PROSIDING PERKEM ke-9 (2014) 392 - 399
ISSN: 2231-962X

Modeling Risk in the Pricing of Deposit Insurance in Malaysia

Nur Azura Sanusi
School of Social Development and Economics
University of Malaysia Terengganu
E-mail: nurazura@umt.edu.my

Nazatul Azrin Nazri
School of Social Development and Economics
University of Malaysia Terengganu
E-mail: nazat964@gmail.com

ABSTRACT

Malaysia set up a deposit insurance system to protect depositors against the loss of insured deposits placed with member institutions in the event of insolvency and failure of member institutions. It can be implemented through the Malaysia Deposit Insurance Corporation (PIDM) which was introduced in 2005. Basically, the Corporation is designed to maintain public trust in the banking system as a formal mechanism agreed with the bank's risk and strengthen the understanding of the benefits and limitations provided by the deposit insurance system and communication approaches based education and support, which will help the public to make decisions better financial information. Therefore, this study aimed to develop a deposit insurance pricing model taking into account the risk modeling. The method used in this study using secondary data obtained from the financial statements for the 12 commercial banks in Malaysia for a period of four financial years from 1999 to 2012. The findings suggest that the formation of the pricing model that takes into account the deposit insurance risk modeling and management of financial risk premium that would distinguish between banks in Malaysia. In addition, this study also provides a significant contribution to strengthening consumer protection infrastructure in line with the Financial Sector Master Plan (FSMP) 2011-2020 in preparation for moving to strengthen the competitiveness of high-income nation by the year 2020 and the liberalization of international finance.

Keyword: Deposit insurance system (DIS), Banking risk, Management risk.

ABSTRAK

Malaysia menubuhkan sistem insurans deposit bagi melindungi pendeposit terhadap kehilangan deposit diinsuranskan yang disimpan di institusi ahli sekiranya berlaku ketidakupayaan dan kegagalan institusi ahli. Ia boleh dilaksanakan melalui Perbadanan Insurans Deposit Malaysia (PIDM) yang diperkenalkan pada tahun 2005. Pada asasnya, PIDM dirangka untuk mengekalkan kepercayaan orang awam kepada sistem perbankan sebagai satu mekanisme rasmi persetujuan dengan risiko bank serta mengukuhkan lagi pemahaman tentang manfaat dan had yang disediakan oleh sistem insurans deposit serta pendekatan komunikasi berasaskan pendidikan dan sokongan, yang akan membantu orang awam membuat keputusan kewangan bermaklumat yang lebih baik. Oleh itu, kajian ini bertujuan untuk membina satu model perletakan harga insurans deposit dengan mengambilkira permodelan risiko. Kaedah yang digunakan dalam kajian ini menggunakan data sekunder yang diperolehi daripada penyata kewangan bagi 12 buah bank perdagangan di Malaysia bagi tempoh 4 tahun kewangan iaitu dari tahun 1999 hingga tahun 2012. Dapatan kajian mencadangkan bahawa pembentukan model perletakan harga bagi insurans deposit yang mengambilkira permodelan risiko pengurusan dan risiko kewangan yang akan membezakan premium antara bank di Malaysia. Selain itu, kajian ini juga memberikan sumbangan yang signifikan dalam mengukuhkan infrastruktur perlindungan pengguna selari dengan Pelan Induk Sektor Kewangan (PISK) 2011-2020 sebagai persediaan mengukuhkan daya saing bagi menuju negara berpendapatan tinggi menjelang tahun 2020 serta liberalisasi kewangan antarabangsa.

Kata Kunci: Sistem insurans deposit, Risiko perbankan, Risiko pengurusan.

INTRODUCTION

Numerous studies have measured deposit insurance is an important and potentially beneficial component of a country's financial safety net because they promote and contribute to the stability of the financial system. Demirguc-Kunt, Edward and Luc Leaven (2008) shows that the government deposit insurance can avoid an economy from decreasing into bad run equilibrium by assuming all the public and private sector jointly responsible for overseeing the deposit insurance system to begin with. The literature on deposit insurance, bank runs and related banking issues can be explicit and merely implicit set up models under the compulsory deposit insurance scheme. Demirguc-Kunt and Detragiache (2000) find in a sample of 61 countries that over a period from 1980 to 1997 deposit insurance significantly increased the probability of banking crisis.

Malaysia's deposit insurance system is designed to effectively diminish moral hazard. At the same time has made a conscious decision to restructure back their financial system before undertaking deposit insurance. The deposit insurance system applies limited coverage and has a risk based premium system set in for its member banks. An early study by Kam Hon Chu (2011) and Asli Demirguc-kunt, Edward Kane, Baybars Karacaovali and Luc leaven (2008) in the case of deposit insurance, Malaysia have adopted full deposit guarantee as a temporary precautionary measure against financial turbulence. However these measures of higher or full deposit insurance coverage have succeeded to curb bank runs, at least temporarily, but its long term impact on the stability of the banking system has yet to be seen. Malaysia become commonly practice to issue blanket guarantees to arrest a banking crisis. Meanwhile, Asli Demirguc-Kunt and Edward Kane (2006) argue that blanket guarantees can create an expectation of their future use in similar circumstances. As a result, they undermine market discipline and may prone greatly destabilizing over longer periods. Luc Laevan and Fabian Valencia (2008) state that blanket guarantees can prevent bank runs if they are credible, however guarantee could add substantial fiscal cost of bank restructuring programs and may increase moral hazard going forward.

The aim of this paper is to establish a pricing risk modeling in resignation of deposit insurance in Malaysia. This paper also wishes to develop a model for risk to be borne by the banking operators. On the other hand, the paper evaluates the insurance market deposit taking banking risk in setting premiums. This paper attempts to use secondary data derived from the financial report for the 12 sampling banks for the time frame start from 2009 to 2012. The Financial Sector Master Plan (FISMP) launched by Bank Negara Malaysia (BNM) aims to diversify the financial structure and strengthen the Malaysian financial system to compete in a liberalized global environment.

This paper is divided into five sections. The second section will discuss about few previous researches will be explored to see the implementation configuration of the insurance. Whereas the third section will discuss the deposit insurance pricing by taking into account the effect of interest rate risk and credit risk. The result and summary of each component will be discussed in the analysis section. Empirical results will be discussed in section four and five.

LITERATURE REVIEW

An early study about method to strengthen our bank security discusses by Abdul Ghaffar Ismail and Goh Chuan Hai (2000) is more concentrate about the minimum requirement that hold by bank. This study shows that the bank will not be able to adjust the ratio of capital immediately so that the bank must always maintain higher capital ratios than the minimum requirements of the regulator to reduce the level of risk. The study also found that there were positive reactions bank *well-capitalised* the minimum capital requirement to show that the regulators should focus more on member banks are *under-capitalised*. The result shows Return on Asset (ROA) increased by 10 percent it means that total loans also increased, by the increased level of risk. The increase in total assets by 10 percent also implies that the size of the enlarged bank. This is expected to increase the likelihood of *credit crunch*.

Other research by Deniz Anginer, Asli Demuirguc-Kunt and Min Zhu (2012), using a sample of 4,019 publicity traded banks in 96 countries to identify the impact of deposit insurance on bank risk and systematic stability separately for the crisis period from 2007 to 2009, as well as the three years from 2004 to 2006 leading up to the global financial crisis. They use z-score (a commonly-used accounting measure of bank risk) and stock return volatility to measure standalone risk of an individual bank and the conditional value at risk measure (CoVar) of Andrian and Brunnermeier (2010) to measure the risk posed by an individual bank to the banking system as a whole. They find that generous financial safety nets increase bank risk and reduce systematically stability in non-crisis years. However, bank risk is lower and systematic stability is greater during the global financing crisis in countries with deposit insurance coverage. Nevertheless, the overall effect of deposit insurance on bank

risk over the full sample periods remains negative since the destabilizing effect during normal times is greater in magnitude compare to the stabilizing effect during global turbulence.

There are researches that present several methodologies by Luc Leavan (2002) toprovide guidelines for the pricing of deposit insurance in different countries. This study shows that several methodologies can be used to set benchmarks for the pricing level of deposit insurance in a country and quantities how specific design features affect the cost of deposit insurance. They find that the actual premiums levied on banks are lower than the premiums implied by these theoretical models in many countries and argue that deposit insurance is underpriced in many countries around the world, notably in several developing countries.

Thereare some empirical study reports the positive relationship between the effects of interest rate risk and depositor's behavior. The research bySophio Khundadze (2012) analyze about 95 percent or 473 of respondents from 500 respondents declare that to be ready to deposit their excess funds into the bank account if deposits were insured, and to be ready to insure their deposit even at the lower interest rate were offered by bank. However, according to Jonathan Carroll and Shino Takayama (2014)reports there are negative relationship between risk covered by deposit insurance and depositor's behavior. The analysis showed that depositors might not deposit their money at all unless the interest rate on deposits is sufficiently high or the risk of bank failure is sufficiently low. This result is consistent with the extant empirical work on depositor behavior about riskiness and the interest rate.

Furthermore, according to Pennachi (2005) also argues that if risk-based insurance premiums were integrated with risk-based capital requirement, bank regulation would create fewer distortions and would emulate the market discipline that investors impose on non-banking firms. The bank regulations should meet its goals while avoiding subsidies that could distort the financial system. The primary goal of bank regulation is to protect small or unsophisticated depositors and thereby prevent bank runs and their monetary consequences. To achieve this goal, many countries have established deposit insurance, which then requires additional policies to control insurance losses and to avoid subsidization of the deposit insurance 'safety net'.

METHODOLOGY

This study are similar with Duan and Simonato (2002) and Duan et al (1995), the academic foundation for measuring the value of deposit insurance lie in Merton (1977) and who models deposit insurance as a put option on the value of the bank's assets based on the expected loss pricing approach to pricing deposit insurance. This model is founded from Vasicek (1977), who assumed that the instantaneous interest rate is governed by a mean-reverting stochastic process. The model can be written as follows:

$$dr_t = q(m - r_t)d_t + vdZ_{rt} \quad (1)$$

where*r* is the instantaneous free risk interest rate,*m* is an average of long term mean of interest rate, *v* is interest rate volatility, *q* is constant (positive) that measures the average power of reverse magnitude, *t* refer to time and Z_{rt} is a Weiner process.[1]

Then to compute total bank assets follow by the following process:

$$\frac{dV_t}{V_t} = \mu d_t + \sigma_v dZ_{vt} \quad (2)$$

whereV_t is a value of bank assets with the duration of$t$;μ is an instantaneous expected return of bank assets;σ_v is the volatility of return on bank assets and Z_{vt} is a Weiner process. The processes $Z_{rt}$and$Z_{vt}$are expected to be correlated with a correlation coefficient of η.

Equation (1) and (2) can explicitly test the vulnerability ofasset to interest rate risk in the form of contract options such as bank equity and deposit insurance. Therefore, equation-solving (2) can create the effect of interest rate risk. Equation-solving process (2) is done by including quote dZ_{vt} to dZ_{rt}.[2] Next, the mentioned equation appellation is included into equation (2). With the purpose of

[1] Weiner process is obtained by adding the average and standard deviation of the three- month treasury bill (Z_{rt}).
[2] Producing $dZ_{vt} = \eta dZ_{rt} + (1 - \eta^2)^{\frac{1}{2}} dW_t^*$
[3] The interest rate elasticity measured by dividing the percentage change in asset by the change in the interest rate.

including the process of interest rate into process of total bank assets, then the appellation of dZ_{rt} in equation (1) is substitutes into equation (2) thus it is obtained as:

$$\frac{dV_t}{V_t} = [\mu \quad - \Phi_v q(m - r_t)]d_t + \Phi_v dr_t + \psi dW_t \tag{3}$$

with $\Phi_v \equiv \sigma_v \, {}^{\eta}/_{v}$ and $\psi \equiv \sigma_v(1-\eta^2)^{\frac{1}{2}}$; W_t refer to Weiner processed that is independent of interest rates.

From the equation (3), it is clear that Φ_v refers to interest rate elasticity for bank assets and valued constant.[3] While, ψ refer to volatility of constant bank assets also known as credit risk. From the definition of Φ_v and ψ can be shown that total assets risk, σ_v in equation (2) can be expressed as $\sqrt{\varnothing_v^2 v^2 + \psi^2}$. Therefore, the fraction allows bank assets variance to be divided into both interest rate risk and credit risk. When the value of bank assets are known, the market value of deposit insurance value per Ringgit of insurance deposits at time t is given by:

$$I_t(V_t, r_t = XP(r_t, t, T) \ [1 - N(h_{t-t})] \ - V_t[1 - N(h_t)] \tag{4}$$

where

$$h_t \equiv \frac{1}{\delta_t} 1n\left[\frac{V_t}{P(r_t,t,T)X}\right] + \frac{\delta_t}{2}$$

$$\delta^2 \equiv (\varnothing_v^2 v^2 + \psi^2)(T-1) + 2\varnothing_v v^2\left[\frac{(T-1)}{\square} + \frac{1}{\square^2}\left(e^{-\square(T-1)} - 1\right)\right]$$

$$+ v^2\left[\frac{(T-1)}{\square^2} + \frac{2}{\square^3}\left(e^{-\square(T-1)} - 1\right) + \left(\frac{1-e^{-2\square(T-1)}}{2\square^3}\right)\right]$$

Since the estimated value of the assets (V), the interest rate elasticity for asset (v) and credit risk (ψ) is needed to get the value I in equation (4), after find the equation of interest rate elasticity, the three equations following is required:

First, the equation of bank equity value: The creation of the bank's equity valuation equation needs several assumptions. Let assume E_t refer to bank equity value at time t; which is $X \equiv Fe^{RT}$ denote of depositors to equity holders (where F refer to the face value of deposits and R refer to the interest rate of deposits); $P(r_t, t, T)$ refer to zero coupon bond price at time t to be paid of RM1 on the period of T; while N(.) refer to the standard normal cumulative distribution function, and $B(T-t) = [1 - e^{-q(T-1)}]/q$ refer to negative interest rate elasticity of the free zero-coupon bond with maturities of possibility $(T-t)$. Thus the bank's equity valuation equation can be following as:

$$E_t = V_t N(h_t) - XP(r_t, t, T)\,(h_t - \delta_t) \tag{5}$$

Second, the equation of equity interest rate elasticity at time t is given by:

$$\varnothing_{Et} = \Omega_t[\varnothing_v + B\ (T-t)] - B(T-t) \tag{6}$$

with

$$\Omega_t = N(h_t)\frac{V_t}{E_t}$$

Equation (6) shows the equity interest rate elasticity, which Ω_t is the options standard elasticity; $\varnothing_v$ is the bank asset interest rate elasticity; $-B(T-t)$ is elasticity liability interest rate elasticity, the difference between $\varnothing_v$ and $-B(T-t)$ shows a mismatch between the exposure of interest rate risk for asset and liability, thus the term $[\varnothing_v + B\ (T-t)]$ refer to the banks gap of interest rate elasticity.

Third, the standard deviation of the bank equity returns or volatility at time t is given by:

$$\sigma_{Et} = \sqrt{\varnothing_{Et}^2 V^2 + \Omega_t^2 \psi^2} \tag{7}$$

Thus, all the three equations (5), (6) and (7) are used to estimate the DMS model (1995). More detailed, estimated results of the three models used to obtain the estimation of $\emptyset_v$ and *V*.

Based on deposit insurance pricing model, there is an equation to measure the value of estimated bank asset interest rate elasticity. The $\Phi_v = \sigma_v \eta / v$ equation are used to show the similarities to the bank asset interest rate elasticity. Besides that, there is another way to get it is through the following equation:

$$\phi_v = \frac{[Cov(dV_t / V_t, dr_t)]}{[Var(dr_t)]} \quad (8)$$

Or this equation is derived through coefficient regression for the percentage change in the functioning total asset to the percentage change in interest rate (three-month treasury bills).

From the model, equation (9) can be derived as follows:

$$\Delta TA_t = \gamma \Delta TB_t + \mu_t \quad (9)$$

where ΔTA is the change in total assets, γ is the coefficient of treasury bills, while ΔTB is the change of three-month treasury bills and μ is a random disturbance.

Equation (9) is estimated by using cross-sectional regression analysis in connecting the total bank assets and the interest rate treasury bill. To obtain the value of bank assets interest rate elasticity, the value of the coefficient will be used to measure the value.

The data used in this study: first, a total of 45 samples Treasury bond revenue to maturity (yield to maturity) three years collected from the period of January 2009 to December 2012. This data obtained from the RAM Bond Newsletter, issue of Rating Agency Malaysia Berhad (RAM).

Second, the data are also derived from the financial report for the 12 banks and the time frame starts from year 2009 to 2012 collected from Central bank of Malaysia (BNM). This data includes total equity, total assets, total liabilities and net income. Third, for a free risk rate that is three-month treasury bill; loan rate and commercial bank fixed deposit rate, obtained from daily data in the Monthly Statistical Bulletin, Bank Negara Malaysia for the period of January 2009 to December 2012.

Data transformation will be implemented to produce a meaningful data in the research. Return of assets (ROA) is obtained by calculating the ratio of net revenue to total bank assets. Whereas interest rate data volatility are obtained by looking into the differences between loan rate and three months fixed deposit in the commercial bank. Variables for changes of total assets and treasury bills are obtained by getting the differences in variables from the current year to the previous years.

DESCRIPTIVE ANALYSIS

This section reports the descriptive analysis of the variables through the compile findings from the experience of the 12 financial institutions. Average values reported in Table 1 are for the 12 selected banks include total average assets (column 2), the average liabilities (column 3), the average amount of equity (column 4) and the average return on assets (ROA) in column 5, all in terms of RM thousand. Whereas, Table 2 reports the three-month treasury bills in the form of a percentage. Figure recorded in the second column. Table 1 shows the mean value of the total assets of the 12 samples randomly selected bank. The results found that the mean value of total assets (second column), reported the lowest mean value recorded for the Bangkok Bank of RM262.7 million. The mean value of the total assets of the highest recorded for Maybank totaling RM288.3 billion. The third column reports the mean value of the total liabilities of the lowest and highest respectively amounting to AmBank of RM395 million and Maybank of RM259.7 billion. The study also obtained a mean value of total equity, as reported in the fourth column shows that the mean minimum for the Bangkok Bank amounting to RM473.9 million. The highest mean value reported for Maybank totaling RM276.6 billion. In terms of the ratio of total equity to total assets of Bangkok Bank and Maybank respectively showed a significant difference of 1.8% compared with 19.8%. Hence, the return on assets (ROA) of both these banks is 0.02 and 0.03 as reported in column 5. From these values,there are small different amount between both banks. It meansthe amount of assets that are not accompanied by high capital and high ROA ratio. It shows that an increasing in total assets is not necessarily giving high returns. Further based on Table 2 the average of three-month treasury bill is 2.65 percent.

EMPIRICAL EVIDENCE

Each bank will often run the risk varies according to the size of the bank as a result of the difference of the loan portfolio, the maturity of various assets and liabilities, and also due to factors non-interest activity. Given this, banks should review their risk profile is always changing from time to time and taking all the costs involved to help banks to assess their current risk. Therefore, this paper uses cross-sectionalregression analysisdata to estimate equation (9) by year to year. The result estimates for the effect of changes in the discount rate of treasury bills towards changes the amount of assets as indicated in Table 3. During the years 2009 to 2010, it shows the changes in the treasury bills discount rate respectively provide the positive and negative effects towards changes in the bank's assets. This indicates either an increase or decrease in the deposit insurance premium is depend on an increase or decrease in interest rates. It means that if the higher the interest rate, the higher deposit insurance premiums will be charged.

Based on Table 4, whereas reports the overall result for the deposit insurance pricing model. Data derived from the average of 12 samples were selected bank to include the value of bank assets, the liabilities value of the bank and also the bank's equity. These values are taken for the end of the year for the period 2009 to 2012 which include a bank that has been selected at randomly. The credit risk recorded in the fourth row. This paper used a ^{4}matrix correlation to calculate the η value in finding the credit risk value. Table 4 shows the results of the findings in the calculation of the anticipated of the absolute value of the credit risk respectively the highest and lowest values recorded in 2009 and 2011. To obtain the value of the interest rate elasticity of the bank's assets set in the fifth line derived from the coefficients of treasury bills.

CONCLUSION

In this paper examine that to designing a pricing risk modeling in resignation of deposit insurance in Malaysia. This research tries to set forth the deposit insurance pricing model developed by DMS (1995) to be applied to data banks in Malaysia. Overall result shows: first, bank interest rate risk faced by most of the banks in Malaysia witnessed a positive gap position, with total assets over the total liability. Second, the anticipated of the absolute value of the credit risk respectively the highest and lowest values recorded in 2009 and 2011. This shows that bank capital need to be increased in the two years mentioned. Third, with a decrease in credit risk and increase of anticipated asset value, thus the market value of deposit insurance per Ringgit will decrease. This shows that the low premium value does not give sufficient incentive to depositors to observe the bank and the possibilities for banks to invest in risky projects. Therefore, the necessity of bank capital is still the first-best allocation to create a stable and safe bank.

REFERENCES

Andrian, T., and M. K. Brunnermier. 2010. CoVar. *Working Paper, Princeton University*.

Anginer, D., Demirguc-Kunt, A., and Zhu, M. 2012. How does deposit insurance affect bank risk? Evidence from the recent crisis. *Policy Research Working Paper WPS6289.*

Carroll, J. and Takayama, S. 2014. A Hierarchial Agency Model of Deposit Insurance. *Journal of Finance*, 10, 267-290.

Chu, K. H. 2011. Deposit insurance and banking stability. *Cato Journal*, 30 (1), 99-114.

Demirguc-Kunt, A., and E. Detragiache. 2000. Does deposit insurance increase banking system stability? An empirical investigation.*IMF Working Paper WP/00/03*.

Demirguc-Kunt, A., Kane, E. J., and Laevan, L. 2008. "Deposit insurance design and implementation: Policy Lessons from research and practice," in Demirguc-Kunt, A., Kane, E. J. and Laevan, L. eds, *Deposit Insurance Around the World: Issues of Design and Implementation* (pp. 3-26). The MIT Press, Cambridge.

Demirguc-Kunt, A., Kane, E. J., Karacaovali, B., and Laevan, L. 2008. "Deposit insurance around the world: A comprehensive database," in Demirguc-Kunt, A., Kane, E. J. and Laevan, L. (Eds.), *Deposit Insurance Around the World: Issues of Design and Implementation*(pp. 363-382). The MIT Press, Cambridge.

Demirguc-Kunt, A., and Kane, E. J. 2006. Deposit insurance design and implementation: Policy lessons from research and practice. *World Bank Policy Research Working Papers WPS3969.*

Duan J. C., and Simonato J. G. 2002. Maximum likelihood estimation of deposit insurance value with interest rate risk. *Journal of Empirical Finance*, 9, 109-132.

Duan Jin Chuan, Moreau F. Arthur and Sealey C.W, (1995). Deposit insurance and bank interest rate risk: Pricing and regulatory implications. *Journal of Banking and Finance*, 19, 1091-1108.

Ismail, A. G., and Hai, G. H. 2000. Keperluan modal bank, risiko dan pemamahan kredit: Pendekatan persamaan serentak. *Jurnal Analisis*, 7 (1&2), 79-106.

Khudadze, S. 2012. The perspective of effectiveness of risk-based insurance premium for Georgia. *Journal of Business*, 1(1), 29-33.

Laevan, L., and Valencia, F. 2008. The use of blanket guarentees in banking crises. *IMF Working Paper WP/08/250.*

Leavan, L. 2002. Pricing of deposit insurance. *Policy Research Working Paper 2871.*

Merton, R. L. 1997. An analytic derivation of the cost of deposit insurance and loan guarantees. *Journal of Banking and Finance*, 1, 3-11.

Pennachi, G. G. 2005. Risk-based capital standards, deposit insurance and procydicality. *Journal of Financial Intermediation*, (14), 432-465.

Vasicek, O.A. 1977. An Equilibrium characterization of the term structure. *Journal of Financial Economics*, 5, 177-188.

TABLE 1: Descriptive Statistic of Average Total Asset, Liabilities, Equity and Return of Asset (ROA) for Selected Bank

Bank	Average of Total Asset (RM'000)	Average of Total Liability (RM'000)	Average of Total Equity (RM'000)	ROA Average (RM'000)
MayBank	288,306,422.3	259,732,164.5	28,574,257.75	0.028518889
Alliance Bank	22,289,805	26,489,571.25	2,905,012	0.242665624
Affin Bank	36,883,281.75	33,615,927.25	3,267,354.5	0.027553896
Citi Bank	39,980,503	36,182,498	3,798,005	0.045864392
Scoatia Bank	4,285,710.75	3,631,314.25	629,396.5	0.027188206
Standard Chartered Bank	44,911,557.75	41,936,005.25	2,975,552.5	0.034366306
OCBC Bank	57,440,280	52,980,603.25	4,459,676.75	0.002827304
RHB Bank	116,154,330.5	107,068,502.8	9,085,827.75	0.031054964
Public Bank	199,248,868.8	185,861,422.8	13,387,446	0.027766877
Ambank	7,624,879	395,150	7,229,729	0.109257682
UOB Bank	60,721,355	56,301,274.25	4,420,080.75	0.015606142
Bangkok Bank	2,626,521	2,152,592.5	472,812.25	0.017862026

TABLE 2: Descriptive Statistic for Three-Month Treasury Bill

Bank	Average	Standard Deviation	Skewness	Curtosis	Jarque-Bera
Total Banks	2.653	0.437894	-0.832596	-1.029384	1.916247

TABLE 3: Output Estimation of Equation (9)

Year	Treasury Bill	t-statistic
2009	0.683776	1.034798
2010	-0.623578	-2.535105
2011	0.022479	0.220531
2012	0.052219	-2.291264**

Note: ** Significant at the significance level of 5%

TABLE 4: Expectation Result of Deposit Insurance Pricing Model

Variables	2009	2010	2011	2012
Equity	5,480,134.83	6,222,438.67	7,191,655.83	8,364,630.5

Liability	57,570,855	61,614,166.83	74,457,105.5	81,820,401.5
ψ rv (anticipations for credit risk)	3.5398	2.5	1.7	3.1853
Φrv (anticipations for bank asset interest rate elasticity)	0.683776	-0.623578	0.022479	0.052219
Vrv (anticipations for bank asset value)	5,181,924.4	5,206,257.7	5,989,643.2	6,626,700.76

[4] Equation for calculating credit risk is as follows: with $= \delta_v (1 - \eta^2)^{\frac{1}{2}}$, with ψ is credit risk, δ_v refer to the volatility of total assets return, and η refer to the correlation matrix between Weiner process with the total assets and Weiner process for treasury bills. This correlation is shown in Table 5.

TABLE 5: Weiner Process for Zvt (Total Bank Assets) and Zrt (Interest Rate)

Year	**Zvt ***	**Zrt ****
2009	1,195,688	2.6
2010	1,167,748	2.9
2011	1,324,937	3.0
2012	1,442,725	3.067

Note:
(ii) Zvt * is compute by total up the average of total assets adding with a standard deviation of bank assets.
(iii) Zrt** is calculate by total all the average of three-month treasury bills adding with a standard deviation of treasury bills.