Deposit Insurance and Bank Risks in Vietnam

DAO Thanh Binh

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Abstract

The relationship between deposit insurance and banking risks has been widely studied, but has been the subject of relatively few empirical studies, especially for Vietnamese banking system. This research contributes to the existing literature by exploring the effect of deposit insurance on banks’ risk taking in Vietnam. The paper employs 7 bank specific variables and 2 macroeconomic variables, as well the premium paid by banks. The results suggest that deposit insurance does impact banks’ risk taking incentive but it has different effects on each type of risk. It is concluded that credit, default and leverage risk are found to have a negative relationship with deposit insurance, while asset risk and deposit insurance have a positive relationship.

Keywords: deposit insurance, credit risk, default risk, leverage risk and asset risk.

1. Introduction

The Great Depression during 1929-1933 raises the need to develop a financial institution which is specialized in protecting and maintaining the confidence of depositors and coordinating with government agency to preserve financial system stability. The first deposit insurance scheme sponsored by the federal government was officially introduced in the US in 1933 with the establishment of the Federal Deposit Insurance Corporation. However, it was not until the last two decades that deposit insurance was studied thoroughly and comprehensively. The financial crisis that started in 1997 is one of the most significant economic events over the last 50 years. The waves of systemic banking crises have affected most of the countries around the world, regardless of developing or developed countries. World Bank (2001), using increases in the stock of public debt to GDP in the crisis year as a measure, figures out that total fiscal cost of Thailand and Korea during 1997 banking crises surpassed 30 percent of total GDP, while in Indonesia it is 50 percent of GDP.

Nevertheless, the cost of financial crises does not include fiscal cost only. It spreads out to many aspects of the economy. During the crisis, many banks, including those which were considered to be sound, have to face liquidity problem. Depositors may lose access to their funds and borrowers can lose access to credit. Some banks are forced into bankruptcy and investors lose their market confidence.

The goal of achieving and maintaining the health and soundness of financial institutions and system has become a top priority for policymakers. A “safety net” is established in almost every country to limit the likelihood of financial breakdown and its possible consequences. This safety net consists of deposit insurance system, lender-of-last-resort at the central bank, procedures for investigating and resolving bank insolvencies, strategies for regulating and supervising banks and provisions for accessing emergency

1 FMT, Hanoi University, Km9 Nguyen Trai Street, Thanh Xuan, Hanoi.
Corresponding author: binhdtt@hanu.edu.vn
assistance from multinational institutions, such as the IMF (Demirguc-Kunt and Kane, 2002). Deposit insurance has always been considered an important part of the “safety net” in most countries. It has spread rapidly in recent years. According to the International Association of Deposit Insurers (IADI), an international organization established to contribute to the stability of financial systems by promoting international cooperation and to encourage wide international contact among deposit insurers and other interested parties, as of 31 March 2011, 111 countries have instituted some form of explicit deposit insurance compared to only 12 countries in 1974. Also, 41 countries are considering the implementation of an explicit deposit insurance system.

The primary mission of a deposit insurance scheme is to limit the risk of bank runs by guaranteeing that depositors receive some, or all, of their deposited funds with reasonable speed if their banks fail and become insolvent. It is supposed to reduce the likelihood and severity of bank runs during a financial crisis and thus can be a useful tool for governments to enhance the financial system and to protect depositors from huge losses by insolvent banks during crisis times. Moreover, deposit insurance can help to restore depositors’ confidence and promote financial intermediary development by increasing opportunities for small banks to compete with larger institutions for deposits as deposit insurance addresses the depositors’ concern about the fragility of small banks.

Despite the benefits of deposit insurance, it has also been subject to criticism. There has been a widespread consensus that because deposit insurance reduces the incentive of depositors to monitors banks, the existence of a deposit insurance scheme induces the insured banks to take excessive risks. This side-effect of deposit insurance is referred to as “moral hazard” problem, which indicates that banks tend to take on risks that can be shifted to a deposit insurance fund. Therefore, deposit insurance can eventually lead to the very problem (systemic bank failure) that they are supposed to solve. Moral hazard arises when bank offer high interest rates to depositors and at the same time make risky investments in order to earn high return to pay those high interest rate deposits. Both banks and depositors can engage in incautious banking activities, with the thought that whatever happens, their principals are still protected by deposit insurance.

Regarding the development of deposit insurance system in Vietnam, it has been 15 years since the introduction of deposit insurance. Compared with other developed countries, the function of Vietnamese deposit insurance system is still restricted. However, it is undeniable that ever since the establishment of the Deposit insurance of Vietnam in 1999, it has played in essential role in protecting the rights of depositors, improving public confidence and contributing to the soundness of the financial and banking system.

International research on deposit insurance has proliferated over the last two decades. However in Vietnam, despite the importance of deposit insurance, there is still a lack of studies on the impact of deposit insurance on the financial and banking system, more specifically, the relationship between deposit insurance scheme and bank risk taking activities. Most of the studies in this field only focus on theoretical part of deposit insurance, and lack of empirical evidence, hence not convincing enough. This research, using an empirical model, is targeted to develop a more complete study on the relationship between deposit insurance and banks’ risk taking in Vietnam. This study seeks to answer the question regarding the relationship between deposit insurance and banking risks, with the support of empirical evidence.
The paper is structured as followed: The first section introduces the main topic of the research, the necessity of developing an empirical study on deposit insurance in Vietnam and methodology of the research. Section 2 reviews the theoretical and empirical framework on deposit insurance and banking risks. This part aims to give a comprehensive background about deposit insurance, current deposit insurance policy both internationally and in Vietnam. Section 3 states the hypothesis and the model. Last section provides results, implications of this research, and conclusion.

2. Literature review

2.1. Theoretical framework on Rationale for Deposit Insurance

The main activities of banks in financial markets are taking deposits from customers and making loans to those who are in need of money, or investing in potential projects. However, lenders tend to make short-term deposits while borrowers prefer long-term loans for investment. This maturity mismatch is the primary cause of banks’ liquidity risks and it becomes a serious problem especially during financial crisis.

According to Diamond and Dybvig (1983), bank runs happen when depositors are afraid of losing their deposited amount, they find it best to withdraw their deposits prematurely if they expect others to do the same. This is due to the assumptions of first-come first-served basis and costly liquidation of the banks’ long-term assets. If all depositors rush to the banks and withdraw their funds, while the majority of banks’ assets are of long-term maturity, they might have to liquidate their long-term assets to meet the unexpected huge liquidity need, and eventually fail if they cannot meet the demand. On the contrary, if people believe that no panic will occur, only those who are really in need of money will withdraw their funds and those demands will be easily met by banks. Deposit insurance arises in this context. With the existence of a deposit insurance scheme, depositors believe that their funds are safe no matter what other people do; they will not rush to the bank to withdraw money prematurely. So banks do not have to liquidate their long-term assets to meet customers’ demand and therefore remain solvent.

Demirguc-Kunt and Sobaci (2001) notes that deposit insurance or deposit guarantee is a complementary element in the financial safety net used by governments to maintain stable banking system and protect small investors in case of bank failures. Deposit guarantee can exist either as explicit deposit insurance, which are formal schemes enacted through legislation or implicit deposit guarantee system if there is no such formal schemes.

Likewise, Schich, S. (2009) argues that without a financial safety net, a simple rumor of financial institutions having solvency or liquidity issues might cause depositors to withdraw their deposits before maturity and could potentially turn into a self-fulfilling full blown crisis. He further points out that deposit insurance is necessary as it tends to provide a greater of public confidence at the onset of a crisis, thus reduce the risk of leading to a severe financial crisis.

Market discipline increases the information available to the public by encouraging the release of timely information detailing a company's assets, liabilities and general financial information. This reduces the uncertainty and promotes the function of the market as an exchange between lenders and borrowers.

For example, the capital requirements for a bank might be to keep 1% in reserves. Market discipline, on the other hand, encourages banks to keep a higher amount to reduce their liquidity risks and increase the confidence of their depositors.
Market discipline becomes a topic of particular concern because of banking deposit insurance laws. Practically, most deposit insurance schemes are funded by the governments. Normally, bank managers have strong incentives to avoid risky loans and investments. However, government-funded deposit insurance reduces much of the risk to bankers, resulting in excessive bank risk taking. This constitutes a loss of market discipline. In order to offset this loss of market discipline, governments carry out regulations aimed at preventing banks from taking excessive risk. Today market discipline is introduced into the Basel II Capital Accord as a pillar of prudential banking regulation.

However, the competence of regulations aimed at introducing market discipline is questionable. The existence of financial bailouts provides implicit insurance schemes like “too-big-to-fail”. In other words, a big bank is guaranteed that in any case, it will be rescued by central agencies for fear of financial contagion. As a result, depositors would not bother much to monitor bank activities under these favorable circumstances. There have been a lot of academic studies on this subject. The results at first had mixed and somewhat unpromising results where market discipline did not appear to be a crucial feature in banking. However, later studies, after including some of the previously missing key aspects into the empirical analysis, supported the presence and importance of such a natural control mechanism unambiguously. Accordingly, depositors ‘discipline’ bank activities to some extent depending on the well-functioning of financial institutions and market.

**Moral hazard** is the risk that a party to a transaction has not entered into the contract in good faith, has provided misleading information about its assets, liabilities or credit capacity, or has an incentive to take unusual risks in a desperate attempt to earn a profit before the contract settles.

A number of studies have analyzed the drawbacks of deposit insurance in terms of moral hazard. Boot and Greenbaum (1993) stated that as with any form of insurance, risk-sensitive and complete deposit insurance increases banks’ incentives to act prudently and limits market discipline since depositors no longer have the incentive to control their banks. This means that risk is shifted on to the deposit insurer and there is a trade-off in the provision of deposit insurance. On the one hand, explicit deposit insurance can significantly lower the incidence of bank runs, as depositors are guaranteed to receive the promised payments. On the other hand, if not done carefully, deposit insurance increases risks in the financial system and may fuel bank crises by giving banks incentives to take excessive risks.

In a world without deposit insurance, banks always have to pay premium for any additional risks taken. The riskier the bank’ investment, the more premium depositors require the bank to pay. However, with the existence of a government-funded deposit insurance scheme, depositors will not demand a risk premium from banks because they know that the government will insure the repayment of their deposits, regardless whether the bank makes the loan. Therefore, deposit insurance gives banks incentives to take excessive risks, either by raising their leverage or making riskier loans, eventually increases the government’s exposure to losses.

Despite the moral hazard in explicit deposit insurance, there are several ways in which the distortion introduced by risk-sensitive deposit insurance can be corrected, or at least limited. Allen, Carletti and Leonello (2011) suggest three ways to constraint moral hazard. The first one is to implement a risk-sensitive pricing structure. If premium were risk sensitive, then deposit insurance would not entail incentive problems as premium would perfectly reflect the risk of banks’ portfolios, thus removing any incentive to take additional risks. Nonetheless, implementing risk sensitive premium can be problematic.
because it requires that the regulators detect the risk of banks’ portfolios or are able to encourage banks to reveal it without entailing too high costs. The second way to reduce the distortions caused by deposit insurance is to complement it with a proper regulatory framework. A solution that restores banks’ cautious behavior is to require them to raise capital. Considering the fact that shareholders have to use their capital to repay depositors in case of bank failure, they no longer have the incentive to use depositors’ fund for risky investments. Hence, a combination of deposit insurance and capital regulation may minimize the effect of moral hazard and allows the achievement of an efficient method to stabilize the banking system. Another way to solve the incentive problem arising from deposit insurance is through taxation of banks’ liabilities. In fact, without bailouts, banks usually invest in short-term assets as a form of private insurance against runs. However, with the introduction of deposit insurance, bailouts are possible; banks tend to invest excessively in long-term assets. This incentive can be corrected through a Pigouvian taxation on banks’ short-term liability which aims to equalize the private value of the bank’s investment choice to that of the social planner so that the efficient allocation can be achieved.

2.2. Empirical framework

Most researchers conducted on this subject tend to indicate that deposit insurance is responsible for the increase in risk-taking activity in banks. Enkhbold (2013) uses a panel database of 401 banks in 31 Asian countries over the period from 2000 to 2010 to study the effects of deposit insurance on banks’ risk-taking incentives. The result demonstrates that risk-taking incentives vary depending on bank size and risks. Additionally, differentiated premiums may not accurately reflect the level of risk that a bank carries. With the existence of a deposit insurance system, the pattern of the non-linear relationship between bank size and risk-taking considerably changes. The study points out that market discipline exercised by banks is stronger in the presence of mandatory deposit insurance scheme. Government-funded deposit insurance funds allow Asian banks to take a higher risk. A risk-based deposit insurance scheme functions more effectively in the countries with good regulatory framework and institutional quality. Enkhbold (2013) concludes that the implementation of deposit insurance helps to stabilize the banking system but at the same time it also encourages banks to undertake excessive risks.

Demirguc-Kunt and Detragiache (2000) conduct an empirical investigation on the impact of deposit insurance on banking system stability, relying on a database assembled at the World Bank which records the characteristics of deposit insurance systems around the world. Firstly, they test whether a zero-one dummy variable for the presence of explicit deposit insurance has a significant coefficient. The second test is designed to determine whether the impact of deposit insurance on bank stability depends on the quality of the regulatory environment. The research finds that explicit deposit insurance tends to be detrimental to bank stability. The impact is particularly more obvious in countries where bank interest rates are deregulated and where the institutional environment is unhealthy. Furthermore, the adverse effect of deposit insurance on bank stability seems to be stronger when a higher coverage is offered to depositors, when the scheme is funded, and when the scheme is managed by the government instead of the private sector.

Angkinand and Wihlborg (2008) tested the impact of deposit insurance coverage and banks’ governance structures on banks’ risk-taking in a cross-section time-series, as well as cross-section analysis using country-level data. The advantage of using country level data instead of data available on the bank level is that information about non-performing loans through the IMF’s Financial Stability Reports can be
obtained. The IMF data reflects information the IMF has gathered in addition to the data published by banks themselves, so it will be more accurate. The research’s sample consists of 52 countries: of which 14 are industrial countries, 32 are emerging markets, and 6 are developing countries. Two separate tests are designed: one using data of all countries in the sample, the other only consider emerging markets. The result suggests that the relationship between banks’ risk taking and deposit insurance coverage can be described as U-shaped, particularly in countries with higher quality of governance. In fact, the deposit insurance coverage range varies widely among Asian and European countries. The research also demonstrates that while some countries would benefit by raising the coverage, some would have advantage if they decrease the coverage. The overall conclusion is that banks’ risk taking is minimized at an intermediate level of deposit insurance coverage.

In a different perspective, Davis and Obasi (2009) explore microeconomic aspects of the deposit insurance – banking risks relationship. It takes into account four of the five IMF core financial soundness indicators, using data from financial statements of 914 banks in 64 countries. Results, generated using Generalized Method of Moments, suggest that the presence of a deposit insurance scheme has no impact on the level of liquidity and the capital adequacy of banks. Instead, the effect of deposit insurance system on banking risks is demonstrated by its relationship with the asset quality of banks as captured by the total loans to total assets ratio and bank profitability as presented by the return on average assets. An optimal deposit insurance scheme might include features such as voluntary membership, no coinsurance, be unfunded, no cover for foreign currency deposits, and administered by a private sector manager with the insurance cost borne fully by the private sector.

By contrast, Gropp and Vesala (2004), using data from balance sheets and income statements of European banks to test the relationship between deposit insurance, bank charter value, debt-holder monitoring and risk taking for European banks, come to a conclusion that the establishment of explicit deposit insurance may significantly reduce the risk taking of banks. Gropp and Vesala (2004) claim that deposit insurance may reduce moral hazard, if it leaves out non-deposit creditors. EU bank level data are used to test the model, the result suggests that explicit deposit insurance may serve as a commitment device to limit the safety net and permit monitoring by uninsured subordinated debt holders. They further find that the introduction of explicit deposit insurance tends to increase the share of insured deposits in banks’ liabilities. The research emphasizes that the credibility of the deposit insurance system might be the key to the difference between the result from their study and the result of previous researches, which tend to concludes that deposit insurance increase moral hazard. Other studies which claim that a deposit insurance scheme raises banks’ risk taking mostly use data from developing or emerging countries.

2.3. Current deposit insurance policy

2.3.1. International deposit insurance system

The deposit insurance regulation was established in the USA before the Federation of Deposit Insurance Company (FDIC) – the first deposit insurance organization in the world - was founded in 1933. Since then, it has been amended many times to adapt to the change in economic conditions and to improve the effectiveness of FDIC.

In Russia and most European countries, deposit insurance regulation is also carried out before the establishment of deposit insurance organization. In addition to the deposit insurance regulation system of
each country, the European Community carries out EU Directive in deposit insurance applied for all member countries.

In Asia, Korea enforces Depositor protection Law as a legal basis for deposit insurance system. Japan has deposit insurance regulation in accordance with the law system regulates activities of members in National financial safety net.

South East Asian countries which already have explicit deposit insurance system such as the Philippines, Indonesia, Malaysia have established deposit insurance regulation. Founded in 2005, Malaysian deposit insurance already had deposit insurance regulation with clear clauses on the functions, rights, obligations of deposit insurance organization and the relationship with other financial institutions.

In fact, there is not a common organizational model and management mechanism applied to all countries. Several surveys on deposit insurance organization have pointed out that an effective deposit insurance organization needs to be independent of and not be affected by political system and finance – banking sector.

In other countries, deposit insurance system is structured in many different ways. A deposit insurance organization can be a governmental or independent state enterprise, or may be an organization established based on many commercial banks’ capital contribution, or a unit belonging to central banks or supervisory authorities.

Most deposit insurance organizations are structured as independent institution owned by the government. The tasks of these organizations (for example in Canada, Japan, Malaysia, Mexico, the United States) are often prescribed in law. Although this organizational model requires more concern than the other models, it allows the deposit insurance institution to perform assigned tasks in an efficient manner and best protect the interests of depositors.

A different form of deposit insurance organizations is non-profit institution founded and funded by a number of banks (for example in France, Argentina and Brazil). Despite being funded by the banks’ capital and managed by those banks, common tasks of these organizations are also specified in law.

One of the least common forms is a deposit insurance organization directly under a ministry, supervisory office or central bank and headed by the leader of that agency (for example in Laos, Cyprus, Sri Lanka). Although this form is less complicated and expensive than others, the organization structured in this way will be limited in performance efficiency and depends entirely on the resources the superior organization. In addition, the concentration of too many functions into one agency (the supervisory agency, or central bank) will lead to the case that agencies cannot separate their important tasks from the function of deposit insurance and by that the interests of the depositors will not be properly protected.

Each country has a different way of dividing responsibilities among agencies in national financial safety net, but in general, an effective financial safety net often includes components such as a safety management and surveillance division, the lender of last resort, deposit insurance organization and resolution mechanism for banks in trouble. In many countries, another government agency (usually the Ministry of Finance) also plays an important role in the safety net and is often responsible for the policy regarding financial sector. The members of the financial safety net aim to improve performance efficiency and stability of the banking system during normal periods as well as crisis.
The survey by Kunt (2005) shows that all deposit insurance organizations have been considered as a component of the financial safety net in that country, as a channel to stabilize the banking system alongside monitoring agencies and the only agency which has the function of protecting depositors.

2.3.2. Vietnamese deposit insurance system

The Deposit Insurance of Vietnam (DIV) is a state run financial institution set up under the Prime Minister's Decision No.218/1999/QD TTg dated November 9, 1999, with the mission of protecting the legitimate interests of depositors, and contributing to the maintenance of the stability of the insured institutions and the safe and sound development of banking operations.

Like the deposit insurance system of most countries in the world, DIV was launched with these main objectives: (1) To protect depositors with small amount of money and limited information on the institutions that receive deposits; (2) To contribute to the stability of the banking - financial system, prevent crashes in the system; (3) To improve the equal competitiveness among financial institutions and healthy development of the financial system. These three objectives are closely related and the objective of protecting the rights of depositors is considered as a top priority.

Some of the main tasks of DIV include: receiving, managing and using proper capital, land and other resources allocated by the government; fulfilling commitments on insurance payment to the depositors of any insured institution which shall be declared in written form by the relevant authorities to be insolvent; fulfilling commitments to the insured institutions and other commitments under DIV's jurisdiction.

DIV is given these important powers: managing and using its charter capital, recapitalization from insurance premium collected from the insured institutions and capital allocation and loans as stipulated; requesting the insured institutions to provide documents, information and reports on their operation and business situation on a regular basis; taking corrective actions against violations of the prudential regulations in banking operations and the danger of insolvency; taking part in the management and liquidation of the assets of the bankrupt insured institutions; and cooperating with domestic and foreign organizations in order to enhance the operational capacity of DIV and the insured institutions.

Regarding the membership of deposit insurance, all financial institutions and institutions that are allowed to perform banking activities like receiving deposits from individuals and organizations are obliged to pay deposit insurance premium.

Money deposits insured by DIV are any deposit denominated in VND from individuals, households, private enterprises and joint enterprises except for: deposits from shareholders owning more than 10% of chartered capital or more than 10% of share capital with voting right of that institution; deposits from members of the Board of directors, Board of supervisors, directors, deputy directors; deposits served to insure the obligation of depositors.

Deciding the limit of deposit insurance coverage and insurance fees is extremely important. An appropriate deposit insurance coverage means that large depositors will face the risk of losing the excessive amount of money over the coverage if they do not choose reputable, clean and safe banks to deposit money; and the small depositors who do not have enough information are fully protected. For example, when a weak bank is in trouble, it usually raises the deposit rates very high in order to attract more deposits to offset its losses. People who deposit in those weak and risky banks because of high
interest rates are likely to lose the amount of deposits exceeding the deposit insurance coverage. In that case, if the deposit insurance coverage is maintained at the proper level and publicized, people with large deposits will have to consider carefully and find banks with rational deposit rates to put their money in. This is the operational mechanism of market discipline and motivation to adjust the behavior of both depositors and banks, thereby making the market grow healthier.

In Vietnam, the fixed deposit insurance coverage which is paid to all types of deposit including both the principal and return of one depositor is VND 50 million. As recommended by the IADI, deposit insurance coverage should be able to protect from 90% to 95% of depositors; and the ratio of "Coverage/GDP per capita" should be at least 2 and equivalent to the average of that in other countries with the same level of banking service development. However, because of the increase in Vietnam’s GDP per capita, since 2011 the ratio of "Coverage/GDP per capita” has been less than 2 and only 85% of depositors are insured. The deposit insurance coverage in Vietnam is lower than the minimum level recommended by IADI. Judging from many different criteria, deposit insurance coverage of Vietnam is among the lowest group in Southeast Asia, which is detrimental to the domestic banks during integration period. This raises the need to increase deposit insurance coverage, thereby contributing to improve the effectiveness of deposit insurance policy.

Being aware of the importance of deposit insurance coverage, DIV has conducted surveys and proposed an increase in deposit insurance coverage to VND200 million; whereby over 90% of depositors are insured, equivalent of 5 times GDP per capita at 31/12/2013. According to the DIV research team, VND200 million is more consistent with the international practices (based on the average of Southeast Asia, after taking into consideration inflation, GDP per capita, being in the process of bank restructure, risk level of the economy,...). This will also help people feel more secure when putting money in banks.

Currently, in Southeast Asia, there are 7 countries that have an official explicit deposit insurance system, including Indonesia, Malaysia, Philippines, Singapore, Thailand, Laos and Vietnam. It should be noted that in comparison with the recommendations of international community and other countries in Southeast Asia, Vietnam is among the group of countries with the lowest deposit insurance coverage.

| Countries   | Deposit insurance coverage | % of depositors entirely insured |
|-------------|----------------------------|-------------------------------|
| Indonesia   | IDR 2 billion ($174,000)   | 99%                           |
| Malaysia    | MYR 250,000 ($77,000)      | 99%                           |
| Philippines | PHP 500,000 ($11,500)      | 97%                           |
| Singapore   | USD 50,000 ($50,000)       | 90%                           |
| Thailand    | THB 50,000,000 ($1,539,000)| 99%                           |
| Vietnam     | VND 50,000,000 ($2,300)   | 87%                           |

Source: IMF

It can be seen from the table that among 6 countries in Southeast Asia, Vietnam has the lowest deposit insurance limit, and it is much less than that of other countries. In addition, the percentage of depositors that are entirely ensured by deposit insurance are also the lowest, only 87%, which is 8% less than the recommended standard by the IADI.
**Vietnamese deposit insurance fee**

Deposit insurance fee is considered as a measure of the health of the institutions participated in deposit insurance, and also contributes to the accumulation of saving for the future.

According to deposit insurance policy, deposit insurance fee range is determined by the premier, relying on the proposal of the State Bank of Vietnam. Using the fee range, the State Bank assigns specific deposit insurance fees for financial institutions on the basis of the assessment and classification of the organization.

Research on the activities of international deposit insurance organizations indicates that deposit insurance fee mechanism based on the level of risk has many advantages. This mechanism ensures fairness among insured institutions on the principle that organizations bearing more risks have to pay a higher premium, thereby motivating quality improvement of risk management of insured institutions. Thus, risk based deposit insurance fee mechanism can be used as a measure of the health of each insured institution. On the other hand, setting an appropriate fee will help speed up deposit insurance fund accumulation to better cope with higher risk of the banking system. Among Southeast Asia countries, Malaysia deposit insurance has a lot of experience and Indonesian deposit insurance has commenced on the risk based deposit insurance fee system.

Currently, deposit insurance fee for each quarter applied to all banks in Vietnam is calculated as follow:

\[ P = \frac{((S_0 + S_3)/2 + S_1 + S_2)/3 \times 0.15\%}{4} \]

In which: \( P \) is deposit insurance premium for current quarter, \( S_0 \) is deposit balance of depositors qualified for deposit insurance at the beginning of previous quarter and \( S_1, S_2, S_3 \): deposit balance of depositors qualified for deposit insurance at the end of the first, second, third month of previous quarter.

This fixed deposit insurance premium system has been opposed by many economists. There are a lot of arguments and recommendations with regard to the necessity of a risk-based deposit insurance premium system in Vietnam.

According to Mr. Dao Minh Tu, Vice-governor of the State Bank of Vietnam, the current fixed deposit insurance premium rate in Vietnam is not reasonable. However, to set up a different deposit insurance fee system applied to credit institutions on the basis of risk level or stability of the bank is a complex issue. If the mechanism of a risk-based system is not fully explained to depositors, people may misinterpret that some banks are more unsound compared with others, leading to the fall of market confidence in banks. Therefore, the timing of the application should be suitable.

Mr. Cao Si Kiem, member of the National Assembly's Economic Committee, Chairman of the Association of Small and Medium Enterprises claims that a deposit insurance premium system based on the level of risk is consistent with international practice. It helps the DIV and watchdog organizations accurately assess the financial institutions, create a healthy competitive environment among banks in improving operational efficiency and reducing risks.

In the previous two sections, the rationality of deposit insurance as well as several previous studies relating to deposit insurance and banking risks, the overview of current foreign and local deposit
insurance situations, have been presented. In the next section, the paper will present the quantitative model for deposit insurance in Vietnam with the statement of hypothesis, the database for the research drawn from financial statements of banks in Vietnam, securities companies and deposit insurance premium and the regression results for four different risk models.

3. Quantitative Model for Deposit Insurance in Vietnam

3.1. Hypothesis of relationships

From the above theoretical and literature review, we come to the hypothesis regarding the relationship between deposit insurance and banking risks.

Research hypothesis: The presence of a deposit insurance scheme generates incentives that lead banks to take on excessive risks.

To test the stated hypothesis, we employ this model:

\[ R_t = \alpha_0 + \alpha_1 X_t + \alpha_2 M_t + \epsilon_t \]  

(1)

Where:

- \( R_t \) stands for a set of dependent variables of risks of individual banks
- \( X_t \) represents a vector of control variables unique to the bank at the period \( t \)
- \( M_t \) stands for a vector of country-specific variables at time \( t \).

3.2. Description of variables

| No | Variables                          | Definition                                                                 |
|----|------------------------------------|---------------------------------------------------------------------------|
|    | Dependent variables                |                                                                           |
| 1  | Risk variables = \( R_t \)         | A set of dependent variables of risks of individual banks                  |
| 2  | Default risk (DEF)                 | \( 1/(1+12^{\exp(R)} \)                                                  |
| 3  | Credit risk (CRE)                  | Non-performing loans/Gross loans                                          |
| 4  | Asset risk (ASRISK)                | Non-performing loans/Total assets                                         |
| 5  | Leverage risk (LEV)                | Book value of debt/Book value of total assets                             |
|    | Independent variables              |                                                                           |
|    | Bank variables - \( X_t \)         | Variables unique to the bank at the period \( t \)                        |
| 1  | CAR                                | Capital adequacy ratio                                                    |
| 2  | NII                                | Non-interest income/Gross income                                          |
| 3  | PRE                                | Annual deposit insurance premium/Total deposits                           |
| 4  | ROA                                | Net income/Total assets                                                  |
| 5  | ROE                                | Net income/Total equity                                                  |
| 6  | TA                                 | Total assets                                                             |
| 7  | TDTA                               | Total customer deposits/Total assets                                     |
|    | Country-specific variables - \( M_t \) | Country-specific variables at time \( t \)                                 |
| 8  | GDPG                               | Annual percentage change of real GDP                                     |
| 9  | RINT                               | Real interest rate                                                       |
3.2.1. Risk variables

The dependent variables are risk variables of individual banks. In this study, default risk, asset risk, credit risk and leverage risk are used as proxies to bank risks.

Default risk

By definition, default risk is the event in which companies or individuals will be unable to make the required payments on their debt obligations.

In the context of banking system in Vietnam, among all empirical studies on how to calculate business default probability, there is an superior approach by Dao and Dang (2010). The two researchers use a sample of 62 Vietnamese firms including commercial banks. The final estimation resulted from the model is:

$$\text{DEF} = \frac{1}{1 + 12 \cdot \exp(R)}$$

In which, DEF is the bank default probability, a proxy of default risk and R is the bank credit scoring. Dao (2010) develops a reasonable model to determine credit rating for Vietnamese commercial banks based on the financial data using regression analysis. Bank credit scoring is calculated as:

$$\hat{R}_{it} = 1.857995 + 9.221743 \cdot \text{ROE}_i - 7.183857 \cdot \text{NPM}_i - 11.26797 \cdot \text{AU}_i - 0.064605 \cdot \text{EM}_i - 48.83976 \cdot \text{NNIM}_i + 1.047736 \cdot \text{NNIEX}_i$$

(3.2)

where: ROE is Return on Equity, NPM is Net profit margin, AU is Asset utilization, EM is Equity multiplier, NNIM is Net non-interest margin, NNIEX is Non-interest income/Non-interest expense

Asset risk

The second measure of risk, asset risk, is approximated by using the share of bad debts in total assets. Bad debts are debts that are not collectible and therefore worthless to the bank. The ratio of bad debts over total assets reflects the asset quality of the bank.

Credit risk

Credit risk is the risk of loss of principal or loss of a financial reward from a borrower's failure to repay a loan or meet a financial obligation. Credit risk arises whenever a borrower is expecting to use future cash flows to pay a current debt. Investors are compensated for assuming credit risk by way of interest payments from the borrower or issuer of a debt obligation.

For banks, NPL ratio, defined as the ratio of non-performing loans or bad debts to gross loans is a proxy for credit risk. A NPL ratio shows the asset quality of a bank and how much proportion of total loans is classified as close to default.

Leverage risk

Leverage is the use of various financial instruments or borrowed capital, such as margin, to increase the potential return of an investment, or the amount of debt used to finance a firm's assets. A firm with significantly more debt than equity is considered to be highly leveraged. Leverage in banking is far higher.
than in other industry sectors. For instance, the average leverage ratio across 10 of the world's largest listed non-financial companies is about 50%. That is, on average these companies fund their assets around 50:50 with debt and equity. In banking, however, a more common ratio is 95:5 (Ingves, 2014).

In this paper, leverage risk indicator is calculated by dividing book value of the bank’s debts over book value of total assets. A more accurate measure of leverage risk should be the ratio of book value of debts over market value of assets (the market value of equity plus the book value of liabilities). However, due to the lack of available information, market value of equity cannot be obtained. So a simplified ratio is used instead.

### 3.2.2. Bank-specific variables

Banks variables include: NII, TDTA, CAR, PRE and TA.

**NII** represents the diversification of banks’ sources of income, defined as the ratio of non-interest income to gross income. There exists a negative relationship between the diversification of income sources and the bank’s risk exposure.

Non-Interest income is calculated by summing up: net fee and commission income, net income from dealing in foreign currencies and gold, net income from trading securities, net income from disposal of investment securities, net other income, net income from investments in other entities. Gross income is the sum of interest revenue and non-interest income.

**TDTA**, the proportion of banks’ total deposits over total asset, is used to measure the amount of deposits in a bank’s capital structure, or more specifically, the proportion of a bank’s assets which are financed through customer deposits.

**CAR**, Capital Adequacy Ratio, is a measure of the bank’s capital. It is expressed as a ratio of a bank’s capital to its risk:

\[
CAR = \frac{\text{Tier I capital} + \text{Tier II capital}}{\text{Risk weighted assets}}
\]

*where:* Tier I capital = Common stock + Retained earnings and Tier II capital = Undisclosed Reserves + General Loss reserves + Hybrid debt capital instruments + Subordinated debts

Risk-weighted assets are a bank’s assets and off-balance-sheet exposures, weighted according to risk. This ratio is used to protect depositors and promote the stability and efficiency of financial system around the world.

Two types of capital are used to calculate CAR: Tier I capital, which can absorb losses without a bank being required to cease trading, and Tier II capital, which can absorb losses in the event of a winding-up and so provides a lesser degree of protection to depositors.

**PRE** is the ratio of annual deposit insurance premium to total deposits of a bank. Data on banks’ annual deposit insurance fee are obtained² through published documents by Deposit Insurance of Vietnam.

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² The author would like to thank Ms Pham Bao Khanh for helping us with premium data.
Total asset of banks, TA, is included as a measure of the bank’s size. Larger banks are expected to have a greater capability to diversify their risks and stabilize the cash flow from their business. However, they might be incentivized to take more excessive risks due to their systematic importance (too-big-too-fail cases).

**ROA**, calculated as Net income over Total assets, is an indicator of how profitable a company is relative to its total assets. ROA gives an idea as how efficiently management uses its assets to generate earnings. The assets of the company consist of debt and equity, both of which are used to fund the operations of the company. The ROA number gives investors information on how effectively the company is converting the money it to invest into net income. The higher the ROA, the better, because it means the bank is earning more money on less investment.

**ROE**, calculated as Net income over Book value of equity, measures the bank’s efficiency at generating profits from every unit of shareholder’s equity, or in other words, shows how well the bank uses their investment funds to generate earning growth. ROE incorporates three pillars of corporate management: profitability, asset management and financial leverage. By breaking ROE into these smaller components and seeing how well the firm balances these factors, the investors can not only have an idea of whether they will receive a decent return but also assess the firm’s management’s survival probability.

3.2.3. Macroeconomic variables

Macroeconomic variables are included to demonstrate the state of the economy. In this research, real interest rate, RINT, and Vietnam real GDP growth rate, GDPG, are taken into consideration.

The real interest rate is the rate of interest an investor expects to receive after allowing for inflation. It has been adjusted to remove the effects of inflation to reflect the real cost of funds to the borrower, and the real yield to the lender. The real interest rate of an investment is calculated as the amount by which the nominal interest rate is higher than the inflation rate.

GDP, Gross Domestic Product, is the market value of all officially recognized final goods and services produced within a country in a year, or other given period of time. GDP is commonly used as an indicator of the economic health and the standard of living of a country. GDP annual growth is used in this study as a measure of the country’s economic growth.

3.3. Population and sample selection

This research is set to examine the effect of deposit insurance on banks’ risk taking in Vietnam, so 38 Vietnamese commercial banks can be considered as the population in selecting a sample for testing. Of these 38 banks, 29 banks are randomly chosen for the sample in this research.

After the selection of sample, consolidated financial data in 3 years, from 2010 to 2012, of 29 banks are collected. The data are limited to 3 years only to better reflect the situation of current banking system.

3.4. Data collection

In order to examining the impact of deposit insurance on banks’ risk taking in Vietnam, the panel data of Vietnamese banks are used. This data set contains the annual information about 29 banks and Vietnamese macroeconomic data from 2010 to 2012. Data was obtained from a number of different sources. For dependent variables, data on the risks of banks are derived from banks’ financial statements and annual
reports. For independent variables, some bank variables can be collected from banks’ financial statement. Meanwhile, the data on deposit insurance premium are obtained from published documents by Vietnam Deposit Insurance. Macroeconomic indicators are from www.econstats.com website. This website is one of the most trustworthy websites collecting and providing a wide range of economic data.

Based on the data on collected financial statements, firstly, banks variables are calculated. TA and TDTA can be found from banks’ balance sheet while NII is from banks’ income statement. PRE is computed using annual deposit insurance premium and total customer deposit data from balance sheet. Both ROA and ROE are calculated using net income from income statements and total assets, total equity from balance sheets. CAR data, on the other hand, is collected from banks’ and securities companies; annual reports.

Regarding risk variables, leverage risk ratio can be easily calculated from banks’ balance sheet. For credit risk and asset risk, the data on banks' non-performing loans are collected from banks’ annual reports and then used to generate ratios of “Non-performing loans/Gross loans” and “Non-performing loans/Total assets”.

To compute banks’ default probability, 6 financial ratios including ROE, NPM, AU, EM, NNIM and NNIEX are drawn from balance sheets and income statements to calculate banks credit rating. Then these credit rating data are used as input to generate data on banks’ default risk indicators.

The resulting sample contains data for 29 banks in 3 years, with a total of 86 observations due to the lack of data about Agribank in 2012.

3.5. Empirical results

From collected data, Eviews is employed to estimate the equations to show how banks variables and macroeconomic variables affect banks’ risk taking.

3.5.1. The relationship between deposit insurance and banks’ asset risk

After several trials with different variables and functional forms, this model is determined as the best one to describe the relationship between banks’ asset risks and deposit insurance.

The estimated regression is as follow:

\[
\log(\text{ASRISK}) = -5.123 + 3.863 \times \text{NII} + 3.376 \times \text{TDTA} + 2.232 \times \text{CAR} - 8.555 \times \text{RINT} - 16.822 \times \text{GDPG} - 4.427 \times \text{ROE} + 0.238 \times \log(\text{PRE})
\]

\text{t-stat (respectively): } -7.389, 3.040, 5.915, 3.109, -3.454, -1.851, -4.122, 1.823

\text{R}^2= 0.523348, \text{Adjusted R}^2= 0.480572, n=86

All the p-value of independent variables are less than 5%, except the coefficient of GDPG and \log(\text{PRE}) is at \text{p}= 7\%. It means their betas are statistically significant and it can be said that these 7 variables have considerable impact on banks’ asset risk.

3 The detailed computed table of default probability can be provided upon request.
4 The detailed database can be provided upon request.
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\[
-5.123 \text{ suggests that if NII, TDTA, CAR, RINT, GDPG, ROE, and LOG (PRE) were equal to zero, natural logarithm value of bank’s asset risk indicator (Bad debts/Total assets) would be -5.123. However, this does not have real economic meaning.}
\]

The coefficients of NII, TDTA and CAR are 3.863, 3.376 and 2.232 respectively, which means that holding other variables constant, if NII, TDTA and CAR increases by 1%, on average, banks’ asset risk ratio increases by 3.86%; 3.37% and 2.23%.

The coefficients of RINT, GDPG and ROE are -8.555; -16.822 and -4.427 respectively means that if real interest rate and GDP growth rate increase by 0.01 on average, banks’ asset risk ratio decreases by 8.56%; 16.82% and 4.43%, holding other variables constant.

The beta value of LOG (PRE) is equal to 0.238. It means that if the percentage of annual deposit insurance premium over total customer deposits increases by 1% on average, holding other variables constant and banks’ asset risk ratio rises by 0.238%.

The R-squared value of the model of 0.523348 means that about 52.33% of the variation in banks’ asset risk can be explained by the variation in NII, TDTA, CAR, RINT, GDPG, ROE and PRE.

3.5.2. The relationship between deposit insurance and banks’ credit risk

The estimated regression is as follow:

\[
\text{LOG (CRE) = -10.429} - 0.179*\text{LOG(PRE)} - 0.530*\text{LOG(ROE)} - 2.077*\text{LOG(GDPG)} - 4.641*\text{RINT} + 2.787*\text{NII} + 0.227*\text{LOG(ROA)}
\]

\[t\text{-stat (respectively): -7.839, -1.562, -4.272, -4.680, -2.275, 2.502, 2.022}\]

\[R^2= 0.442617, \ \text{Adjusted } R^2= 0.400284, \ n= 86\]

All the independent variables except LOG(PRE) at \(p=12.21\%\), have the \(p\)-value less than 5%.

\[
-10.429 \text{ suggests that if LOG(PRE), LOG(ROE), LOG(GDPG), RINT, NII and LOG(ROA) were equal to zero, natural logarithm value of bank’s credit risk indicator (Bad debts/Total loans) would be -10.429. However, this does not have real economic meaning.}
\]

The coefficients of LOG(PRE), LOG(ROE), LOG(GDPG) are -0.179, -0.530 and -2.077 respectively, which means that holding other variables constant, if PRE, ROE, GDPG increases by 1% on average, banks’ credit risk ratio decreases by 0.18%, 0.53% and 2.08% on average.

The coefficients of RINT and NII are -4.641 and 2.787 respectively means that holding other variables constant, if RINT increases by 0.01, banks’ credit risk ratio decreases by 4.64%; if NII increases by 0.01, banks’ credit risk ratio increases by 2.79%, on average.

The beta value of LOG (ROA) is equal to 0.227. It means that banks’ return on assets increases by 1% on average, holding other variables constant and banks’ credit risk ratio rises by 0.227%.
The R-squared value of the model of 0.442617 means that about 44.26% of the variation in banks’ credit risk can be explained by the variation in PRE, ROE, GDPG, RINT, NII and ROA.

3.4.3. The relationship between deposit insurance and banks’ default risk

The estimated regression is as follow:

\[ \text{LOG(DEF)} = -2.794 - 1.277 \times \text{CAR} - 0.151 \times \text{LOG(PRE)} - 1.498 \times \text{TDTA} - 5.006 \times \text{ROE} + 23.015 \times \text{ROA} \]

\[ t\text{-stat (respectively): } -12.51, -2.694, -1.989, -5.395, -6.161, 3.226 \]

\[ R^2 = 0.481740, \text{ Adjusted } R^2 = 0.449349, n= 86 \]

All independent variables have the p-value of less than 5%. It means their betas are statistically significant and it can be said that these 5 variables have considerable impact on banks’ default risk.

The R-squared value of the model of 0.481740 means that about 48.17% of the variation in banks’ default risk can be explained by the variation in CAR, PRE, TDTA, ROE and ROA.

3.5.4. The relationship between deposit insurance and banks’ leverage risk

The estimated regression is as follow:

\[ \text{LOG(LEV)} = -0.348 - 0.013 \times \text{LOG(PRE)} + 0.499 \times \text{ROE} - 0.403 \times \text{CAR} - 0.045 \times \text{LOG(ROA)} \]

\[ t\text{-stat (respectively): } -9.232, -1.958, 6.300, -9.322, -8.244 \]

\[ R^2 = 0.811891, \text{ Adjusted } R^2 = 0.802602, n= 86 \]

All 4 independent variables have the p-value less than 5%. It means their betas are statistically significant and these 4 variables have significant impact on banks’ leverage risk.
The beta value of \( \text{LOG(PRE)} \) is equal to -0.013. It means that if the percentage of annual deposit insurance premium over total customer deposits increases by 1\% on average, holding other variables constant, banks’ leverage risk ratio falls by 0.013\%.

The coefficients of \( \text{ROE} \) and \( \text{CAR} \) are 0.499 and -0.403 respectively means that holding other variables constant, if ROE increases by 0.01, banks’ leverage risk ratio increases by 0.499\%; if CAR increases by 0.01, banks’ leverage risk ratio decreases by 0.403\%, on average.

The coefficient of \( \text{LOG(ROA)} \) of 0.045 means that holding other variables constant, if banks’ ROA increases by 1\% on average, banks’ leverage risk ratio increases by 0.045\%.

The R-squared value of the model of 0.811891 means that about 81.19\% of the variations in banks’ leverage risk can be explained by the variation in \( \text{PRE}, \text{ROE}, \text{CAR} \) and \( \text{ROA} \).

4. Discussions, findings and conclusions

4.1. Discussion on the results

After constructing 4 models to estimate the relationship between banks’ risk taking and deposit insurance, this is the summary of the results. The coefficients of each variables are listed, together with their corresponding p-value in the brackets.

Appendix 1 presents the estimation results of equation (1) where dependent variables include 4 kinds of bank risks and independent variables include bank specific variables and macroeconomic variables. There are 9 regressors in total; however, not all of them have significant impact on a certain type of banks’ risk. One independent may also have different effect on different types of risk.

The results of the constructed models generally support the prediction that there exists a relationship between deposit insurance and banks’ risk taking. However, it is not completely in line with the hypothesis which stated that the presence of a deposit insurance scheme generates incentives leading banks to take on excessive risks. As can be seen from table 3, the coefficients of \( \text{LOG(PRE)} \) are negative in credit, default and leverage risk model, while it is positive in asset risk model. This implies that deposit insurance premium has a negative relationship with banks’ credit risk, default risk and leverage risk while it has a positive relationship with banks’ asset risk. In other words, the higher the deposit insurance premium, the less credit, default and leverage risk undertaken by bank. On the other hand, an increase in deposit insurance premium leads to higher banks’ asset risk.

After a series of error checking, all the 4 models have no problems of model auto correction, multicollinearity and specification. However, both models for default risk and credit risk have heteroscedasticity problem but not models for asset risk and credit risk.

The positive relationship between deposit insurance and asset risk ratio can be explained by the fact that higher deposit insurance fee has negative effect on bank profitability, which creates an incentive for banks
to invest in more high-return but also high-risk investments, or to be less careful in the issuance of loans, resulting in a high proportion of bad debts over total assets. This seems to conflict with the negative relationship between deposit insurance and credit risk ratio (Bad debts/Total loans). However, with the presence of deposit insurance, depositors have more trust in banks so the total deposits in banks will increase. With more deposits, banks are able to loans out more. The increase in the denominator in the Bad debts/Total loans ratio may be the reason why credit risk has opposite relationship with deposit insurance premium in comparison with asset risk.

Default risk is estimated to have a negative relationship with deposit insurance premium. This is understandable because from equation (3.1), banks’ default probability has a negative relationship with bank’s credit rating. In addition, it can be inferred from equation (3.2) that bank’s credit rating has a positive relationship with bank’s profitability. As stated above, with the existence of deposit insurance, in order to offset the premium paid to deposit insurance organization, banks try to make riskier investments in return for higher profit.

In the case of leverage risk, the model built in this study indicates a negative relationship between leverage risk and deposit insurance. In fact, there have been various findings from previous empirical researches despite conflicting results. While David and Obasi (2009) conclude that none of the deposit insurance design features matter for the leverage ratio, Gropp and Vesala (2004) find out that leverage risk tends to increase with explicit deposit insurance. Nonetheless, 2 researchers find this result quite surprising as they claim that banks increase their share of insured deposits when deposit insurance is introduced, thus reducing leverage risk.

One more factor that might lead to the difference between the results from this research and those from international ones is that the scope of this paper is restricted to Vietnamese banking system only. Researches on deposit insurance with an international scope can use various deposit insurance variables in hypothesis testing, which will result in a more comprehensive and accurate conclusion. On the contrary, in Vietnam, the same policy about deposit insurance coverage and membership obligation is applied to all banks, the only factor that differs among banks is the deposit insurance fee submitted to the DIV. The lack of deposit insurance variables may lead to conflicting results.

4.2. Limitations and recommendations for further researches

Although much effort has been put into this research, unavoidably, it stills expresses some limitations. The first to mention is the statistical significance of estimation models. The p-value of LOG(PRE) in the credit risk model is 0.122 which is not considered statistically significant at the significance level of 0.1. In addition, heteroscedasticity is existed in the leverage model, which may be the reason for inaccurate implications.

Regarding the quality of selected data, even the author has tried to get as much information as possible, the time budget is limited, thus, only 29 commercial banks with time constraint from 2010 to 2012 are taken into account which may not well represent the whole population. The database is mostly calculated based on the financial statements published by the banks themselves which are subject to manipulation. Furthermore, during the process of collecting the data, the researcher met several problems that might affect the validity of the model such as data unavailability or out-of-date data. Therefore, it is suggested that in the future, given more flexible time and more efficient information collection, the sample size
could be increased and data can be collected for a longer time period so that the quality of the tested data will be more reliable.

Secondly, this paper only takes into consideration the quantitative data and ignores the qualitative information such as management’s sufficiency which may be far more important and reliable than the number shown on banks’ financial statements. It is clear that such qualitative information are difficult to collect and interpret, nonetheless, it can reveal much about the financial situation of the firm and its level of risks. Hence, it is highly recommended that further research should pay attention more to this kind of information so as to increase the reliability of the constructed model.

4.3. Conclusion

The influence of deposit insurance on the banking system has been a subject of concern for a long time. However in Vietnam, this is still a fresh topic. This research seeks to analyze the relationship between deposit insurance and banks’ risk taking in Vietnam. The results from this study suggest that the presence of a deposit insurance system increases banks’ asset risk, but reduces banks’ credit, default and leverage risk. Despite some limitations, this research gives an explicit link between deposit insurance and baking risks, supported by empirical evidence. Further researches are recommended to give deeper and more comprehensive analysis on this subject.
### Appendix 1: A summary of the relationship between banks’ risks and deposit insurance

| Variables | LOG(ASRISK) | LOG(CRE) | LOG(DEF) | LOG(LEV) |
|-----------|-------------|----------|----------|----------|
| CAR       | 2.232 (0.003) |          | -1.277 (0.009) | -0.403 (0.000) |
| NII       | 3.863 (0.003) | 2.787 (0.014) |          |          |
| LOG(PRE)  | 0.238 (0.072) | -0.179 (0.122) | -0.151 (0.050) | -0.013 (0.054) |
| ROA       |              |          | 23.015 (0.002) |          |
| LOG(ROA)  |              | 0.227 (0.047) |          | -0.045 (0.000) |
| ROE       | -4.427 (0.000) |          | -5.006 (0.000) | 0.499 (0.000) |
| LOG(ROE)  |              | -0.530 (0.000) |          |          |
| TDTA      | 3.375 (0.000) |          | -1.498 (0.000) |          |
| GDPG      | -16.822 (0.068) |          |          |          |
| LOG(GDPG) |              | -2.077 (0.000) |          |          |
| RINT      | -8.555 (0.000) | -4.642 (0.026) |          |          |
| R²        | 0.523348 | 0.442617 | 0.481740 | 0.811891 |
| Adjusted R² | 0.480572 | 0.400284 | 0.449349 | 0.802602 |
References

1. Allen, F., Carletti, E., Leonello, (2011), “Deposit insurance and risk taking”, *Oxford review of economic policy*, pp. 464-478.

2. Angkinand, A & Wihlborg, C, (2010), “Deposit Insurance Coverage, Ownership, and Banks' Risk-Taking in Emerging Markets”, *Journal of International Money and Finance*, vol 29, no. 2, pp. 252-274.

3. Boot, A., Greenbaum, S., (1993) “Bank-Regulation, Reputation and Rents: Theory and Policy Implications”, Cambridge University Press, Cambridge

4. Bui, Son., (2014) “Giáy pháp nâng cao hiệu quả chính sách bảo hiểm tiền gửi tại Việt Nam”, *Thống tin Bảo hiểm tiền gửi Việt Nam*, No.25

5. Dao, Binh, (2011) “Vietnamese Commercial Banks Ratings”, Thesis, Hanoi University

6. Dao, Binh, Dang, Trang., (2010) “Credit scoring model for manufacturing Vietnamese company 2010”, Thesis, Hanoi University.

7. Davis, E., Obasi, U., (2009), “Deposit insurance systems and bank risk”, Working Paper, Brunel University

8. Demirguc-Kunt, A., Detragiache, E., (2000), “Does deposit insurance increase banking system stability? An empirical investigation”, *Journal of Monetary Economics*, Vol. 49, no 7, pp. 1373-1406

9. Demirguc-Kunt, A., Kane, E., (2002), “Deposit insurance around the globe: Where does it work?”, *Journal of Economic Perspectives*, American Economic Association, Vol. 16, No. 2, pp. 175-195

10. Demirguc-Kunt, A., Sobaci, T., (2001), “Deposit Insurance Around the World: A Data Base”, *The World Bank Economic Review*, Vol.15, No. 3, pp. 480-490.

11. Diamond, D., Dybvig,P., (1983), “Bank Runs, deposit insurance and liquidity”, *Journal of Political Economy*, Vol. 91, No. 3, pp. 401-419

12. Enkhbold, E., (2013), “The effect of deposit insurance on risk taking in Asian banks”, *Asian Journal of Finance & Accounting*, Vol. 5, No. 1

13. Gropp, R., Vesala, J., (2004), “Deposit insurance, moral hazard and market monitoring”, *Review of Finance*, Vol. 8, No. 4, pp. 571-602

14. Ha, Tuan, (2014) “Vai trò của chính sách bảo hiểm tiền gửi và những vấn đề cần hoàn thiện để bảo vệ tốt quyền lợi người gửi tiền”, *Thống tin Bảo hiểm tiền gửi Việt Nam* No.25

15. Ingves,S., (2014) “Banking in leverage”, Speech, 10th Asia-Pacific High-Level Meeting on Banking Supervision, Auckland, New Zealand