The analysis of the existence of the hypothesis of adverse selection on the relationship between off-balance sheet items and the bank's risk

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ABSTRACT

Balance sheet itself does not specify and show all the activities that a bank pays. Because banks can do many swap contracts and obligations, exchange, and commitments Outside of the balance sheet. To such activities and exchange that will not appear on the balance sheet, are saying off-balance sheet activities. These items are usually reported in the notes to the attached financial statements. One of the reasons for conducting the activities of off-balance sheet by the banks is the interest rate risk coverage. However, the use of these tools for risk management leads to multiple different sorts of risk and that the overall judgment about the outcome of the risk management of the off-of-balance sheet activities has met with ambiguity. The present research has examined the relationship between risk and the items of off-balance sheet under the hypothesis of Adverse selection with the use of the Iran's nine commercial bank data. The results show that this hypothesis isn't able to respond off- balance sheet activities behaviour in Iran.

1. Introduction

The banks all around the world play an important and essential role in business and economic activities and to the various borrowers and investors, they face with a variety of monetary and financial markets and therefore they constantly face with various risks.

So that it may be entering a market or leaving it, reduce or increase one or more type of risk. [10].

The first important factor in the recent financial crisis was the process of making the financial tools,

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securitization and financial engineering and risk management techniques.

The experience of the recent crisis well teaches that the activities outside the balance sheet at the same time creates a new duct to transfer liquidity boost and part to the economic activities, can be a fatal role also in the destruction of the real economy and it is necessary to embed an adequate oversight in all stages of the use of these items [9].

In this study, by using data of 9 Commercial Banks, influences of these items on the risk have been investigated.

2. Research Literature

Balance sheet itself does not specify and show all the activities that a bank pays. Because banks can do many swap contracts and obligations, exchange, and commitments Outside of the balance sheet. To such activities and exchange that will not appear on the balance sheet, are saying off-balance sheet activities. These items are usually reported in the notes to the attached financial statements [9].

To express more precisely, a stylus or an activity is an asset of off- the balance sheet, if either it is transferred to the balance sheet of the assets section or effect of a possible happen, Or in the case of profits and malicious find as an income realization.

In contrast, an activity is a debt of off- balance sheet, if it is either transferred to the off balance sheet liabilities section or possibility of something or an event, or to be shown or in the form of profit and loss or income statement. Off-balance sheet activities, including fee related activities such as: guarantee, letters of credit, standby letters of credits, line of credit, foan commitment, OTC-Over the counter derivatives, forwards, futures, options, interest Rate swaps [8].

There are several assumptions about the effect of off-balance sheet activities on the Bank's risks? Berger & O'Dell studied the relationship between off-balance sheet activities and risks in the financial institutions and carried them out in 8 hypotheses. According to forecasts of these hypothesis, they can be divided into four general categories.
1-Possitive relation
2-Negetive relation
3-Neutral relation

Internal investigations:

It has not been done a lot of domestic research on this topic, perhaps because of its limitation of off-balance sheet activity in Iran.

Modares and TaleiFard[10] by using data from 10 public and private commercial banks ranged from 2002 to 2008 and the relationship between off-balance sheet activities and the bank's risk total index showed that this relationship was significant, and unlike traditional activities, an activity outside the balance sheet increase the risks of banks.

External Research

Bochokoa reviews the Credit risk management in the Czech's banking system, in order to quantify the expected losses used for credit risk models. The results show that credit risk is well managed.

Calms and Theort have reviewed the relationship between OBS, risk and the efficiency in the Canadian Banks.and indicated that there were structural failures in 1997.For 1988-1996 this relationship is negative but for 1997-2007 no-interest incomes of OBS has no effect on banks returns.Kabirhasan reviews the risk of off-balance sheet activities of America's big banks.Off-balance sheet activities, On the one hand they have the advantage of diversification, which reduces the risk. But on the other hand, they increase the risk of the leverage effect.

The results showed that: Firstly: reducing diversification effect exceeds on the effect of being a growing financial risk, and finally the overall risk of banks reduces. Secondly, the activities outside the balance sheet do not impact on the systematic risk except the credit component warranties, which reduces the systematic risk. Doran and Lozano have addressed the hypothesis of adverse selection in the 27Europe Union countries. Its results show that the hypothesis of adverse selection is established for 15 old Member of this Union, but this hypothesis is not able to explain the other 12 members.To explain the behavior of the 12 new members, they have used the market theory.

3. Compound Relation

In general, reasons for the growth of off-balance sheet activities can be summarized and can be outlined as follows:

Reducing the profit margins of traditional banking methods

Banks interest in saving the capital and avoiding the requirements of the reserve

Deregulation

Increasing the fluctuation of securities price that result in increase in demands for risk management.

Technological developments that led to the development of new products and new forms of intermediation [8].

Out-of-balance sheet activities in Iran just include the opening of the different warranties, managed funds and account documents and compared with the advanced countries is quite a bit of growth.

Since the major activities of the out-of-balance sheet used in second hand markets and marketing, lack of transparent financial markets, ambiguity in the concept of interest rate cause the non-proliferation of these markets. The state of the economy is another reason for low growth.

Public banks even though have the country's banking market, but in comparison with their assets, their activities are not enough.

4. Adverse Selection Hypothesis

In classical microeconomic topics and analyzing the behavior of economic units, there is a basic assumption about the idea of the invisible hand function or existence of complete information about the specifications of the item transitioned in the market.

But such a reckoning in the real world may not be established, therefore, definitive analysis on microeconomics change and uncertainty analysis takes its place. Lack of information leads us to a discussion of asymmetric information. This lack of information affects the wealth of uninformed side. With this scenario, the market and the process of achieving the balance in the market will be affected.

Akerlof questioned the above principle labeled as lemon role, by considering the existence of the asymmetric information between dealers and sellers in reality that weakened most of microeconomical issues [11].

Based on his idea, the existence of asymmetric information causes the bad products get out the good products from the market and balance in the market is not the kind of balance that is created in the classics of supply and demand equality.

This subject has led to economic experts to formulate the scope of economics, patterns and provide different theories and provide different views in the markets with asymmetric information.

Adverse selection, anti-elected or negative term used in economics, insurance industry, applies in the statistics and risk management [5].

This term refers to the process of a market where, as a result of asymmetric information between the seller and the buyer, the wrong results comes into the market.

In this case the possibility of choice of bad products or customers is more.

For example, when a bank to do banking, set a unit price for all customers, chances are more for customers who accept the price and have more activity volume.

The cause of this issue is due to the Bank's incomplete information about current clients and setting different prices [12].

Based on the theory of adverse selection, the theoretical relationship between the bank and the client in the market is this way: the banks are the neutral risk factor and with complete information, whiles on the other hand, the investor that purchased the guaranteed assets by the Bank, plays the role of incomplete information and risk aversion who is attempting to avoid a bad choice [1].

The threats of failure of the markets are possible when there are assets or publishers, that don't have a high quality or considered by investors as a safe investment.

Table 1. The issue of adverse selection between the banks and the counterparts on the market activities of the out-of-balance sheet

banks counterpart in OBS	banks	factors
With less information and risk aversion	More information and risk-neutral	features
Avoiding lemon(asset with low quality from low quality bank)	Doing OBS	goals

No deal will happen, if investors consider investment risky. To avoid the lack of transaction, the behavior of the banks and investors will have these features:

Firstly, the balance sheet of activities that are provided and introduced by the Banks, are highly valued for the risk-averse sides, because it is safe and has high liquidity.
As a result of activities outside the balance sheet, the bank's risk position in terms of quality and liquidity of balance sheet assets will worsen.

This is a subject that the assets outside the balance sheet relative to the assets of the balance sheet are less risky verified by the experimental results.

Secondly, as a result of being probable of off-of-balance sheet activities, when the Publisher, show that banks is suggesting low probability of bankruptcy and chances of bankruptcy and thus do not take low risk potential claims, in this case investors will rate more valuable OBS items. By combining these two features, taking into consideration the fact that numerous risks involved in the definition of the bank's risk position, the result will be that the activities of the off-of-balance sheet has a relation with several different types of risks.

In the case of credit risk and liquidity, and this is positive. but may have a negative relationship with other risk criteria and with other risk measures, especially in the case of the risks that show how much the Ban k's portfolio is safe or how much the bankruptcy probability is near or in the other word or how likely it is near bankruptcy [4].

5. Research Methodology

In this research, we will review the relationship between the balance sheet activities and the Bank's risk position among 9 commercial banks of Iran (Melli, Sepah, Tejarat, Maskan, Keshavarzi, Refah, Post bank, Mellat, Saderat); In particular, we want to test whether or not this relationship is explained based on the theory of adverse selection.

In this hypothesis to explain the bank's risk position, different types of risks are used.

Under these assumptions, whatever the bank's risk general position is better, more investors will value Contingent claim of bank's OBS and therefore the Bank's motivation will increase for entering into OBS. Therefore, better the quality of assets that banks use for OBS, more investors will value this assets, so if the quality of assets that the Bank uses for the balance sheets increase, investor's asset value will be increased.

This is an incentive for banks to use assets with high liquidity and low risk on their balance sheet, so adverse selection hypothesis predicts that the balance sheet has a positive relationship with credit risk and liquidity but its relationship with the general level of risk and the risk of failure is a negative.

According to Doran-Lozano model, our model will be estimated to the following form:

$$A\_RISK_i = \alpha + \beta . A\_OBS_i + \sum_{h=1}^{M} \gamma_h . A_{Z_{hi}} + u_i ,\qquad(1)$$

In this formula we have some parameters, for example:

A_RISK : different kinds of Risk

OBS : The volume of off-balance sheet activities

$A_{Z_{hi}}$: Control variable

According to the theory of adverse selection, it is expected that Risk of failure and an overall measure of risk and overall risk criteria have a negative relationship with balance sheet.

The risk of failure is displayed by the standards Z, which represents the probability of failure and bankruptcy of the Bank and thus be defined:

$$A\_ZS_i = \frac{A\_EA + A\_ROA_i}{\sigma ROA_i}\qquad(2)$$

A_ROA_i : Average bank returns

A_EA: Average return on equity

σROA_i: The standard deviation of returns

Since ZS has positive relationship with standard measure of profitability and capitalization and it has negative relationship with profits non-stability

We can mention that a measurement of financial stability and a measurement for the probability of

bank failures are reversed. The higher ZS will show an excess of the stability of banks and the Bank's overall risk being less.

To test the stability, we use another alternative or successor i.e. the average value of equity to total assets ratio.

In addition, two new elements are inserted into the analysis: The first alternative (ZS1) is to risk failure and its value is equal to equity ratio divided by the standard deviation of the asset efficiency, it means that:

The next element (ZS2) is equal to the ratio of assets returns divided by the standard deviation of returns

$$A_{ZS2_i} = \frac{A_{ROA_i}}{\sigma ROA_i} \tag{3}$$

According to mean-variance approach of portfolio management discussion, a ZS element generally considered as a measure of bank risk portfolio and represents the Bank's general risk. Adverse selection hypothesis testing requires testing the relationship between OBS, credit risk and liquidity risk.

Credit risk (A_CR) is equal to the average of the ratio of loan loss allowance to total assets.

Liquidity risk is equal to the average ratio of liquid assets to total assets.

The table below shows the expected mark of variables on the relationship between the OBS and different type of risks under adverse selection.

First, a large number of variables have been entered in the model to control the potential differences between the sizes of the banks.

But due to the existence of linear relation between variables, control variables are only limited to average total assets.

Although the existence of the rest of the control variables, regardless of the effect of the collinear also does not change results.

6. Hypotheses

The research hypotheses including:

OBS has a significant effect on risk.

OBS has a significant impact on the liquidity risk.

OBS has a significant impact on the credit risk.

OBS has a significant effect on the risk of financial distress.

7. Results

In the present research by using data from 9 commercial bank of Iran, the relationship between the risk (Credit, liquidity, distress and portfolio risk) and OBS is reviewed.

Due to the limitations of the data, Panel model approach is used for estimating the relationship.

To choose between the pooled least squares and least squares variable compilation of imaginary chaw test is used.

For choosing between fixed effects and random effects, Houseman test is used in testing. Assumptions are as follow:

Zero hypotheses: random effect method is more efficient.

The first hypothesis: A fixed effect method is more efficient

If the test statistics is greater than the critical value, the zero hypotheses can be rejected.

The final result of the test is displayed in Table2.

Table 2. Final Results

Credit risks	Liquidity risk	Portfolio risk	zs2 Risk of distress	zs1 Risk of distress	
3.09 (0.65)	1.2- (0.32)	20.11 (0.18)	1.88- (0.48)	0.0001- (0.73)	variableOBS
0.003- (0.56)	0.003- (0.007)	149678 (0.22)	0.16 (0.59)	4.68- (0.92)	Control variable
F=112 R2=0.82 DW=1.77	F=400 R2=0.76 DW=2.17	F=96.68 R2=0.78 DW=2.19	F=83.26 R2=0.79 DW=1.72	F=0.94 R2=0.68 DW=2.08	

Hypothesis one:

The null hypothesis is not rejected, therefore, the OBS does not have a significant effect on portfolio risk.

Hypothesis two:

the null hypothesis is not rejected. It means the balance sheet does not have a significant effect on

liquidity risk. But the size of bank is effective on the bank's liquidity risk.

Hypothesis three:

The null hypothesis is not rejected. It means the balance sheet does not have a significant effect on Credit risks.

Hypothesis four:

The null hypothesis is not rejected. It means OBS does not have a significant effect on Risk of distress. Therefore, the result of the performance of OBS items in Iran does not match with adverse selection hypothesis.

8. Conclusion

Type and the nature of the risks associated with activities on the items of outside of the balance sheet and balance sheet items are different. In balance sheet items, output and outflow of current liquidity in terms of amount and time are quite specific and manageable, but because of being unpredictable of off-balance sheet items, the Bank face with the worst case of mandatory liquidity flow or forced cash flow.

In case of credit risk, non-payment of off-balance sheet items by the customers and client will be entered to the precarious chapter, but in the case of facilities as one of the items in the balance sheet, the amount firs will enter over-due chapter then deferred chapter and eventually, after eighteen months of doubtful can be reflected in precarious chapter.

OBS are not imported in the in conventional measures of capital adequacy standards, that the ratio of capital to assets are calculated based on the items in the balance sheet. So the capital adequacy standards that is measure of banking network health degree, do not reveal the true extent of the danger that banks are receptive. So shareholders accept the incorrect image of bank and this damages to the health of the banking system.

On the other hand, market analyst believe that banks won't receive the risk price that the pay about off-balance sheet items.

The intensity of the competition in bank fee network activities sometimes archives to 0.25 percent, In the case of good performance guarantee and 16% in the case of exchange. As long as won't be the minimum prices for such transactions, competition severely reduces the prices.

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