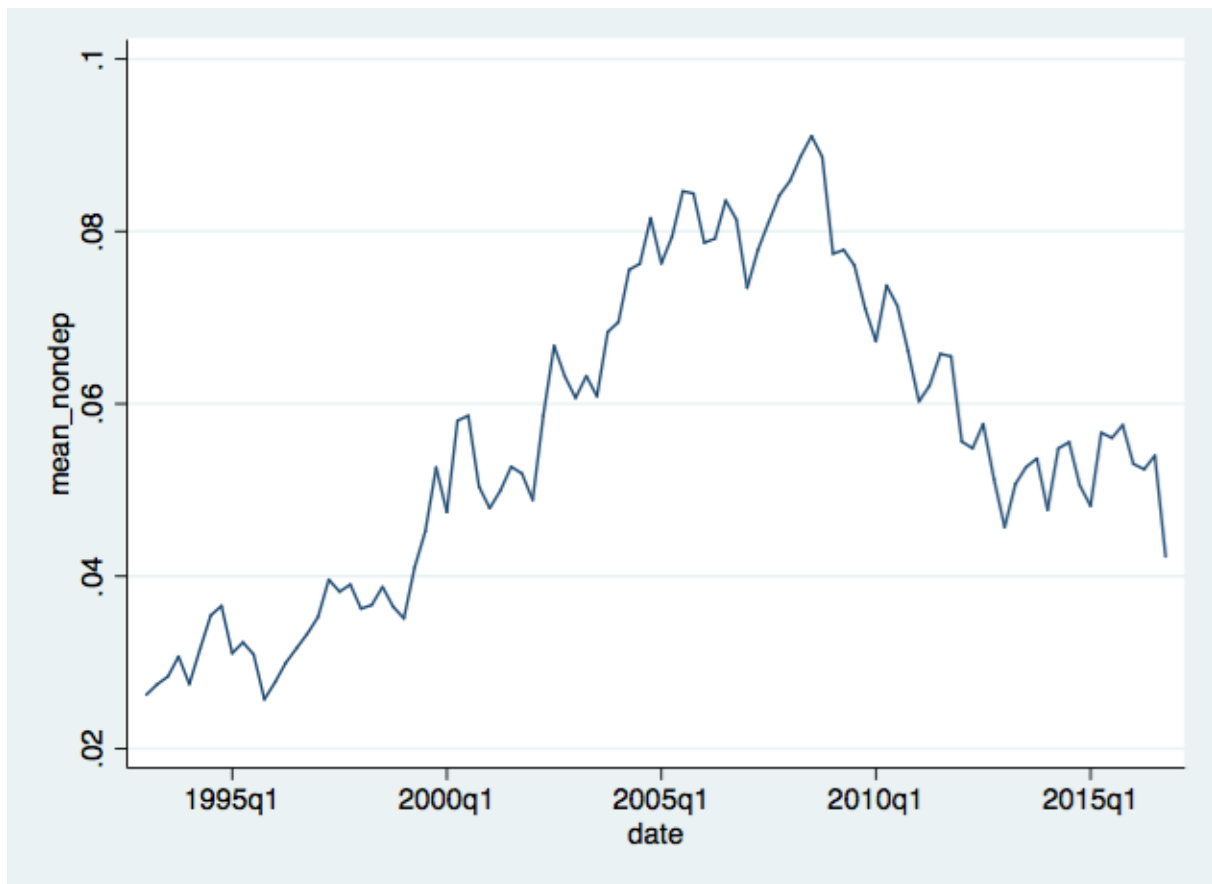
3 Regressions of Quarterly Loan Growth on Non-Deposit Debt/Assets

In this part of the study, I regress loan growth on non-deposit debt/assets, bank size and profitability for the sub-sample of your data during the financial crisis. The primary objective is to explore the relationship between loan growth and non-deposits debt/asset but there are some other factors that might affect this relationship. Therefore controlling these variables provide us a more reliable results. To this end, bank size and profitability are controlled for.

Fixed-effects (FE) model is employed. It is frequently used whenever we are interested in examining the effect of variables varying over time.

Fixed-effects model shows the association between predictor and dependent variables within

an entity (banks in this case). Each banks has its own specific characteristics that may or may not influence the independent variables. As FE is applied, it amounts to assuming that individual may have impact the predictor or dependent variables and it should be controlled. This is the underlying justification behind the assumption of the correlation between bank's error term and independent variables.

$$\text{Loan growth}_t = a_1 + a_2 \text{non-deposit debt/assets}_t + a_3 \text{profitability}_{t-1} + a_4 \text{bank size}_{t-1} + \epsilon_t \quad (1)$$

where

- growth is the quarterly loan growth

- non-deposit debt/assets is division of Assets - Deposits - Equity by assets

- profitability stands for one quarter lagged return on assets

- banks size represents the one quarter lagged natural logarithm of total asset

In the table below, it seems that non-deposit debt and bank size have negatively related with the loan growth during 2008q1-2010q4. Whereas there is positive association between profitability and growth in the same period. However, the estimated coefficient of profitability is not statistically significant at conventional significance level. Bank size and non-deposit debt assets are, on the other hand, statistically significant relation with the loan growth at 5% and 10% levels, respectively.

To interpret, if the bank size increases 1-point , this increase leads to 0.000173%. If non-deposit debt assets raise 1-point, then it retards loan growth by 0.000009 point which is quite low in terms of economic magnitude as in bank size and loan growth relation.

3.1 Pre-Testing

In this stage, unit root test is applied and presence of multicollinearity is checked before running the regression so that in the presence of unit root and/or multicollinearity, some

adjustments are required.

3.2   Unit root test

It is very common to observe that a macroeconomic variable increase or decreases over time. This downward or upward trend in time amounts to non-stationary. A time series, xt, is defined to be stationary when distribution shows time-invariant characteristics. This is another way of saying that mean and variance of the distribution stays as it is. Non-stationary series can be mathematically described as:

$$X_t = X_{t-1} + \epsilon_t \tag{2}$$

where X_t and X_{t-1} value of the variable at time t and t-1 and ϵ_t random walk component.

In the presence of trend non-stationarity, taking difference can make the data stationary.

In this study, Fisher type unit-root test is applied to check the presence of unit root. Series contains a unit root is the null hypothesis and variable extracted from a stationary series is checked by alternative hypothesis.

Below tables indicates the results of the unit root test. They show that none of the variables are non-stationary though the bank size variable produce puzzling result in which I use Modified inv. chi-squared Pm statistics to interpret the result.

Table 2: Unit Root Test of Profitability

	(1) Statistics	(2) p-value
Inverse chi squared	2.62e+04	0.0000
Inverse normal	-79.1243	0.0000
Inverse logit	-97.7078	0.0000
Modified inv. chi-squared Pm 138.8363	0.0000	

Table 3: Unit Root Test of Loan Growth

	(1) Statistics	(2) p-value
Inverse chi squared	1.96e+04	0.0000
Inverse normal	-41.6749	0.0000
Inverse logit	-60.2070	0.0000
Modified inv. chi-squared Pm 92.3384	0.0000	

Table 4: Unit Root Test of Bank Size

	(1) Statistics	(2) p-value
Inverse chi squared	9007.14959	0.0000
Inverse normal	20.2992	1.0000
Inverse logit	14.7159	1.0000
Modified inv. chi-squared Pm 6.6478	0.0000	

Table 5: Unit Root Test of Non-deposit debt/assets

	(1) Statistics	(2) p-value
Inverse chi squared	2.99e+04	0.0000
Inverse normal	-33.9865	0.0000
Inverse logit	-86.0972	0.0000
Modified inv. chi-squared Pm 171.5013	0.0000	

3.3 Multicollinearity

Multicollinearity defined as the correlation of two or more variables, is a phenomenon frequently occur in the regression analysis.

Possible detection methods of multicollinearity are as follows:

- In the case estimated coefficient varies from model to model

- While F-test for all estimated coefficients are statistically significant but t-test does not.

- Correlation among independent variables are large which is 80% as a rule of thumb.

As is seen from correlation table below, there is no high correlation among the variables, it does, therefore, imply that there is no multicollinearity among these variables. So all variables can be entered into the regression simultaneously.

Table 6: Correlation Table

	(1) Non-depositdebt/assets	(2) Profitability	(2) Bank Size	(2) Loan Growth
Non-deposit debt/assets	1.0000			
Profitability	-0.0037	1.0000		
Bank Size	-0.0911	0.0141	1.0000	
Loan Growth	-0.01855	-0.0027	0.0704	1.0000

Table-7 reveals the result of regression on the non-deposit debt/asset, banks size, profitability. While banksize is positively related with the loan growth, profitability and non-deposit debt/asset are negatively correlated with the loan growth indicating that as non-deposit-debt/asset increases, loan growth diminishes.

Bank size is the only statistically significant coefficient in that t-value of 8.90 is higher than the critical value and 1-point increase in bank size fosters loan growth of 5.09%[1]

Since the number of banks is too high to be include in the regressio result, I use F-test to assess overall significance. According to the F-test which is 2.126 (F(4099, 31928) = 2.126) and p-value of 0.000 indicating model fits better than the intercept term model only.

3.4 Regression Result

Table 7: Regression Result

	(1) Loan Growth
l_banksize	5.095***
	(8.90)
l_profitability	-0.000392
	(-1.75)
l_non-deposit debt/ asset	-0.120*
	(-2.10)
Constant	-26.50***
	(-8.88)
Observations	3916

*D*ependent variable is total loan growth.

*l*_banksize stands for one quarter lagged natural logarithm of total asset

*l*_profitability represents one quarter lagged return on assets

*l*_non-deposit debt asset is one quarter lagged values of equity over assets. t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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[1]As the bank size is the logarithm of total asset, the interpretation is done in terms of percentage.

4   Proxy Risk Measures and Cross-Sectional Average of the Risk measures

The relationship between equity and risk has been on the agenda in finance literature over decades. But last gloabl financial crisis has arised the attention towards the topic once again. Jokipii and Milne (2011) used a sample of U.S. banks and observed a positive relationship between capital and risk-taking for highly capitalized banks and a negative link between capital and risk-taking for banks with inadequate capital adequacy ratios.

Camara et al.(2013) employed a sample of European banks and concluded that an increase in equity positively affects risk, whereas an increase in equity of moderately undercapitalized banks negatively affects risk.Lee and Hsieh (2013) investigated a sample of 42 Asian countries' banks and indicated that there exists a relation between bank capital and risk-taking for commercial banks. In particular, their results implied that equity to total assets ratios are inversely correlated with some accounting measures (e.g., loan loss reserves) of bank risk-taking. As opposed to that, Haq, Faff, Seth, and Mohanty (2014) investigate a sample of 15 Asian countries and come up with puzzling results. In particular, they realized a negative nexus between bank capital and bank idiosyncratic risks, and a positive association between bank capital and bank total and systemic risks.

After global financial crisis discussion over how to improve banking stability, capital regulation continues to play a significant role. In September 2010, the Basel Committee on Banking Supervision announced the Basel-III Accord. In Basel-III, both the quantity and the quality of regulatory capital have been improved so as to counter excessive bank risk-taking behavior.

We have two risk measures, namely risk weighted asset divided by total assets and non-performing loans divided by total loan. These two risk proxies are computed via following formulas:

- Risk Weighted Asset/Total Asset

- Non-performing loans/Total Loans

4.1   Risk Weighted Asset/Total Asset

Risk-weighted assets are utilized to determine the minimum required amount of capital that must be held by banks and other institutions to mitigate the risk of default. Risk assessment is used to determine the capital requirement for every single banks.

Risk Weighted Asset is the sum of bank's tier 1 capital and tier 2 capital and divided this by total assets. Tier-1 capital is capital adequacy of a bank, is core capital that contains equity capital and disclosed reserves. Tier 2 capital is designed as supplementary capital, and includes of items such as revaluation reserves, undisclosed reserves, and subordinated term debt.

4.2   Non-performing loans/Total Loans

A bank loan is thougt to be a non-performing when more than 90 days pass without the borrower paying the agreed installments or interest. Non-performing loans are also called "bad debt". In order to run a bank in a successful way, managers need to minimize this ratio. Cross sectional average of risk weighted asset over total assets is examined via plot in this part of the study. Figure-3 exhibits that average of risk weighted total asset ratio is around 0.55 in 1993 indicating that required capital to be held as cushion by bank is relatively low. Over time, this ratio showed upward trend which is strong sign of increasing risk. This upward trend keeps going until financial crisis broke out at which cross-sectional average of the risk weighted asset over total assets reached record high level of 0.74. After tipping this point and as the effect of financial crisis started to disappear,this ratio declined to previous level reached at the beginning of 2000s. Then as of mid-2013, this ratio again tend to increase.

Figure 3: Cross-Sectional Average of Risk Weighted Asset Divided by Total Assets
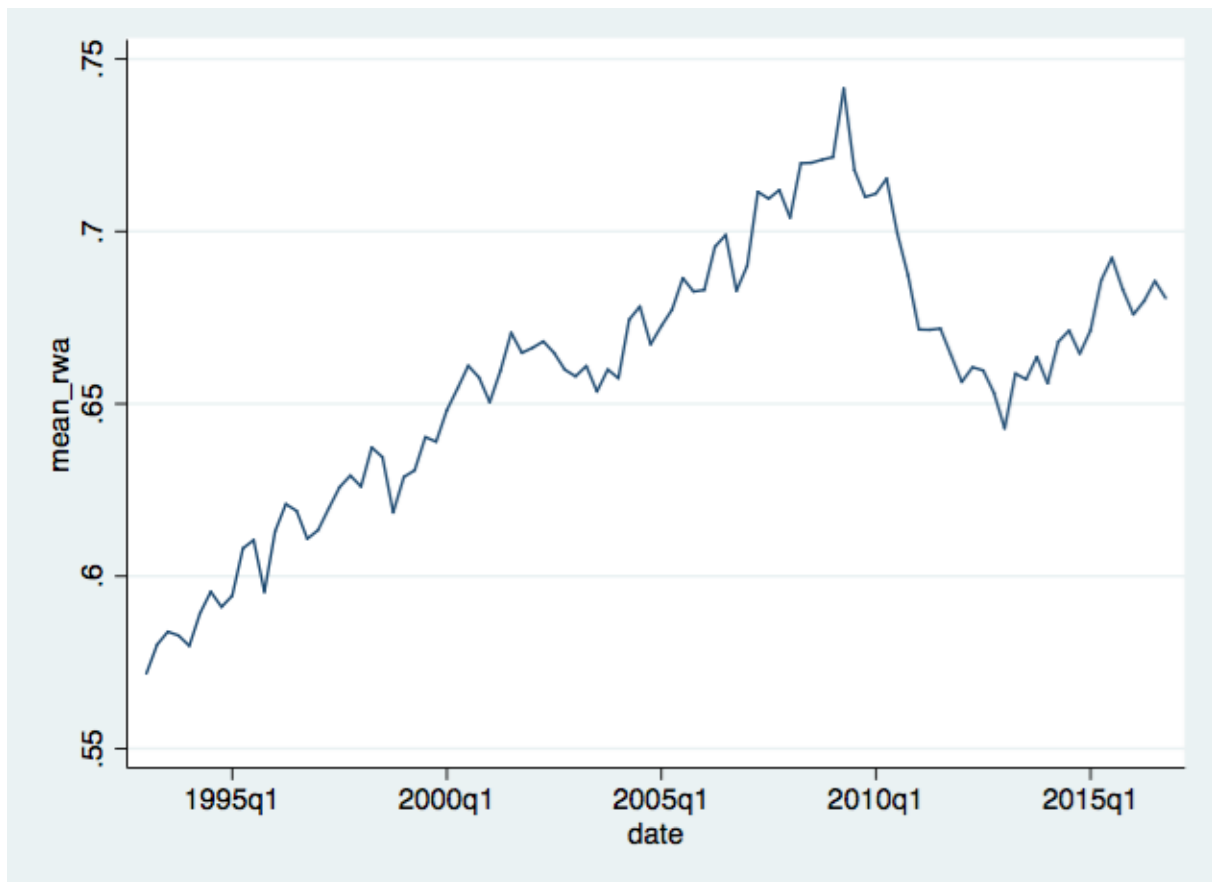

Researchers or practitioners are used loan ratio to compare quality of loan portfolios among banks. So the higher the non-performing loan ratios, the more risk the financial institution bears which in turn lead to bank failure.

Similar to the logic of risk weighted ratio, non-performing loans is expected to rise in the financial distress times. As expected, cross-sectional average of risk weighted asset over total loans skyrocketed in 2010. However this ratio was around 0.02 which is considered as quite low during 1993-2007. This increase in the financial crisis period imply that quality of loans are deteoriorated because at least 90 days passed without payment has been made by borrower.

Subsequent to pick point, non-performing loan ratio was started to decreased at a fast pace so that the ratio reverted back to itspre-crisis period in five years.

Figure 4: Cross-Sectional Average of Non-Performing Loans Divided by Total Loans
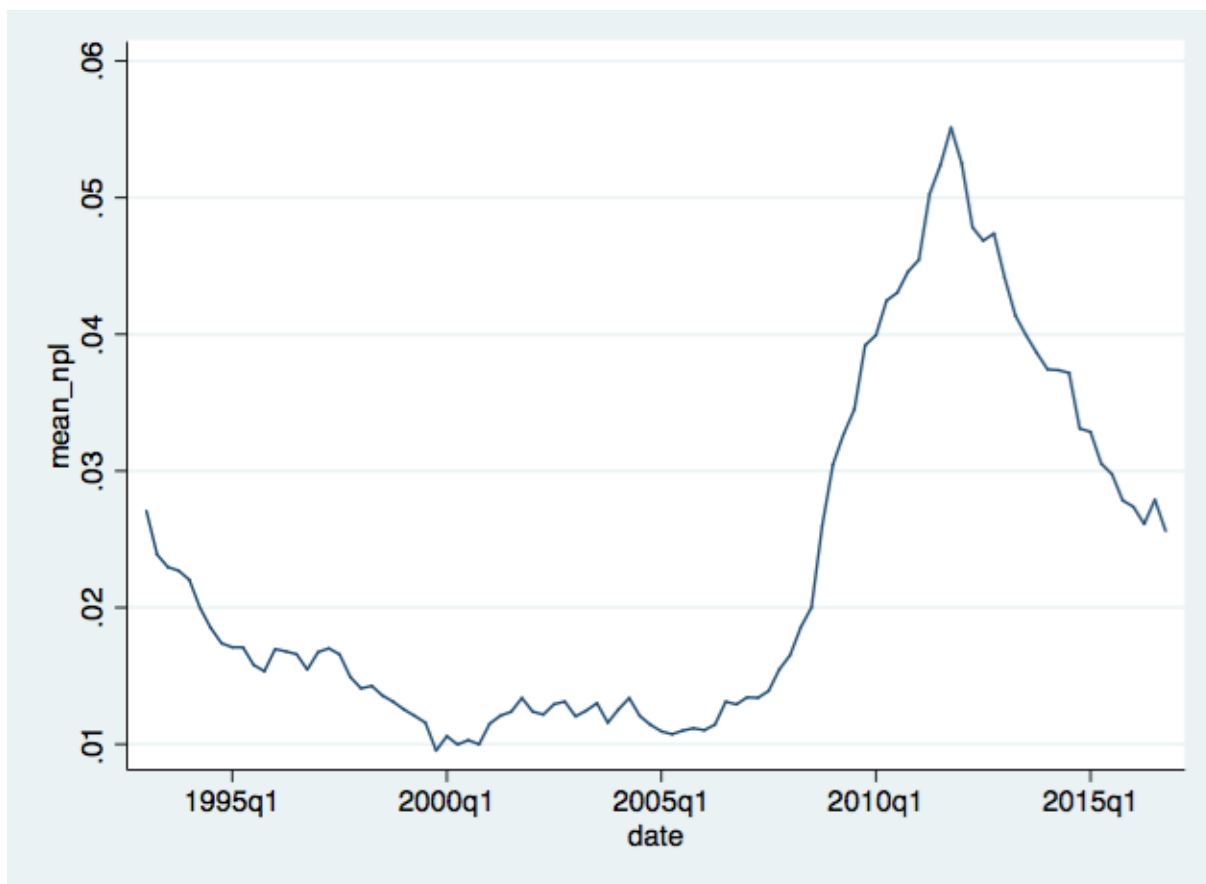
5   Regressions of Risk measures on Equity over Assets

In this part, the relationship between risk weighted asset divided by total assets (and/or non-performing loans divided by total loans) and equity over assets by controlling for the bank size and profitability over the entire sample.

Theoretically, it is expected that as the profitability decreases which frequently occurs in the financia crisis period,risk weighted asset ratio increases implying the increased vulnerability to the shocks. In the same vein, in the expansion period of an economy, it is easy to attract additional capital either in the form of debt or equity. It is, however, not easy to find capital in the time of financial distress. Therefore, one can expect negative correlation between equity over asset and risk weighted asset during shocks.

The two regressions run in this section of the study are:

$$\text{Risk-weighted asset/total asset}_t = a_1 + a_2 \text{equity over assets}_{t-1} + a_3 \text{profitability}_{t-1} + a_4 \text{bank size}_{t-1} + \epsilon_t$$

$$(3)$$

$$\text{Non-performing loan/total loans}_t = a_1 + a_2 \text{equity over assets}_{t-1} + a_3 \text{profitability}_{t-1} + a_4 \text{bank size}_{t-1} + \epsilon_t$$

$$(4)$$

In these two regressions, only dependent variables are different. In the first regression, dependent variable is Risk-weighted asset/total asset and in the second regression, dependent variable is non-performing loan/total loans.

First of all, descriptive statistics is provided below. Accordingly, the most volatile variable is profitability and the least volatile one is bank size which is the logarithmic value of total assets. Moreover, maximum value of equity on asset (EoA) is 851 and minimum value of the same variable is close to -234.

Table 8: Descriptive Statistics

	(1)	(2)	(2)	(2)
	Mean	Std.Dev	Minimum	Maximum
Risk Weighted Asset	.1149309	.098761	-.7694528	1.066324
Non-Performing Loan	.0058533	.0454586	-.9710238	1.623118
Equity on Asset	.0209223	1.429991	-233.9583	851.7692
Bank Size	5.068087	.6023189	0	9.326028
Profitability	.020157	1.429886	-233.9583	851.7692

Unit root test for this panel analysis cannot be applied in that there are too much banks whose unit root test cannot be computed and therefore excluded.

Correlation tables are provided below for two different regressions of this part. The first correlation table belongs to the first regression (equation-3) and the second correlation table belongs to the second regression (equation-4). The most striking result is the high corre-

lation among equity over asset and profitability in that the correlation coefficient is 0.9998 which is extremely high and these two variables cannot enter into regression at the same time.

The rest of the variables have low correlation which is not considered as multicollinearity. For instance, the correlation between equity over asset and bank size is 0.0017. Same is true for the second correlation table given in the Table-10. In this case, equity over asset and profitability cannot enter into regression simultenaously.

Table 9: Correlation Table

	(1) Risk Weighted Asset	(2) Bank Size	(2) Profitability	(2) RoE
Risk Weighted Asset	1.0000			
Bank Size	-0.2731	1.0000		
Profitability	0.0056	0.0016	1.0000	
EoA	0.0054	0.0017	0.9998	1.0000

Table 10: Correlation Table

	(1) Non-Performing Loan	(2) Bank Size	(2) Profitability	(2) RoE
Non-Performing Loan	1.0000			
Bank Size	-0.0838	1.0000		
Profitability	-0.0006	0.0016	1.0000	
EoA	-0.0007	0.0016	0.9998	1.0000

In the Table-11 regression result is revealed. Accordingly, at first glance, it is apparent that only bank size are statistically significant association with the risk weighted ratio. 1-point increase in bank size leads to a decrease of 0.048% indicating that the economic magnitude of the change in bank size on risk weighted ratio is not large.

Profitability and risk weighted ratio has positive but not statistically significant coefficient and as there is high correlation between profitability and equity over assets, the estimated coefficient of equity over asset is not very different and it is also not statistically significant at conventional significance level.

F-statistic is F(7226, 435175) = 201.61 and p-value is 0.0000.

F-value indicates that all group variables, namely banks, are whether jointly significant. I have p-value of 0.000 meaning that all model provide a better fit than the intercept term model only.

Table 11: Regression Result

	(1)	(2)
	rwa/ta	rwa/ta
l_Bank size	-0.0482***	-0.0482***
	(-91.67)	(-91.67)
l_Profitability	.0003067	
	(0.68)	
l_Equity over assets		0.000314
		(0.69)
Constant	0.357***	0.357***
	(132.49)	(132.51)
Observations	442404	442404

*D*ependent variable is risk weighted asset/total asssets.

*l_*banksize stands for one quarter lagged natural logarithm of total asset

*l_*profitability represents one quarter lagged return on assets

*l_*EoA is one quarter lagged values of equity over assets. t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As in the first regresssion, profitability and equity over asset cannot be considered simultenously due to the multicollinearity in the second regression as well. Similar to the first regression in this part, bank size is positively and statistically significant relation with the non-performing loans over total loans in that t-value, -17,26, is way above the critical value.

To interpret, 1-point increase in bank size promotes non-performing loans/total loans by 0.0047%.

On the other hand, even though the estimated coefficient of profitability is not statistically significant at 10% level, the sign of this coefficient is negative indicating that an increase in profitability leads to a decrease in non-performing loans/total loans.

Finally, in the secon colum of the Table-12, profitability is excluded and equity over asset is included and it turns out that sign and magnitude of the relation is preserved in that there exist negative and statistically significant association between bank size and non-performing loans/total loans and negative but statistically insignificant relation with the non-performing loans/total loans.

F-statistic is $F_{(7226, 435174)} = 201.59$ and p-value is 0.0000.

F-value indicates that all group variables, namely banks, are whether jointly significant. I have p-value of 0.000 meaning that all model provide a better fit than the intercept term model only.

Table 12: Regression Result

	(1)	(2)
	npl/tl	npl/tl
l_Bank size	-0.00472***	-0.00472***
	(-17.26)	(-17.26)
l_ Profitability	-0.0000119	
	(-0.44)	
l_Equity over asset		-0.0000533
		(-1.11)
Constant	0.0297***	0.0297***
	(21.02)	(21.02)
Observations	441872	441872

*D*ependent variable is non-performing loan over total loans.

*l*_banksize stands for one quarter lagged natural logarithm of total asset

*l*_profitability represents one quarter lagged return on assets

*l*_EoA is one quarter lagged values of equity over assets. t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6 Conclusion

In this study, I first provide theoretical background about the capital structure of the financial instituiton and then plot the cross-sectional average of deposits/assets as well as non-deposit debt/assets across time.

Plot of cross-sectional average of deposits/assets shows that deposit/asset diminishes during financial crisis but, in expansion period,this ratio is high. Whereas plot the cross-sectional average of non-deposit debt/assets climbs high in financial distress times but it is by and large low in the case of sound economic situation.

In the part-3, I run a regression of quarterly loan growth on non-deposit debt/assets controlling for bank size and profitability during 2008Q1-2010Q4. It turns out that bank size and non-deposit debt/asset are statistically significant relation with the loan growth. But non-deposit debt/asset is negatively related with the loan growth.

In the fourth part, two proxy risk measure is defined and calculated and then, plots of these two risk measures are given.It is natural to expect that risk weighted asset increases during crisis and, in the same vein, non-performing loan described as the loan which can be paid more than 90 days pass after the maturity, raises as crisis hit an economy. But plot of the non-performing loan/total loan tells us that non-performing loan ratio responses to the shoch with some delay. Because, financial crisis hit the economy in 2007-2008 but the effect on the non-performing loan emergers around 2010.

In the final part,regressions are run to observe the relation betweeen two ex-post measures of bank risk on equity over assets by controlling for the effect of bank size and profitability on the entire sample. As happened before, the only variable which has statistically significant relation with the risk weighted asset and non-performing loan ratio is bank size.

It is worth discussing a bit about possible shortcoming of this study. Endogenity is one likely shortcoming of this study. As is known, it emerges when a variable that is not included in the model, is related to a variable incorporated in the model.So this study can be extended so as to include some intitutively important or empirically significant variables.

7 References

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