

The relationship between risk and return and banks income structure

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Abstract

The present study investigates the effect of interest and non-interest activities on return and the risk of some Iranian banks over the period of 2006-2011 using regression analysis. The paper uses three independent variables where the first one is interest income and the second one is the commission fee income and the third one is obtained as a difference between other non-interest incomes with commission fee. There are three dependent variables including risk, return on investment, and return on equity, leading us to set up three regression analysis. The result of the study indicates that interest based activities have a meaningful relationship only with bank return. And the non-interest based activities have a meaningful relationship with bank risk and return on equity.

Keywords: Asset, investment, return, commission, bank.

Introduction

Banks as financial institutions and services play a role in determining the flow of money and create wealth in society; therefore, they have a special place in the economy of any country. Effective actions can make an important impact on the development of different economic sectors and increase the quality and quantity of the products. Banks play the most basic role in financing economic sectors in the economy, and with Complex transactions and the development of financial markets and increased competition in traditional activities, including at-

tracting funds from investors and lending of deposits and service fees, every aspect of the activities of both public and private banks is becoming much more extensive. So Banks are constantly trying to allocate a greater share of the market demand, implementing policies consistent with market demand and diversify services.

In the economies of all countries, especially those in developing countries, banks are considered as one of the pillars of economic development. In order for banks to be able to play their role in society and the economy, a good plan is needed to be prepared for them.

Before 1970s and 80s, banks limited their activities and did only traditional activities such as lending, paying bills, and such like. Banks were, in fact, considered as brokers' activities of which were bound for the area around them and at that time, there was no competition between them. Nowadays, banks increased their competition, and they were subsequently broadening the scope of their actions. They become involved in new activities including non-interest activities, e.g. fees, commission, and investment activities. In the late 1970s and 80s, banks sought to follow non-interest actions. Thus, the non-interest income was only 19% of the total revenues in commercial banks in America in 80s. While it rose to 43% in 2001 and increased from 26% to 41% in Europe in the 1990s (Young & Roland, 2001).

Given that most of the financial operations, facilities, and investment funding are done by the banking system in most countries, so banks are regarded as the engines of production, investment, and employment services; also they are tools of economic development. These institutions should pay enough attention to the issue of investment and risk.

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Due to the constant changes in environmental factors and economic systems, many risks affect the economic structure of banks every day; therefore, the ability to control them can be influential in the development of this business in every country.

Review of related literature

In the recent years, many banks all over the world has been expanding their portfolio by offering non-traditional services and activity fees, including fees associated with the operation of an exchange bought and sold, opening fees, renewal or revocation of domestic credit, charge transfer funds from customers and opening a wage and the extension of International credit (exports-imports), fees related to the issuance of financial guarantee and dollars, buying and selling securities commissions, fees of maintenance of stagnated accounts, as well as the fees of the services concerned with business advisory affairs raised; subsequently, the non-interest income, fees and other revenues have grown dramatically.

Bank Income Structure

Operational revenue

This kind of income generates from the differentials in interest rates paid to depositors and the interest rate obtained from facilities.

Regarding the crucial part of banks (collection and distribution of funds in the form of credit), this income is one of their principal sources of income. This kind of income is generated from the most significant activity of the banks, i.e. intermediation of funds.

Revenue from fees

The growing competition at the International level has shifted business managers' concern toward maximizing revenue from services. The Basel rules and the strong emphasis on the capital adequacy ratio decreased tendency toward holding risk-taking assets such as facilities. Therefore, banks resorted to the other ways to receive fees, taking into account the types of risks. Some of the charge resources of banks include fees associated with the transfer of customer funds, guarantee fees related to the issuance of currency and dollars, buying and selling securities commissions, financial advisory fees and commissions on keeping clients' documents and securities.

Research Background

Brewer (1989) is one of the economists who examined the relationship between bank holding com-

pany risk and nonbank action. Indeed, the study focused on the use of particular interest rate derivative instruments to offset the inherent interest rate risk in fixed rate lending.

An interest rate swap is a financial contract, which allows one party to trade a set of interest payments (state, fixed rate) for another set of interest payments owned by another party (state, floating rate). Brewer (1989) investigates the significant differences in the economic characteristics of banking organizations, which implement derivatives relative to those that do not. The results suggested that the performance of users was not better or worse than that of nonusers.

Young and Roland (2001) considers product mix and earnings volatility at commercial banks by investigating the evidences from a degree of total leverage model. They performed an empirical study on the US banks and argued that the trend to off-balance sheet activity could increase bank profits volatility because of high competitive rivalry in these markets.

In another investigation, Stiroh and Rumble (2006) find that interest income can be correlated with non-interest income because of the possible cross-selling of different products to the same customer. They also believe that when clients obtain financing from banks, they also worry about how to repay it and an easy retail payment service can facilitate repayment and attract more customers to borrow money from banks. Marcucci and Quagliarello (2006) investigated the relationships between credit risk and the business cycle for financial stability and risk management purposes. They hold that many previous studies generally neglected the presence of asymmetric effects, i.e., the likelihood that the influence is dissimilar over various phases of the business cycle. They tried to use threshold regression models with two or more regimes at both the aggregate and individual levels to exploit a unique dataset on Italian bank borrowers' default rates. The study tried to figure out whether the relationship between the business cycle and credit risk was subject to regime switches, determining endogenously the thresholds. The results recommended that the effect of the business cycle was more pronounced when starting credit risk levels were higher, and also during the downturns.

Discrete regime switching models may disclose unsatisfactory for dynamic credit risk management. For instance, Lucas and Klaassen (2005) explain that the combination of an insufficient distinction between multiple economic regimes as well as a lacking identification of these regimes could weaken

the capability of these tools to discriminate between default regimes. They also point out that implied asset correlations and default rate volatilities were biased towards zero and implausibly low.

Leaven and Majoni (2003) conduct another study to investigate the effects of macroeconomic factors on the banking industry and concluded that macroeconomic factors play an important role on increasing credit risk in the market.

Kraft and Galac (2007) conduct a study in Croatia and examine the deposit interest rates, asset risk and bank failure in that country. They, in fact, scrutinized the aftermath of deregulation in Croatia, which incorporated rapid growth of both deposits and deposit interest rates, followed by numerous bank failures. They used panel regression techniques and found some evidence of “market-stealing” via higher deposit interest rates. They connected high deposit interest rates to bank failure using Logit models. High deposit interest rates were a reliable signal of risk-taking and when supervisory capabilities and powers were weak, deposit interest rate regulation could be worth considering.

Liadaki and Gaganis (2010) attempt to investigate whether the stock performance of EU listed banks was associated with their efficiency. They selected a sample consisting of 171 banks operating in 15 EU markets over the period 2002–2006. They first used a stochastic frontier analysis to evaluate the cost and profit efficiency of the banks, while controlling environmental factors. The results indicated that the change in profit efficiency had a positive and significant effect on stock prices; however, there was no association between changes in cost efficiency and stock returns.

Ho (2012) investigates the impacts of market reform on consumers and state commercial banks in China. He jointly estimated a system of differentiated product demand and pricing equations under alternative business structures and reported some mixed results. Although there was a welfare gain from more consumers participating in the deposit market, the existing consumers suffered welfare losses because of declining service quality. The welfare impacts were unevenly distributed, with losses skewed toward inland provinces and particular consumer groups. There was no clear evidence that the pricing of banking services had become more competitive after the reform, and such pricing remains subject to government intervention.

This is an empirical study attempting to measure the effects of three important factors of interest

and no-interest income on risk and return on investment, return on equity structure in the banking system. The study first sought to present details of our regression models; sections 2 and 3 report the results of applying three regression models. Finally, concluding remarks are presented to summarize the contribution of the paper.

Methodology

The present study tries to examine the impact of interest and non-interest income on the banks risk and return. To this end, 6 governmental banks and 11 private banks were chosen as the samples of the study. It is well worth mentioning that the study is limited to a 5 year time period, i.e. 2006 to 2011. To extract the necessary information, official reports including statement and balance sheet were used and the data were analyzed applying some software packages. The study utilized three linear regression models. The first one is as follows:

The relationship between income structure and risk of banks:

$$RISK = \beta_0 + \beta_1 NII + \beta_2 COM + \beta_3 NET + u \quad (\text{Model 1})$$

The relationship between income structure and return of banks:

$$ROI = \beta_0 + \beta_1 NII + \beta_2 COM + \beta_3 NET + u \quad (\text{Model 2})$$

$$ROE = \beta_0 + \beta_1 NII + \beta_2 COM + \beta_3 NET + u \quad (\text{Model 3})$$

In these regression models:

B: coefficient	COM: net revenues to total revenues of bank fees
ROE: return on equity	ROI: return on investment
RISK: Risk Bank	NII: Net interest income to total banking income
u: disturbing	NET: Net other non-interest income minus revenues to the total revenues and bank fees

Independent Variables

Net interest income to total bank revenues (NII)

One of the ways through which banks can earn an income is the banking activities of interest, such as, long-term deposits received from customers, investments in various businesses, and provision of long-term facilities for clients.

NII is obtained from the ratio of net income of interest to the total net banking income.

Net fees revenues to total revenues in bank (COM)

Banks generate this revenue through services offered to the clients. Net fees revenue is obtained from the ratio of net income to the total net income of banking fees.

Net non-interest income to total income minus income from bank fees (NET)

This type of income is another way for banks to earn money, and it is earned through activities such as: letter of credit services, bank guarantee services, electronic banking services, foreign exchange, commission on keeping clients' documents and securities, issuance of checks, Etc. NET is obtained from the ratio of net non-interest income minus COM to net banking income. In this study, NET and COM variables are shown as non-interest revenues. Since COM variable is greater than the NET, the former was more focused on while concluding.

$$R = R_1 + R_2 = \frac{ROA}{SD ROA} + \text{Average} \left(\frac{\text{Total Equites/Total Asset}}{SD ROA} \right) \quad (\text{Model 6})$$

Where R_1 is the risk of portfolio, R_2 is the leverage risk, ROA is return on assets, and SDROA is standard deviation of return on assets.

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Research Hypotheses

In line with what has been discussed so far as the main content and purpose of this study, the following three main hypotheses are raised, each of which is comprised of two sub-hypotheses:

1. There is a significant correlation between the bank earnings structure and RISK.

1.1. There is a significant relationship between (NII) and (RISK).

1.1. There is a significant correlation between (COM, NET)) and (RISK).

2. There is a significant correlation between the bank earnings structure and ROI.

2-1. There is a significant relationship between (NII) and (ROI).

2-1. There is a significant correlation between (COM, NET)) and (ROI).

3- There is a significant correlation between the bank earnings structure and ROE.

3-1. There is a significant relationship between (NII) and (ROE).

Dependent variables

The study includes 3 dependent variables, the nature of two variables is returned and the nature of the other one is risky.

Investment Return (ROI)

This variable shows the rate of return to shareholder investment banks, and is calculated as follows:

$$ROI = \frac{\text{Revenues Condominium}}{\text{average of total facilities granted}} \quad (\text{Model 4})$$

Return on Equity (ROE)

This variable shows the rate of return to equity of banks, and is calculated as follows:

$$ROE = \frac{\text{Net profit}}{\text{Average equity}} \quad (\text{Model 5})$$

Bank Risk (RISK)

Risk that is based on the model proposed by Lepetit, et al. (2008) is calculated as follows:

3-1. There is a significant correlation between (COM, NET)) and (ROE).

Models are estimated as the table 1 below.

Table 1. The results of hypothesis testing

T-value	(11.976)	(-0.719)	(3.061)	(0.359)
P-value	(0.000)	(0.474)	(0.003)	(0.720)
Standard deviation:	(1.083)	(1.150)	(2.192)	(0.652)

$$D-W=1.654 \quad F=521.06 \quad S.E. =5.959$$

As the results show, the first independent variable (NII) as well as the third one (NET) do not represent significant value, the second variable (COM) represents statistically significant value, however. Durbin-Watson is within the acceptable value and F-value is highly relevant, ultimately R^2 is 0.95, which means the model can explain 95% of the changes on RISK.

$$ROI = 0.026 + 0.104 NII + 0.011 COM + 0.071 NET$$

$$\text{T-value: } (2.496) (9.748) (0.735) (5.872)$$

$$\text{P-value: } (0.014) (0.000) (0.463) (0.000)$$

$$\text{Standard deviation: } (0.010) (0.010) (0.015) (0.012)$$

$$D-W=1.691 \quad R^2 = 0.837 \quad F=21.873 \quad S.E. =0.131$$

The results show that the first independent variable (NII) is statistically significant but the second variable (COM) does not represent significant value and the third variable (NET) is statistically significant. Durbin-Watson is within the acceptable value

and the F - value is relevant. R^2 Is 0.83, which means the model can describe 83% of the changes on ROI.

$$ROE = 0.128 + 0.047 NII + 0.049 COM + 0.051 NET$$

T-value: (10.196) (1.936) (1.963) (10.689)

P-value: (0.000) (0.056) (0.053) (0.000)

Standard deviation: (0.012) (0.024) (0.025) (0.004)

D-W=1.306 $R^2 = 0.762$ F=13.854 S.E. =0.129

The results of the regression estimation for the second model immediately show that all statistical values are significant. In other words, all t-student values are significant when the level of significance is five percent. In addition, Durbin Watson value is located within an acceptable limit and F-value indicates the whole regression estimation is valid. Finally, $R^2 = 0.76$, which means the model could explain 76% of the changes on ROE.

The summary of the test results have been indicated in table 2.

Table 2. The results of the regression estimation for the second model

Hypothesis	Independent Variables	Regression Analysis		Results
		$\beta = 0$	$\beta \neq 0$	
First	NII	+	-	Reject
	COM, NET	-	+	Accept
Second	NII	-	+	Accept
	COM, NET	+	-	Reject
Third	NII	-	+	Accept
	COM, NET	-	+	Accept

Conclusions

The present paper, presented an empirical study to measure the results of three important factors of interest income, no-interest income as well as commission- based income on risk, return on equity and return on investment and construction in the banking system of Iran. The study was limited to the time period 2006 to 2011. It also sought to investigate the effects of the three mentioned variables on three different variables, using regression analysis. The study yielded the result that interest based activities (NII) did not have a significant effect on the banks' risk, but this variable had significant effects on the return on equity and return on investment in Iranian banks. And the other independent variable, i.e. no-interest based activities (COM, NET) had significant effects on the risk and return on equity of banks, but

this variable did not have a meaningful effect on return on investment of banks.

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