

## Abstract

In the U.S. commercial banking systems, non-interest income contributes to as much as over 40% of net operating income, compared to only 20% in 1980, which demonstrates non-interest income is playing a very important role. To test how non-interest income affects U.S. commercial banks' profitability for recent decade, we accepted accounting ratios to measure the links between non-interest income and other factors contributing to the bank profitability from 2000 to 2010. The results show that banks with higher non-interest income normally have stronger power of profitability. It also indicates that the impact of non-interest income on bank performance can be different, depending on how performance is measured. Thus it can be a helpful complimentary for nowadays non-interest income research.

**Keywords:** Commercial bank • Profitability • Non-interest income

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## **1. Introduction**

Background:

As for U.S. commercial banks, the vital major banking activities group is banks' deposit taking and lending. Yet the Non-Interest Income has been one of the major contributions to the net operating income of the U.S. commercial banking systems. For an instance, in general, the Non-Interest Income portion for commercial banks has grown dramatically from previous researchers' review (Stiroh 2004 used data of Non-Interest Income to net operating revenue ratio, and found it from 20% in 1980 to 42% in 2004. Brunnermeier etc's (2011) measured and compared the data from 1989 to 2007 for the 10 largest banks by Non-Interest Income to interest income ratio, and found that the mean of the ratios has increased from 0.18 in 1989 to 0.59 in 2007.); even after the financial crisis, Non-Interest Income is still an important portion for commercial banks, especially the big ones. And for another instance in details, the credit card penalty fee, a section of the Non-Interest Income, itself is over \$19 billion alone taken by the credit card issuers. Obviously, the Non-Interest Income plays a significant role for the commercial banks.

According to the nature and forms of expression, Non-Interest Income mainly composes of two parts: one is trading and the other is service fees

On one hand, obviously for investment banks or other non-commercial banks, trading is as the major part of Non-Interest Income is with no question. However, trading activities have been as part of commercial banks' business from earlier dates, though not to a very high extension.

On the other hand, fees are building a primary income for banks and creditors. Examples of Non-Interest Income include deposit and transaction fees, insufficient

funds (NSF) fees, annual fees, monthly account service charges, inactivity fees, check and deposit slip fees, etc. Institutions charge fees that provide Non-Interest Income as a way of generating revenue and ensuring liquidity in the event of increased default rates.

Research Question:

Non-interest income has been discussed a lot as one of major indications of diversification from previous papers such as Stiroh (2004 and 2006), De Young and Rice (2004), Laeven and Levine (2007), Williams and Rajaguru (2007 and 2010), Elyasiani and Wang (2008), Lepetit (2008), De Jonghe (2010), Demirguc-Kunt and Huizinga (2010), Pang, Spindt and Tice (2010), Akhigbe and Stevenson (2010), Elsas, Hackethal and Holzhauser (2010), Brunnermeier, Dong and Palia (2011), Sanya and Wolfe (2011), Tabak, Fazio, Cajueiro (2011) and so on. Most of the researchers have been focusing on the relationship with (partial) Non-Interest Income with the bank performance.

The measured elements for the banks' performance can be different. In earliest days, data from balance sheet were accepted and used. However, since Stiroh (2004), most of the previous studies measured the performance using stock market data. Among those research, major part of papers used data such as stock return (Stiroh etc), some other papers used Tobin's Q (Laeven and Levine etc). It was an effective method though the volatility of stock market data is relatively higher compared to the balance sheet method.

Sanya and Wolfe (2011) did a deeper research using accounting measurement. And partially following their thoughts, in our study, we also used accounting ratios (such as ROA and ROE etc) to measure the bank profitability. That is our aim, to find the links between the commercial banks' profitability and their Non-Interest Income.

Profitability is one of the banks' forms of expression, which can be described as the banks' ability to make profit. By its word meaning, it shows how much return a bank can earn compared to its total asset, total equity, total principals or other related quantities. Profitability can be also as an aspect of banks' performance.

Research Hypothesis:

The objective of this research is to find out the relationship between the banks' Non-Interest Income and their profitability.

Our hypothesis is that, larger portion of Non-Interest Income of commercial banks can significantly improve their profitability.

This hypothesis is somehow challenging and it seems contradict to Stiroh etc's previous research. Old paper said that more diversification for a bank, which is greatly due to larger portion of Non-Interest Income, is negatively contributed to the bank's well management or its performance. Compared to those results, Sanya etc. gave the different conclusion from another inspective, which will be discussed as in the following part of this paper.

Structure Thesis:

The structure of this thesis can be divided into three main parts.

The first part is beginning with a general introduction of what will be researched and the theoretical foundations. Continuously, the relevant literature concerning Non-Interest Income will be reviewed. First of all, the subject of previous study that how Non-Interest Income contributes to commercial banks' performance and the related conclusion will be

summarized and explained. Then, the literature will focus on the different methodologies and findings.

The second part comprises of the methodological part of the thesis. In this section, a conceptual framework is constructed based on the research questions and literature review. Moreover, the methodology of this research is explained. This section will also elaborate on the reasons for choosing a measurement, i.e., accounting ratios instead of stock market data. In addition, the concepts of the variables we used are clarified. And for better comparison, we divided the banks according to their sizes into the large, medium and small banks groups, and separated time zone into from 2000 to 2006 and from 2007 to 2010 groups. Compared between those groups, we can tell the changes of the Non-Interest Income portion at different level.

To be continued, the next step is concerning the data collection. All data were derived from “Consolidated Financial Statements for Bank Holding Companies-FR Y-9C”, a formal, legal, all-audited, firm format national used form. And the following is data processing. We used linear regression to test all variables contribution to the measurement. Robust test were also given. The last and very important step for this part is to give descriptive analysis based on the above observation, calculation and tests.

Finally, the third part of this thesis will be presenting the conclusions, managerial implications, limitations and future research.

## **2. Literature Review**

As making greater portion contributing to the banks' net income, the Non-Interest Income is getting to be the focus of more and more literature. Stiroh (2004) in his paper used the ratio of Non-Interest Income to the sum of the net interest income and Non-Interest Income as the expression for the Non-Interest Income, and measured the Non-Interest Income contribution to the banks' performance. He found that banks with greater reliance on Non-Interest Income are associated with lower risk-adjusted profits and higher risk. The similar statement was also supported by De Young and Rice (2004). They tested commercial banks' performance between 1989 and 2001, and concluded that well-managed banks expand more slowly into non-interest activities, and that marginal increases in Non-Interest Income are associated with poorer risk-return tradeoffs on average. They also found that Non-Interest Income is coexisting with, rather than replacing, interest income. The reason why the Non-Interest Income may increase the volatility of bank earnings was given by De Young and Roland (2001) suggesting that 1. Depending on the relationship based, loans may be less volatile than Non-Interest Income from fee-based activity; 2. Variable input decides fee-based activities may require greater operating leverage than lending activities; and 3. Most fee-based activities require banks to hold little or no fixed assets.

The previous empirical literature focusing on Non-Interest Income are usually measured the banks' performance by the stock data. Most researchers such as Stiroh etc chose stock return as measurement, and Tobin's Q - method was also accepted and used by others such as Laeven and Levine. Considering the equity conditions with great risk effect, their conclusion that Non-Interest Income contributing to the diversification is negative related to the banks' performance is from shareholders' perspective. However, from another perspective, such as using different measurement method, or with other various factors, much

literature gives complimentary results, indicating more understanding needed on Non-Interest Income research.

The questions to the literatures of Stiroh and others' related articles are from various aspects in early studies. Whited (2001) from measurement problems perspective, Villalonga (2004) from data problems perspective, Graham et al. (2002) and Lins and Servaes (1999) from sample selection problems perspective, and Campa and Kedia (2002) from endogeneity of the diversification decision perspective suggested the different arguments. And in recent years, during and after the serious global financial crises, Non-Interest Income topics have drawn more attention. More findings on evidence between banks' Non-Interest Income with the performance/profitability have been examined and hence deepened the related research. The topic is deepening and broadening.

Lepetit etc (2008) investigated 602 European banks over 1996-2002 and found that the higher income share from commissions and fees is associated with lower margins and loan spreads. The higher the commission and fee income share, moreover, the weaker the link between bank loan spreads and loan risk. Williams and Prather (2010) examined the data in Australia for fee-based income test, and concluded that the combination of the traditional income and fee income sources generates positive portfolio diversification benefits in Australia, similar to Baele etc (2007) in the European case.

In recent paper, Gatzert and Schmeiser (2011) said that under competitive conditions, diversification does not matter to the extent frequently emphasized in the literature. Elsas, Hackethal and Holzhauser (2010) sampled 9 countries over 1996-2008, testing how revenue diversification affected bank value. Their results showed that diversification increases bank profitability and also as a consequence also market valuations. The results contradicted Laeven and Levine's conclusion (2007) that there is no evidence of a diversification premium.



Elsa etc. suggested the previous results in the literature on the impact of diversification on bank value presumably differ due to the way diversification is measured, and the negligence of the indirect value effect via bank profitability. Sanya and Wolfe (2011) used a new different methodological approach, System Generalized Method of Moments estimators (System GMM), and found new results. System-GMM is shown its advantages by past changes items, by possibility to include time-invariant regressors, and by more robust. Their new findings included that diversification across and within both interest and Non-Interest Income generating activities decrease insolvency risk and enhance profitability; that there is no link between high exposures to Non-Interest Income and bank profitability; that benefits of revenue diversification are greatest for banks with moderate risk exposures; and that the revenue diversification within banks in emerging economies can create value. In addition, they showed the fee income increases bank profitability and reduce risk.

As mentioned earlier, what data should be chosen constitutes one of the major differences for Non-Interest Income related studies. On one hand, Stiroh and most of the researchers were in the scope of stock data; on the other hand, Sanya etc adopted accounting elements for the measurements. The research showed that different measurements lead to accordingly different results.

During previous study, people were already aware that Non-Interest Income raises the risks thus may be negatively associated with banks' stability. But even that, why the banks' business related to Non-Interest Income did not drop down, instead, still increased? One explanation is that it is due to the banks' business proficiency level. That is to say, for their first stages to associate with the non-traditional business, banks were not familiar with the relevant business management, such that those banks might not gain enough from the initially

weak competition skill in market. That hence made more potential risks to the market and the banks might not be paid back expected returns.

However, some papers were paying attention to other factors. In recent research, the topics on relationship between CEO compensation and Bank's performance have been dug out a lot. One interesting topic is that in 2006, Davila and Penalva disclosed the fact that compensation contracts in firms with higher takeover protection and where the CEO has more influence on governance decisions put more weight on accounting-based measures of performance (return on assets) compared to stock-based performance measures (market returns).

CEO's compensation/salaries are usually directly associated with some accounting values, such as ROA (Return on Asset) and ROE (Return on Equity). In this case, it seems much reasonable for banks continuously put effort into Non-Interest Income parts. CEOs will get more compensation/salaries from ROA/ROE if ROA/ROE is positively linked to Non-Interest Income. That helps to explain why banks are still pursuing Non-Interest Income business. And it is also one of the reasons why we in this paper choosing ROA/ROE, instead of stock market data, associated with Non-Interest Income for the measurement. The relevant discuss on CEOs and Non-Interest Income is still in progress.

### 3. Methodology (Sample and Variables):

Our purpose in this paper is to test the hypothesis; whether the Non-Interest Income has positive impact on banks' profitability. In order to build a more precise test, we use some control variables in the test to better elaborate the relationships. The control variables that we adopt are the size, the capital ratio, the loan and deposit. To test relationship between the bank's profitability and Non-Interest Income together with the control factors, we used a regression method to conduct an empirical estimation. The regression has the profitability as the dependent variable. For the independent variables, we used the Non-Interest Income as the independent variable, other than this variable; we used bank's size, capital ratio, loan and deposit as the control variables. Therefore, we have the regression:

$$\text{Profitability} = \beta_0 + \beta_1 * \text{Non-Interest} + \beta_2 * \text{Size} \\ + \beta_3 * \text{Capital Ratio} + \beta_4 * \text{Loan} + \beta_5 * \text{Deopsit} + \text{Error Term}$$

Profitability:

In our test, we are putting more emphasize on the bank's potential profitability other than the traditional risk-adjusted performance. Therefore, we define the bank's profitability with two accounting ratios: Return on Asset (ROA) and Return on Equity (ROE). These two ratios represent the bank's profitability in the form of empirical return. The definition of ROA, ROE from the accounting perspective is:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Asset}} \quad \text{ROE} = \frac{\text{Net Income}}{\text{Total Equity}}$$

Non-Interest Income:

Non-Interest Income is the key independent variable in our process of regression. In the regression, we are mainly focusing on how the bank's portion of Non-Interest Income would affect the profitability. Therefore, the Non-Interest Income was not divided into subdivisions with different sources. Following Stiroh (2004), we define the non-interest income ratio as:

$$\text{Non-Interest Income ratio} = \frac{\text{Non-Interest Income}}{\text{Net Interest Income} + \text{Non-Interest Income}}$$

Size:

One of the control variables is the bank's size. We are interesting in how the bank's size would affect the profitability (ROA, ROE). Additionally, we consider the relationship between the bank's size and the Non-Interest Income in the bank's income structure. We are trying to find out whether larger bank tends to have larger portion of its income be the Non-Interest part. Again, in order to smooth and adjust the data more close to a normal distribution, we define the independent variable size as:

$$\text{Size} = \log(\text{Total Asset})$$

Other Control Variables:

Our regression has Capital ratio, loans, and deposits as the control variables. These factors are normally considered to have impact on the portion on the bank's income structure, and the bank's risk taking appetite. Therefore, they affect the bank's profitability as well in the common senses. For these control variables, we use relative terms as the measurement. They are defined as follow:

$$\text{Capital Ratio} = \frac{\text{Total Equity Capital}}{\text{Total Asset}} \quad \text{Loans} = \frac{\text{Bank Loans}}{\text{Total Asset}}$$

$$\text{Deposits} = \frac{\text{Bank Deposits}}{\text{Total Asset}}$$

**Data Collection:**

Our regression is based on the accounting measurements. Therefore, we collected the empirical data from Wharton Research Data Services (WRDS). The data covers all the US Bank holding companies that had reported to the Bank Regulatory from the year 2000 to 2010. Since there may be significant changes in the relationship during recent financial crisis, for every step we conduct the regression and analysis by two time segments: one is year 2000 to 2006 (pre crisis period), another period is from year 2007 to 2010 which is the most recent data.

**Data Selection/modification:**

After collection of the data, we calculate the corresponding dependent and independent variables' value such as ROA, ROE, and Non-Interest Income etc. In the following test, fat tail of the sample data would reduce the precision of our empirical estimation. In order to reduce the impact of extreme observations, we eliminate 1% of both tails by "winsorized" method before doing any regression process and analysis. In order to have an overview of the after winsorized variable data, we conduct the summary Statistics as shown in Appendix (Table 1), and the Correlation Matrix is shown in Appendix (Table 2). Each of these two tables is prepared into two panels, which represent two time segments.

**Pre-Regression analysis:**

From Summary Statistics:

We can see that the banks' average profitability (ROA and ROE) is much smaller in the 2007-2010 periods than 2000-2006 periods. And the standard deviation becomes larger in the second time period. This observation makes sense, since the 2008 financial crisis made the

overall banking sector suffered huge losses. The bankruptcy and losses from sub-prime mortgage increases volatility of the banks' profitability. Other than the profitability (ROA and ROE), the rest variables are not varying too much in these two time segments. The Non-Interest Income, Loans and Size increase slightly in the more recent period. At the mean time, Capital and Deposits decrease a small amount.

From Correlation Matrix:

The correlation value between ROA and ROE is very high in all periods; this is coincident with our basic assumption that ROA and ROE could both be the measurement of the banks' profitability. With 5% significant level, the correlations of independent variables differ from two time intervals. The Non-Interest Income appears to have positive correlation with ROA and ROE from 2000-2010; however this correlation is becoming more significant in the 2007-2010 period. For the other control variables, the bank's size has become less significant in determining bank's profitability. For ROA, the correlation of capital is not significantly changed. However, for ROE, the correlation changed from significant negative to positive. The bank's profitability correlation with loan and deposits decreased in the recent three years. This fact may indicate that the traditional banking business is not profitable in the recent financial crisis and post-crisis period

Other than direct correlation with profitability, we also can find some information in the correlation between Non-Interest Income and control variables. One interesting point is that the Non-Interest Income has very high correlation with bank's size. This data shows that larger banks tend to have higher portion of Non-Interest Income. For this observation, we will conduct some further regression and estimation in the following testing process. In the other side, the correlation of Non-Interest Income and Traditional banking business (loan and deposit) is negative for all periods. This observation also makes sense, since higher lending

and borrowing banks would have the tendency to be more concentrate on the traditional banking business, and therefore lower income from the non-interest portion.

### Regression:

After collecting and modifying the data, we move to the next step and start the empirical estimation with regressions:

$$\begin{aligned} \text{ROE}_{i,t} \text{ or } \text{ROA}_{i,t} = & \beta_0 + \beta_1 * \text{Non-int}_{i,t} + \beta_2 * \text{Size}_{i,t} \\ & + \beta_3 * \text{Capital ratio}_{i,t} + \beta_4 * \text{Loan}_{i,t} \\ & + \beta_5 * \text{Deposits}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

In this part, we conduct the regression with the same format as previous data collection; divide the regression process into two time segments (2000-2006, 2007-2010). Additionally, we divide banks into three categories by their asset value. The banks with asset value less than one billion are defined as the small size banks. The banks with asset value more than one billion but less than ten billions are defined as median size banks. The banks with asset value higher than ten billions are defined as the large size banks. Within each size category we perform the regression process. By doing this, we can figure out more precisely on how the Non-Interest Income would affect the bank's profitability under different bank's size.

## 4. Result and Analysis:

After performing the regression, we have the results shown in the appendix (table 3 to table 8).

Before Financial Crisis:

First half of the regressions are for the period 2000 to 2006. We have Table 3 to be the result of regression on profitability (both ROA and ROE) and independent variables without regarding to size effect. Table 4 is the result of regression on ROA and independent variables for different bank's sizes. Table 5 is the result of regression on ROE and independent variables for different bank's sizes.

In table 3, regression result shows that Non-Interest Income has a positive coefficient with ROA and ROE. Even with 99% confident level, the coefficients are still significant. Bank's size has a positive coefficient with ROA and ROE with 99% confident level. However Capital ratio has positive coefficient with ROA and negative coefficient with ROE. Capital ratio could have relationship with profitability of the bank, since it reflects some risk. Loans and deposits both have positive coefficient in the regression of ROA and ROE. They are all significant with 99% confident level. From the perspective of this table, we can conclude that for ROA in the period 2000 to 2006, all independent variables are positively supporting the bank's profitability. However, for ROE, capital ratio is the only independent variable that has negative coefficient. This makes sense since we defined capital ratio and ROE as:

$$\text{Capital Ratio} = \frac{\text{Total Equity Capital}}{\text{Total Asset}}, \quad \text{ROE} = \frac{\text{Net Income}}{\text{Total Equity}}$$

Therefore, higher Equity would result in larger numerator in Capital Ratio, and larger denominator in ROE. This results in higher capital ratio and lower ROE.



Next we turn into the result of regressions under different bank sizes in Table 4. Table 4 is the result focusing on ROA. The result shows that Non-Interest Income plays significant positive role in profitability (ROA) in the regressions for all three sizes. The size of a bank would normally be considered as a factor. Intuitively larger bank tends to have higher profitability due to its dominated position in the market share and its ability in diversification. For the asset value less than one billion, the coefficient of size factor is significantly positive. For the bank size larger than one billion, size does not have significant coefficient in the ROA regression. This fact indicates that a bank's asset value may improve its profitability only in the low asset category. After reaching some asset value, further asset value enlargement may not improve a bank's profitability. Back to the Non-Interest Income, as size increases the coefficient increases. The increment may indicate larger bank would be more skilful and efficient in managing diversified business such as Non-Interest Income sector. Even more, Larger bank may have sufficient assets in making Non-Interest Income portion more profitable.

For the ROE result in Table 5, we have similar positive coefficient for the independent variable Non-Interest Income, size, loans and deposits. The reason of having a negative coefficient for the capital is explained in the previous paragraph. If we compare the ROA and ROE table, the Non-Interest Income has more effect on ROE than on ROA. The rest independent variables' absolute coefficients are higher in ROE. However, from the R-square value of the regression. ROA's regression is more fit to the empirical data other than ROE's regression. This may indicates that the volatility of the variables in ROE regression is higher. The result may suggest that as a measurement of profitability, ROE are more sensitive to those independent variables we chose

During and Post Financial Crisis:

For this period, we also perform three regressions as we did on the period 2000 to 2006. This period is from the beginning of financial crisis to the most recent data which are available at the moment.

From table 6, we still have positive coefficients for the Non-Interest Income factor. This means even since financial crisis, Non-Interest Income keeps unchanged in positively supporting the bank's profitability. However, size factor has negative coefficient, this observation coincides with the fact that a lot of large banks bankrupt during the crisis. Large banks suffered the most losses in that period. The size has negative effect on ROA and ROE; therefore, high Capital ratio because of low asset value in the denominator would tend to have positive effect on ROA and ROE. Therefore, from financial crisis, Capital ratio has positive coefficient with profitability. During this period, Deposit factor has negative coefficient as well.

Since financial crisis, ROA has positive coefficient with Non-Interest Income for different bank sizes. From Table 7, we can see that Non-Interest Income is most efficient in improving ROA when the bank's size fall into the median category. This may indicate that during and after crisis, bank's size improves the Non-Interest Income's contribution to ROA until it reaches some high asset value. Beyond certain high asset value such as ten billion, the Non-Interest Income's profitability decreases. Loans and Deposits are supporting a bank's ROA when the asset value is less than one billion. From the result larger banks seems to be less profitable from the traditional banking borrowing and lending business.

The ROE regression result in Table 8 shows more or less the same conclusion as the ROA table. The coefficient in ROE is higher than those in ROA. This fact we can conclude in higher sensitivity and higher volatility when ROE performs as the profitability.

## **5. Conclusion:**

As we conclude from the regression results, for asset value larger than one billion, the traditional banking business (borrowing and lending) is not supporting the bank's profitability if the bank use ROA and ROE as the measurement. On the other hand no matter what size the bank is, Non-Interest Income would always support the ROA and ROE of a bank before and after financial crisis. Therefore, especially for median and large banks, if the bank's CEO has his/her compensation largely based on the profitability which would normally measured by ROA or ROE, improve Non-Interest Income portion relative to the traditional interest margin would yield the higher salary. The result of our test answers part of the question that why

Non-Interest Income becomes so popular in the commercial banking sector even though it has high risk. Besides, the question of whether the Non-Interest Income has diversified the overall risk is not clear yet since the bank's efficiency in using cross sectional information and skill in managing vary sectors' business play very important role in the determination of the answer. The efficiency and risk-adjusted return is still arguable, however, the bank's profitability measured by accounting method (such as ROA and ROE) is proved to be positively supported by the Non-Interest Income. Therefore, the existence and development of Non-Interest Income in the banking sector has its supportive reason. After the recent financial crisis, regulators are imposing new rules on banks such as "Dodd-Frank Wall Street Reform and Consumer Protection Act". The new rule eliminates the portion of Non-Interest Income for the commercial banks. Based on our result, with the accounting measure method, the bank's profitability defined by ROA and ROE may be negatively affected by the new elimination. This negative impact would be more obvious for large size banks.

**Appendix:**

Table 1: Panel A; Summary statistics, 2000 - 2006

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	13484	0.010364	0.00575	-0.04189	0.028267
roe	13484	0.118015	0.071522	-0.8455	0.333154
non_intere~e	13484	0.213619	0.119354	0.017019	0.745542
size	13484	13.22113	1.314347	11.93146	18.83007
capital	13484	0.09038	0.028883	0.024727	0.204433
loans	13484	0.660527	0.130907	0.252398	0.902365
deposits	13054	0.793737	0.098544	0.323367	0.916444

Table 1, Panel B; Summary statistics, 2007 - 2010

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	3963	0.001102	0.014338	-0.04189	0.028267
roe	3963	-0.0073	0.235138	-0.8455	0.333154
non_intere~e	3963	0.229567	0.13839	0.017019	0.745542
size	3963	14.14174	1.237378	11.93146	18.83007
capital	3963	0.087262	0.031471	0.024727	0.204433
loans	3963	0.687662	0.123171	0.252398	0.902365
deposits	3963	0.777757	0.100486	0.323367	0.916444

Table 2:Panel A: Correlations, 2000 - 2006

	roa	roe	non_int	size	capital	loans	deposits
roa	1						
roe	0.8121*	1					
non_intere~e	0.0678*	0.0516*	1				
size	0.0512*	0.0685*	0.4203*	1			
capital	0.3303*	-0.136*	0.0130	-0.0496*	1		
loans	0.008	0.1208*	0.1768*	-0.0825*	-0.2386*	1	
deposits	-0.0062	0.0482*	-0.3705*	-0.5080*	-0.1197*	0.1718*	1

NOTES: \* 5% significance level

Table 2, Panel B: Correlations, 2007 - 2010

	roa	roe	non_int	size	capital	loans	deposits
roa	1						
roe	0.8363*	1					
non_intere~e	0.2036*	0.1599*	1.0000				
size	0.0083	0.0136	0.3159*	1			
capital	0.4141*	0.3492*	0.1388*	0.1425*	1		
loans	-0.1040*	-0.0779*	-0.3496*	-0.2212*	-0.1737*	1	
deposits	-0.1257*	-0.0946*	-0.3191*	-0.4398*	-0.2490*	0.2663*	1

NOTES: \* 5% significance level

Table 3  
2000-2006 Linear Regression results

VARIABLES	(1)	(2)
	roa	roe
non_interest_income	0.0037*** (0.001)	0.0401*** (0.008)
size	0.0004*** (0.000)	0.0048*** (0.001)
capital	0.0734*** (0.002)	-0.2437*** (0.032)
loans	0.0044*** (0.000)	0.0544*** (0.005)
deposits	0.0057*** (0.001)	0.0651*** (0.009)
Constant	-0.0099*** (0.001)	-0.0198 (0.014)
Observations	13,054	13,054
R-squared	0.1310	0.0389

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4

Regression of ROA with independent variables (2000-2006)

(1) Banks with asset less than 1,000,000,000

(2) Banks with asset more than 1,000,000,000 but less than 10,000,000,000

(3) Banks with asset more than 10,000,000,000

	(1)	(2)	(3)
VARIABLES	roa	roa	roa
non_interest_income	0.0025*** (0.001)	0.0060*** (0.001)	0.0091*** (0.002)
size	0.0002** (0.000)	0.0003 (0.000)	0.0001 (0.000)
capital	0.0757*** (0.003)	0.0549*** (0.006)	0.0701*** (0.011)
loans	0.0041*** (0.000)	0.0046*** (0.001)	0.0112*** (0.002)
deposits	0.0066*** (0.001)	0.0025* (0.001)	0.0074*** (0.002)
Constant	-0.0082*** (0.002)	-0.0048 (0.003)	-0.0122* (0.006)
Observations	10,273	2,137	644
R-squared	0.1295	0.1020	0.2513

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 5

Regression of ROE with independent variables (2000-2006)

(1) Banks with asset less than 1,000,000,000

(2) Banks with asset more than 1,000,000,000 but less than 10,000,000,000

(3) Banks with asset more than 10,000,000,000

	(1)	(2)	(3)
VARIABLES	roe	roe	roe
non_interest_income	0.0349*** (0.010)	0.0532*** (0.016)	0.0760*** (0.021)
size	0.0038** (0.002)	0.0026 (0.002)	0.0002 (0.004)
capital	-0.2168*** (0.037)	-0.4844*** (0.069)	-0.1480 (0.133)
loans	0.0517*** (0.006)	0.0520*** (0.014)	0.1136*** (0.022)
deposits	0.0703*** (0.011)	0.0259 (0.018)	0.1057*** (0.025)
Constant	-0.0113 (0.024)	0.0634 (0.040)	-0.0229 (0.073)
Observations	10,273	2,137	644
R-squared	0.0315	0.0554	0.0976

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1



Table 6  
2007-2010 Linear Regression results

	(1)	(2)
VARIABLES	roa	roe
non_interest_income	0.0187*** (0.002)	0.2399*** (0.037)
size	-0.0013*** (0.000)	-0.0147*** (0.003)
capital	0.1830*** (0.009)	2.5595*** (0.171)
loans	0.0011 (0.002)	0.0274 (0.030)
deposits	-0.0029 (0.002)	-0.0052 (0.041)
Constant	0.0008 (0.004)	-0.0919 (0.070)
Observations	3,963	3,963
R-squared	0.2037	0.1402

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7

Regression of ROA with independent variables (2007-2010)

(1) Banks with asset less than 1,000,000,000

(2) Banks with asset more than 1,000,000,000 but less than 10,000,000,000

(3) Banks with asset more than 10,000,000,000

	(1)	(2)	(3)
VARIABLES	roa	roa	roa
non_interest_income	0.0162*** (0.003)	0.0247*** (0.003)	0.0216*** (0.005)
Size	0.0046*** (0.001)	-0.0023*** (0.001)	-0.0020** (0.001)
Capital	0.2280*** (0.013)	0.1725*** (0.015)	0.0510** (0.026)
Loans	0.0067*** (0.003)	-0.0001 (0.003)	-0.0101* (0.005)
Deposits	0.0046 (0.004)	-0.0019 (0.004)	-0.0038 (0.006)
Constant	-0.0910*** (0.014)	0.0153 (0.009)	0.0310** (0.015)
Observations	2,104	1,559	300
R-squared	0.2587	0.2168	0.1053

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 8

Regression of ROE with independent variables (2007-2010)

(1) Banks with asset less than 1,000,000,000

(2) Banks with asset more than 1,000,000,000 but less than 10,000,000,000

(3) Banks with asset more than 10,000,000,000

	(1)	(2)	(3)
VARIABLES	roe	roe	roe
non_interest_income	0.2609*** (0.054)	0.2623*** (0.056)	0.2162** (0.098)
Size	0.0821*** (0.018)	-0.0360*** (0.009)	-0.0145 (0.010)
Capital	3.1352*** (0.245)	2.4205*** (0.271)	1.2847*** (0.488)
Loans	0.1320*** (0.042)	-0.0228 (0.048)	-0.2022** (0.083)
Deposits	0.1111* (0.060)	-0.0150 (0.063)	-0.0013 (0.096)
Constant	-1.6018*** (0.256)	0.2664* (0.153)	0.1641 (0.202)
Observations	2,104	1,559	300
R-squared	0.1776	0.1450	0.0971

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

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