Printed in Japan

ISSN 1343-4500 (print)
ISSN 1344-8994 (electronic)

iNFORMATION

An International Interdisciplinary Journal

Volume 20 Number 4(A), April 2017

Published by International Information Institute
www.information-iii.org

INFORMATION
Volume 20, Number 4(A), pp.2345-2360

ISSN 1343-4500 eISSN 1344-8994

Moral Hazard Testing (Risk Transfer Behavior) in the Deposit Insurance System Based on Fair Premium for Determining Coverage Limit[1]

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Abstract

This research tries to answer a problem that commonly rises in the Deposit Insurance system which is still new, the right value of coverage limit for the Deposit Insurance system in Indonesia. The coverage limit which is too high will encourage moral hazard from the IDIC banks to the IDIC, while the coverage limit which is too low can affect the stability of the financial system of a country. The results of the study show that the coverage limit of IDR 100 million per account and 1 billion per account indicates the occurrence of moral hazard from the banks of the IDIC to the IDIC. However, the results also show that the encouragement toward moral hazard behavior from the banks of the IDIC to the IDIC is not too big when the coverage limit is up to IDR 100 million per account. The results and the model of this research can be used as a consideration by the Deposit Insurance agency (IDIC) in determining the optimal coverage limit.
Key Words: Deposit Insurance System, Credit Risk Model, Coverage Limit.

1. Introduction

Monetary crisis that hit Indonesia 18 years ago has decreased public trust toward banking system. To prevent a bank run (banks rush) and the unwanted chain reaction, Indonesian government established a financial safety net in the form of a blanket guarantee. However, in line with the enactment of Law No. 24 of 2004 concerning the Indonesian Deposit Insurance Corporation (IDIC), it has prompted the government to establish the explicit Deposit Insurance system to replace the previous policy of blanket guarantee. It is characterized by the establishment of the Indonesian Deposit Insurance Corporation (IDIC).

Theories and empirical evidences in many countries show that Deposit Insurance system in long term has encouraged moral hazard, [1, 2] and subsidies from healthy banks to unhealthy banks [3]. Although the Deposit Insurance system has encouraged moral hazard, but history has shown that this system is useful for maintaining the stability of the financial system of a country [4, 5, 6, 7, 8, 9, 10, 11, 12], and is supported by the testimony of Meyer [13] and Greenspan [14, 15] Therefore, to be able to apply this system well, it is necessary to design Deposit Insurance that concerns about trade-off between moral hazard and this stability.

[1] This paper was presented at 3rd Gadjah Mada International Conference On Economics and Business 2015 (GAMICEB) in abstract only

Several studies have shown that well designed Deposit Insurance system can reduce moral hazard [16,17, 18, 19, 20, 21]. The features of the design are the need to establish fair premiums based on bank capital adequacy, coverage limit, co-insurance, and strict prudential regulation supported by a strong regulatory institution. Of the features of the design, the one that is directly related to the presence of the Deposit Insurance Agency is fair premium system, claim reserve therein, and coverage limit.

As a new institution, the main problem faced by the IDIC is similar with FDIC in the United States and other similar institutions, namely the determination of fair premium, the right determination of claims reserve, and the determination of optimal coverage limits. The implementation of flat rate premium system (flat rate)[2], the arbitrary determination of claim reserve[3] , and the determination of the coverage limit value of Deposit Insurance that is too high[4] will definitely lead to moral hazard and the insolvency of the institution if there is bank run. Therefore, for the formation of fair premium and moral hazard testing intended to determine the limits of the Deposit Insurance optimal value, CVaR model[5] can be one of the solutions for the similar problem faced by the IDIC in Indonesia.

By using the model of CVaR and risk transfer behavior testing as the form of moral hazard testing, this study seeks to answer the research problem which is whether the fair premium of Deposit Insurance determined based on the CVaR model can indicate moral hazard behavior of banks to the IDIC after the implementation of the explicit Deposit Insurance system in Indonesia using the coverage limit of Rp 100 million per account and Rp 1 billion per account[6]. The determination of premium based on CVaR model in this study will refer to the study of Firman et al [22].

The moral hazard terminology in this study is defined as a hazard behavior of banks addressed to the Deposit Insurance Agency which is committed to exploit the mistake of

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[2] IDIC sets premium of 0.1% from third-party funds guaranteed to be paid each semester (2 times a year).

[3] The current determination of claim reserve is arbitrary, which is not based on the results of the calculation according to a theory

[4] On October 13, 2008, the government increased the value of guaranteed deposits from maximum Rp 100 million to Rp 2 billion maximum per account. The decision was stipulated in the Government Regulation in lieu of Law No. 3 of 2008 on the amendment of the Act No. 24 of 2004 in conjunction with the Government Regulation Number 66 of 2008 on the Guaranteed Savings Amount of IDIC. The government's decision was subsequently upheld by Law Number 7 of 2009 on the authority of IDIC to change the value of deposits guaranteed by the IDIC. According to the interview with the executive chairman of IDIC, Mr. Firdaus Djaelani, the determination of the coverage limit value of the Deposit Insurance until $ 2 billion per account is only to obey the vice president, Jusuf Kala, in the global financial crisis in 2008. Thus, the decision on the coverage limit value of the Deposit Insurance is not specified based on previous research.

[5] CVaR model merges Credit Risk Model and Value at Risk.

[6] The value in the research of Rp 100 million and Rp 1 billion dollars is due to the availability of the data

premium rate of Deposit Insurance applied by the Deposit Insurance Agency by increasing the risk of leverage (leverage risk, lowering the capital ratio) and the risk of their assets, if the Deposit Insurance does not set its premium based on risk or fixed rate. In this case, banks will transfer the risk to the Deposit Insurance Agency to get benefit.

The results of this study are expected to provide benefits for policy-making of the IDIC in order to develop design the features of the Deposit Insurance system. Because the results of this study will provide input for the IDIC in shaping the Deposit Insurance system that consider trade off between moral hazard and stability through the design of features of fair premium Deposit Insurance based on risks and optimal coverage limit for the Deposit Insurance system, this study will provide valuable input not only for governments but also for the people of Indonesia, especially for the taxpayers. It is also because of the decrease of moral hazard behavior will decrease expropriation of unhealthy banks toward people's wealth through inappropriate use of the Central Government Revenue and Expenditure (APBN), that is to compensate the depositors' fund because of moral hazard behavior.

2. Literatur Review and Hypothesis Formulation

2.1. Empirical Studies on Bank Risk Transfer Behavior

As what has been expressed by the experts, the fixed rate premium system will encourage moral hazard. Moral hazard occurs if there is risk transfer behavior. Risk transfer occurs when banks increase the risk without being followed by the increase of Deposit Insurance premium. With risk transfer, it means banks expropriate the welfare of the Deposit Insurance Corporation which eventually expropriates public welfare or taxpayers. The expropriation of taxpayer mechanism occurs when banks that take more risks will move the burden of their biggest loss to the Deposit Insurance Agency. In this case, if the bank gains profit, this profit will be earned by the bank. On the contrary, if the bank suffers loss then the biggest loss will be borne by the Deposit Insurance Agency. Most of the losses to be borne by the Deposit Insurance Agency will be covered by funds from the premiums collected. If the funds from the Deposit Insurance Agency are not enough, they will be paid by the government with funds taken from public funds or taxpayer funds.

To prevent this risk transfer, the Deposit Insurance Agency must determine premiums based on the risk. Merton is the first to demonstrate that the Deposit Insurance provided by the FDIC is equivalent to put option which is published (writer) toward the assets of banks [23]. In this model, Merton shows there are two risk models that can potentially be transferred to the FDIC, namely asset risk (σ_V) and the risk of leverage (D/V). The change of asset risk will affect the variability of return of the underlying asset, and the change of the leverage will

affect the exercise price of the put option (put option). By using Merton comparative static analysis, it shows that the source of the risk is positively related to the Deposit Insurance, which means the increase of the two sources of this risk will be followed by the increase in insurance costs.

The primary tool to identify risk transfer behavior from banks is by determining whether there is overprice or underprice compared with the its actuarial value. Because the purpose of risk transfer is to make the actuarial value of Deposit Insurance greater than the actual cost, if it happens, the underprice is generally used as the evidence of risk transfer.

Based on Merton model, Duan et al provide different framework to identify risk transfer behavior in commercial banks [24]. In their study, Duan et al state that risk transfer from banks to the Deposit Insurance Agency intended to expropriate the welfare of the Deposit Insurance Agency is done by increasing asset risk (σ_V) and the risk of leverage (D/V). Risk transfer will be successful if it results in the increase of the actuarial value of the Deposit Insurance given by the IDIC which is not followed by the increase in the actual premium. Based on the model proposed by Duan et al, there are two hypotheses: Hypothesis 1: $\alpha 1 \geq 0$ and Hypothesis 2: $\beta 1 \leq 0$, risk transfer occurs when $\beta 1 > 0$. The rejection of hypothesis 1 indicates that risk transfer can be prevented, but the prevention is not strong enough to conclude that there is no risk transfer. The rejection of hypothesis 2 shows the occurrence of risk transfer. There are two basic equations are developed based on this hypothesis. The first equation shows the relationship between asset risk (σ_V) and the risk of leverage (D/V). The second equation shows the relationship between asset risk (σ_V) and fair premium of Deposit Insurance. Because risk transfer only occurs when $\beta 1 > 0$, the final conclusion about bank risk transfer depends on the second equation.

2.2. Hypothesis Formulation

Financial crisis has encouraged the state of Indonesia to improve its banking supervision system by adopting international standards of banking supervision. Pangestu shows that when the crisis hit Indonesia the IMF required the Indonesian government to implement programs known as the Washington consensus focused on corporate governance, bankruptcy procedures, business – government relationship, and strict prudential regulation [25]. With the help from the IMF, the initial step to improve the condition of the banking system in the crisis era was the establishment of *Badan Penyehatan Perbankan Nasional* or the National Bank Restructuring Agency (BPPN / IBRA) by the government. BPPN was served to restructure the troubled banks so that Bank Indonesia (BI) could concentrate on its main tasks.

Bank restructuring was carried out by restructuring banking system through two main

programs. The first was bank restructuring program in the form of debt restructuring, recapitulation program, and blanket guarantee program. The second was strengthening program of banking system in the form of infrastructure development program, improving the quality of bank management, and stabilization and supervision of banks. Bank restructuring implemented resulted in improved banking industry that was demonstrated through banking indicators including the increase of CAR over 8%. In line with the restructuring program and in order to strengthen the banking system, BI also strengthened financial stabilization through some programs: increasing the effectiveness of banking supervision, bank and corporate restructuring, increasing market discipline, improvement of legal system, the reduction of government ownership in banking system, and the application of policy to reduce *too big or too important to fail* [26].

Nam and Lam illustrate that central banks in Indonesia, Malaysia, South Korea and Thailand have given high priority to the changes of regulation that encourage the disclosure of relevant information related to the implementation of good corporate governance [27]. Marcus and Shaked state that banks with significant value charters can limit risk taking behavior [28].

The improvement of banking supervision standards, the increase of bank capital, policies that reduce *too big to fail*, the increase of disclosure which improves market discipline, and the presence of significant charter values indicate restraint on risk transfer behavior through regulators, market and self-discipline. The existence of risk restraints by regulators, market and self-discipline makes the relationship between asset risk and the risk of leverage become negative.

Agusman, Gasbarro and Zumwalt state that the efforts made by regulators in Asian countries including Indonesia above have not been effective in reducing moral hazard [29]. It is due to two reasons. The first is that moral hazard is a long story of banks in Asia. The second is that restructuring program and good corporate governance are programs that come from outside the country, especially because of the pressure of the IMF. Therefore, countries that experienced crisis need time for the learning process, and the consequences that can rise is that the policy cannot be directly executed to prevent moral hazard effectively. On the other hand, after the implementation of the explicit Deposit Insurance system with fixed premium rate, theoretically it will encourage moral hazard. Moral hazard occurs when banks successfully increase their asset risk by the payment of insurance premiums in accordance with the intention of the banks. Since the premium system determined by the IDIC is fixed rate, there is no link between asset risk with the premiums of Deposit Insurance. Here, risk transfer occurs when there is a positive relationship between asset risk and fair premiums of

Deposit Insurance. The positive sign here indicates that fair premiums can respond to the increase of asset risk that does not exist in the fixed rate premium system. For that reason, the research hypotheses that can be formulated are:

H1: There is risk transfer behavior conducted by the banks of the IDIC to the IDIC after the implementation of the explicit Deposit Insurance system in Indonesia.

As previous empirical studies that develop the model of Duan et al to test the moral hazard behavior through risk transfer behavior, the hypothesis testing in this research will also use the same model. Duan et al develop this model based on Merton model which makes analogy of Deposit Insurance as European put option toward the assets of banks. Merton develops a relationship between Deposit Insurance and European put option toward the assets of banks based on the Black and Scholes model [30].

In his model, Merton states that a bank only issues one form of homogenous debt, and assumes the value of bank assets (V) by following the lognormal process with mean and volatility parameters (σV) known. Put option has the time to maturity equal to the audit period, or the maturity occurs at the time of the audit period (T), and the exercise price is equal to the value of the debt at the time of the maturity. This model also assumes that the deposit (third party fund) is equal to the total debt of a bank (D) which is the principal and the interest insured. Furthermore, Merton states that the premium value of Deposit Insurance per dollar of deposits insured (FP) can be expressed in the following equation:

$$FP = N\left(y + \sigma_V \sqrt{T}\right) - (V/D)N(y) \tag{1}$$

where: $y \equiv \left[\ln\left(D/V\right) - \left(\sigma_V^2 T/2\right)\right] / \sigma_V \sqrt{T}$

N = the cumulative standard normal density function

From the equation (1) of Merton, Duan et al states that there are two sources of risk that can potentially be manipulated by banks for the purpose of risk transfer, namely asset risk (σV) and the risk of leverage (D / V). The attempt of banks attempt to transfer the risk is successful if the net effect of manipulation toward asset risk (σV) and the risk of leverage (D / V) is the increase in the premium of Deposit Insurance adjusted to the risk because as stated by Merton regarding the partial derivatives in equation (1), the relationship of the premium of Deposit Insurance adjusted to asset risk and the risk of leverage risk is positive. Therefore, if banks try to transfer their risk, they will do by increase asset risk and the risk of leverage risk to expropriate the welfare of IDIC. However, if there is limitation toward risk transfer behavior of the increase in asset risk, it should be covered by a reduction in the risk of leverage. Furthermore, if risk transfer can be avoided, there should be a negative relationship between

asset risk and the risk of leverage.

Following Duan et al, this study starts the analysis of risk transfer behavior by estimating the change per dollar of the premium of Deposit Insurance Corporation (ΔFP) toward the changes in asset risk (ΔσV) as the form of the following equation:

$$\Delta FP \cong \frac{\partial FP}{\partial \sigma_V}\Delta\sigma_V + \frac{\partial FP}{\partial (D/V)}\frac{d(D/V)}{d\sigma_V}\Delta\sigma_V \tag{2}$$

Notation

$$\alpha_1 \equiv \{d(D/V)/d\sigma_V\} \tag{3}$$

Therefore, equation (2) can be restated as:

$$\Delta FP \cong \beta_1 \Delta\sigma_V \tag{4}$$

in this case,

$$\beta_1 = \frac{\partial FP}{\partial \sigma_V} + \frac{\partial FP}{\partial (D/V)}\alpha_1 \tag{4a}$$

From the equation above, it can be seen that there are two basic equations that need to be considered. The first is equation (3) which shows the relationship between asset risk (σ_V) and the risk of leverage (D/V) indicated by the notation α1. The second is equations (4 and 4a) showing the relationship between asset risk (σ_V) and the premium of Deposit Insurance shown through β1. Equation (4a) shows that small changes in asset risk (σ_V) will be followed by small changes in the premium of Deposit Insurance (FP), and small changes in the risk of leverage (D/V) will be followed by small changes in the premium of Deposit Insurance (FP) multiplied by α1 from equation (3).

Bank risk transfer will happen when β1> 0. Since $\{\partial FP/\partial\sigma_V\}$ and $\{\partial FP/\partial(D/V)\}$ are positive from the static comparative result in equation (1), the sign of β1 will depend on the sign and magnitude of the form α1. As mentioned earlier, if there are factors that limit bank risk transfer, the factors that limit this risk transfer behavior will cause the relationship of asset risk (σ_V) and the risk of leverage (D/V) vary negatively. It is expected that the negative magnitude is sufficient to make β1 less than or equal to zero to indicate the absence of risk transfer. In other words, it is necessary but not a sufficient condition for β1 to be less than or equal to zero if α1 is negative. The sufficient condition here requires that a negative absolute value of α1 is large enough to cause β1 less than or equal to zero.

From the second form in equation (4a), in β1, it appears that reasonable premium based on risk is more sensitive to changes in the financial risk demonstrated by the risk of leverage compared with demonstrated business risk shown through asset risk. It is illustrated that small changes of the financial risk will be followed by small changes of fair premium multiplied by α1 which is expected to result in a negative value. Sensitivity of banks toward this financial

risk occurs because it is impossible that banks are 100% financed by equity.

From the theoretical background above, it can be established two sub-hypotheses that can be used to test the risk transfer behavior in this research, namely:

Sub Hypothesis H1.a: There is a negative relationship between asset risk and the risk of leverage in the banks of the IDIC

and

Sub Hypothesis H1.b: There is a positive relationship between asset risk and fair premium estimated based on the study of CVaR model

The acceptance toward the first sub hypothesis or sub hypothesis 1.a indicates that risk transfer can be prevented, but this prevention is not enough to conclude that there is no risk transfer. On the other hand, the acceptance of the second sub hypothesis or sub hypothesis 1.b shows that there is risk transfer. Because risk transfer only occurs when $\beta 1 > 0$, the final conclusion about risk transfer will depend on the second equation. Here, it appears that sub hypothesis 1.a ($\alpha 1 \leq 0$) is necessary but not sufficient condition for sub hypothesis 1.b ($\beta 1 \geq 0$).

3. Materials and Methods

3.1. Data and Sample

This study used the data from the fund of the third party secured by IDIC and the samples in the study were 22 public banks operating in Indonesia that their stocks were listed in the Stock Exchange with a recording time of at least 1 year at the time of the study. The data consist of total assets, total third party fund, and total exposure of the banking system in 2005, 2006 and 2007.

Based on the data can be concluded that the banks sampled generally have more than 70% of assets of all banks and more than 70% of all third-party funds in the banking system. Furthermore, for the insurance value of IDR 100 million per account and IDR 1 billion per account, they only represent more than 17% and 39% of third-party funds in the banking system but represent more than 80% of account of third party funds in the system. The banks sampled for study are quite representative for the existing banking conditions in the Deposit Insurance system in Indonesia.

3.2. Research Methods

The initial step before performing the test on the indication of moral hazard behavior was by shaping the fair premium of Deposit Insurance based on risk with CvaR model at first. The premium based on CVaR model in this study would refer to the results of the research conducted by Firman Pribadi et al. In forming the premium, Firman Pribadi et al used monte

carlo simulation model from the research conducted by Sironi and Zazzara as the basis [31]. Based on the model of Firman Pribadi et al [22], the fair premium of Deposit Insurance in this study was determined based on the form of the following equation:

$$FP_i = EL_i + R_{premium} \cdot VaR \quad (1)$$

The Empirical Model of the Hypothesis Testing

The hypothesis testing of this research employed the empirical model as the followings:

$$LEVRISK = \alpha 0 + \alpha 1 ASSRISK + \varepsilon \quad (2)$$

$$FP = \beta 0 + \beta 1 ASSRISK + \varepsilon \quad (3)$$

From the two empirical models above, it can be seen that there are three variables that the values must be known, namely LEVRISK and FP which are the dependent variables of the equation (2) and (3) and ASSRISK which becomes the independent variable for both equations. LEVRISK notation indicates the risk of leverage measured by the ratio of the value of insured deposits (D) toward the market value of assets (V). ASSRISK is asset risk indicated by the volatility value of asset (σV). The market value of asset (V) and the volatility value of asset (σ_V) are values that cannot be observed directly. Both of these values can be estimated by using the market value of equity and equity volatility through Merton model [32]. FP notation is the fair premium of Deposit Insurance resulted from CVaR model of this research through the form of equation (1).

After the value of the three variables in the empirical model were known, the three values would be used to test the sub-hypothesis H1.1 in the equation (2) and the sub-hypothesis H1.2 in the equation (3).

4. Results and Discussion

4.1. The Regression Results of Panel Data with the insurance value (Exposure) of IDR 100 million per Account

Here are the results of hypothesis testing on risk transfer with the coverage limit up to IDR 100 million per account. As for the LEVRISK model used to test the sub-hypothesis 1.a, its test results indicate that the OLS regression is preferred to panel data regression for the fixed effect or random effect. It is supported by the F test and the LM test which are not significant.

The OLS regression results indicate that $\alpha 1$ (or ASSRISK estimation coefficient) in equation (2) has negative value and is not significant. It means that the results of this test are not able to support the sub hypothesis 1.a. The small value of the coverage limit is likely to be the main cause of the absence of any restriction in risk transfer behavior and encouragement for risk transfer from the IDIC banks to IDIC. Furthermore, as the comparison for the results of this pooled OLS regression, it can be seen that all data regression for both fixed effect and random

effect shows no significant results.

Although the findings in this sub hypothesis 1.A are not supported, but the implications of risk transfer should be confirmed in the testing of the second sub hypothesis or the result of FP model testing. The results of FP model specification test show that panel regression is preferred to OLS regression. It is supported by the results of the F and LM tests indicating that panel regression with fixed effect and random effect are preferred to the OLS regression.

The results of Chow specification test (F test) which are not significant indicate that panel regression model can be done because the variables are in one unit (poolable). Last, Hausman test shows to choose random effect specification than the fixed effect. Therefore, based on these tests, random effect approach will be used to explain the results of this FP model testing. Then since the FP model testing will use random effect approach, the estimation of the random effect model will usually employ approach Generalized Least Square (GLS) approach. Some literatures explain that there will be no heteroscedasticity and autocorrelation problems in the GLS approach because GLS is the solution for both problems. Therefore, this study will not show the results of heteroscedasticity and autocorrelation tests.

The test results of the sub hypothesis 1.b or FP model show that parameter β1 (or ASSRISK estimation coefficient) in equation (3) has positive value and is significant at 10% level. These results support the hypothesis 1.b, the existence of a positive relationship between asset risk and fair premium estimated from credit risk models. The results of sub-hypothesis 1.b show that the IDIC banks have moved their risk to the IDIC after the implementation of the explicit Deposit Insurance system in Indonesia. Hence, the results of the second sub-hypothesis or sub hypothesis 1.b show supports toward the hypothesis of the research for coverage limit up to IDR 100 million per account, where there is risk transfer behavior conducted by the IDIC banks to the IDIC after the implementation of explicit Deposit Insurance system in Indonesia.

Table 6. Panel Data Regression Test Results for Risk Transfer Hypothesis Test with the Maximum Insurance Value of IDR 100 Million per Account.

Dependent Variables	LEVRISK			FP		
Independent Variables	OLS	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect
Constanta	0.27**		0.27**	0.0036		0.0034
	(2.048)		(2.017)	(1.19)		(0.98)
ASSRISK	-0.37	2.104	-0.345	0.046	0.049	0.047*
	(-0.27)	(0.75)	(-0.25)	(1.46)*	(1.197)	(1.36)
R2	0.001	0.336	0.012	0.032	0.656	0.496
F statistic	0.466	-	-	2.12**	-	-

N	66	66	66	66	66	66
Specifications test						
Chow test			-0.21			0.18
F test			1.058			3.802***
LM test			0.014			160.847*
Hausman test (Fixed effect VS Random Effect)			0.321			0.856

Note: *, ** and *** are significant at the level of 10%, 5% and1%, value in the box shows statistic value of t

4.2. Regression Result of Panel Data with the insurance value of IDR 1 billion per Account

Here are the results of risk transfer hypothesis testing for the coverage limit value up to IDR 1 billion per account. The two models, LEVRISK and FP used to test the research hypothesis indicate that panel regression is preferred to OLS regression. It is supported by the F test and the LM test indicating that the panel regression with fixed effect and random effect specifications are preferred to OLS regression.

Chow test (F test) which is not significant indicates that panel regression model can be done because the variables are in one unit (poolable). Then Hausman test shows to choose random effect specification than the fixed effect. Therefore, based on these tests, random effect approach will be used as the main approach to explain the occurrence of risk transfer behavior.

Because the specification test results indicate that random effect approach will be used, according to the previous explanation, estimation in random effect model will usually employ Generalized Least Square (GLS) approach. Therefore, heteroscedasticity and autocorrelation tests will not be performed.

The results show that in the LEVRISK model of equation (2), as had been previously expected, the value of $\alpha 1$ (or ASSRISK estimation coefficient) has negative value and significant at the level of 1%. It means strong support for the sub hypothesis 1.a. These results illustrate that there are factors associated with the individual decision making behavior of banks that limit risk transfer. Here, the IDIC banks will be encouraged to adjust their leverage (capitalization level) with their asset risk. It has been described in the formation of the research hypotheses before that there are some efforts to prevent risk transfer behavior done by either by regulator, market, or self-discipline. In line with the research by Duan et al, this study cannot conclude about which factor among regulatory, market, or self-discipline that has worked here. However, the empirical results of this study show strong evidence of a negative relationship between the risk of leverage and asset risk.

Although the findings imply that risk transfer can be limited, but the final conclusion will

depend on the result of the sub hypothesis 1.b or FP model because according to Duan et al, although there is a negative relationship between asset risk and the risk of leverage , but if they are not related in the right proportion, risk transfer is still possible. Therefore, the second hypothesis sub or sub hypothesis 1.b considers this risk transfer issue. The testing of sub hypothesis 1.b or FP will include testing and the significance of the statistic of parameter $\beta 1$ from equation (3). If the estimation of parameter $\beta 1$ is positive and significant, the test results indicate that the IDIC banks have managed to transfer the risk to the IDIC after the implementation of the explicit Deposit Insurance system in Indonesia.

The test results of sub-hypothesis 1.b or FP model show that parameter $\beta 1$ (or ASSRISK coefficient) is positive and significant at the level of 10%. These results indicate the support for the sub hypothesis 1.b, that the IDIC banks have managed to transfer the risk to the IDIC after the implementation of the explicit Deposit Insurance in Indonesia. Here, the IDIC banks have managed to exploit the IDIC by increasing their asset risk and transfer some part of the risk to the IDIC. This risk transfer will eventually exploit taxpayers through the Central Government Revenue and Expenditure (APBN) if the claim reserve or the existing capital of the IDIC is not able to cover up the failed bank phenomena. It indicates the existence of agency problem between the bank and the Government or the People.

From the results of risk transfer hypothesis testing above, for the two coverage limits, the final conclusion of those two provides strong support for the indication of moral hazard behavior of the IDIC banks to the IDIC after the implementation of the explicit Deposit Insurance system in Indonesia.

Then the research sub hypothesis 1.a or LEVRISK model 1.A for the coverage limit up to IDR 1 billion per account gives practical implication for regulators that the effort of the regulators which is currently associated with banking capital and methods of banking practices (including efforts to improve market discipline and self-discipline) is not sufficient, and needs to be increased again.

The conclusion of the risk transfer hypothesis testing results in this study support the previous opinions from the experts that fixed rate premium system in the Deposit Insurance system will encourage the emergence of moral hazard behavior from the IDIC banks to the IDIC, especially in the countries where the banking is still weak. As for the coverage limit, it also supports the opinion of the experts that the higher the coverage limit value, the higher the encouragement toward moral hazard behavior.

Table 7. Panel Data Regression Results for Risk Transfer Hypothesis with the Maximum Insurance Value of IDR 1 Billion per Account.

Dependent Variables	LEVRISK			FP		
Independent Variables	OLS	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect
Constanta	0.50**		0.539***	0.003		0.003
	(12.9)		(13.25)	(1.07)		(0.87)
ASSRISK	-0.92**	-1.57***	-1.41***	0.1*	0.06*	0.053*
	(-2.3)	(-4.1)	(-4.1)	(1.6)	(1.3)	(1.5)
R2	0.075	0.874	0.812	0.038	0.682	0.533
F statistic	5.2**	-	-	2.6*	-	-
N	66	66	66	66	66	66
Spesification test						
Chow test			0.76			0.18
F test			13.23***			3.801856**
LM test			40.26***			205.06***
Hausman test (Fixed Effect VS Random Effect)			0.985			0.0084

Note: *, ** and *** are significant at the level of 10%, 5% and1%, value in the box shows statistic value of t

4.3. Optimal Coverage Limit of Deposits

Related with the coverage limit, it is necessary for the IDIC to seek the right balance. Right here is that the insurance value must be big enough to prevent the destabilization of bank run but not too big to eliminate the entire market discipline from the supervision toward higher risk taking by banks.

Based on the results of hypothesis testing of this study, the IDIC in determining the coverage limit of Deposit Insurance can refer to this study by trying to do a simulation of determining the optimal limit for the coverage limit of Deposit Insurance by using some exposure values in order to determine right optimal value to reduce the occurrence of moral hazard behavior. It is because the test results with the coverage limit value of IDR 100 million per account is not big enough to encourage risk transfer behavior, whereas with the coverage limit value up to IDR 1 billion, the risk transfer from the sample banks to the IDIC occurs.

5. Conclusion

As a new institution, the IDIC in applying the premium system still uses fixed rate system. Its claim reserve is still determined arbitrarily, and the determination of the coverage limit value of the Deposit Insurance has not been determined based on the results of research. Furthermore, currently, in the banking system in Indonesian, the role of the IDIC is only to handle failed banks without having the power to oversee the banks as the members of the

IDIC. Sironi and Zazzara call this situation as "powerless responsibility". This term refer an institution that must cover the loss caused by failed banks without having policies as the instrument to oversee the risk taking policies by the banks becoming its members.

With the current condition of the IDIC, it will encourage moral hazard from the IDIC banks to the IDIC. In the terminology of agency theory, risk transfer from the banks to the IDIC shows the expropriation from bank management to taxpayers. Expropriation happens when unhealthy banks must be handled by the IDIC (the IDIC here will act as the government) by using the Central Government Revenue and Expenditure (APBN) which its fund comes from taxpayers. The use of the APBN is possible in Law No. 24 of 2004 concerning Deposit Insurance Agency[7]. Furthermore, Financial Stability Forum states that, this fixed rate premium system will make the IDIC rely on the financial support from the government when the funds are insufficient to cover its obligations to the depositors when there is bank failure [33].

The results that can be drawn from the research is the empirical analysis of moral hazard behavior testing. The results of the empirical analysis related to the moral hazard testing show that for the coverage limit of the Deposit Insurance of IDR 100 million per account and IDR 1 billion per account, it indicates the presence of moral hazard behavior from the banks to the IDIC. However, the test results also show that for the coverage limit of the Deposit Insurance up to IDR 100 million per account, it indicates that the value is not too big to cause risk transfer from the banks to the IDIC, so the results of this study can be used as a consideration in determining the optimal coverage limit of Deposit Insurance.

The limitations of this study open opportunities for further research in order to develop this research. Furthermore, the model testing of moral hazard behavior is only conducted through risk transfer testing, in which the risk of leverage and asset risk have not included regulator, market discipline, and self-discipline variables.

Last, moral hazard behavior testing needs to be expanded by including regulator, market discipline, and self-discipline variables to see which variable is the most dominant in influencing the limit of risk taking by banks.

[7] UU No 24 of 2004 on IDIC allow the use of APBN. It is illustrated in Chapter VIII on wealth, financing, and management – article 81, 82, 83, 84, and 85. Those articles state that if the capital of the IDIC is less than the initial capital – at least IDR 4 trillion and IDR 8 trillion at the maximum, that happens because of insurance claim payment, the government with the approval from the House of Representatives will cover the deficit.

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iNFORMATION Vol.20 No.4(A), 2017

Mathematical and Natural Sciences

Multi-purpose Control Laws in Motion Control Systems
Mikhail N. Smirnov, Maria A. Smirnova, Tatyana E. Smirnova and Nikolay V. Smirnov 2265

Preservation Theorems Concerning Compactness in Generalized Topological Spaces
Samer Al Ghour and Abeer Al-Nimer 2273

Management and Social Sciences

Branding Halal and Future Prospects for the Medical Tourism Industry in Malaysia
Dr. Abdullah Sarwar and Prof. Dr. Murali Raman 2281

About Research of Features of Legal Culture on the Basis of Historical -Literary Heritage
Elnur L. Hasanov 2289

The Effects of the International Division of Labor on Manufacturing Industries' Upgrading of China based on Export Vertical Specialization
Bin Zhang, Keonhyeong Lee and Wence Yu 2297

Application of the Marketing Strategies Experience of Multinational Corporations to Modernize the Russian Industry
Ekaterina A. Degtereva, Veronika Y. Chernova and Boris A. Heyfets 2313

Artifacts as a Source of Russian and Kazakh Zoological Terms
Zifa Temirgazina, Uldanai Bakhtikireeva and Vladimir Sinyachkin 2325

Structural Relationships between Elementary School Teachers' Intercultural Sensitivity, Multicultural Acceptability, Learning Cultures, and Multicultural Teaching Competency
Jong-Hun Kang and JuSung Jun 2337

Moral Hazard Testing (Risk Transfer Behavior) in the Deposit Insurance System Based on Fair Premium for Determining Coverage Limit
Firman Pribadi, Eduardus Tandelilin, Mamduh M Hanafi and Suad Husnan 2345

The Problems of National and International Legal Regulation of Intellectual Property Rights
Irina Mirskikh and Zhanna Mingaleva 2361

Modern Trends of Vertical Integration: Opportunities and Problems
Irina Komarova, Ekaterina Novikova and Elena Ustyuzhanina 2373

An Analysis of Verbal Interaction in Elementary School Class using the Flanders Interaction Analysis Categories
Hyunwook Kim and Sekeun Ahn 2383

Safe Reagent Management System for Volatile Organic Compound Management
Changsu Kim, Hyungwook Choi and Hoekyung Jung 2391

Performance Accountability in the Public Sector: Applying a Social Mechanisms Approach
Sunjoo Kwak 2397

Agriculture and Engineering

Air Cargo Decision Support System
Jakkawan Patomtummakan and Narameth Nananukul 2405

A Judgment of Intoxication using Pitch Contour Compare Signal(PCCS)
Seong-Geon Bae, Won-Hee Lee and Myung-Jin Bae 2417

A Software Framework for the Rapid and Accurate Development of UAV
Jung Kyu Park and Jaeho Kim 2425

Extracting Job Hunting-related Information From Web Documents Using Machine Learning and Characteristic Word Extraction
Masaki Murata and Shinnosuke Sawa 2435

A Dissociation of Vision and Action for Selecting Grasp Positions in Different Task Demands
Takahiro Komatsu and Masazumi Katayama 2445

Time Amplifier Based on Metastability-Dependent Time to-Voltage Converter
Ziyad Ahmed Al Tarawneh 2455

Step Rate Measuring System using a Communication Module on a Smart Shoe
Si-Woong Jang, Dong-Hoon, Jung and Jong-Wook Jang 2469

A Step Counting Method using a Communication Module on a Smart Shoe
Si-Woong Jang and Jong-Wook Jang 2477

Design with Implementation of User and Simulation Management Tool for EDISON Middleware
Jin Ma, Inho Jeon, Jongsuk Ruth Lee, Kumwon Cho and Minjae Park 2483

Big Data Based Disease Keyword Recommendation System
Changsu Kim, Hakbum Park and Hoekyung Jung 2495

Sensor Flow Control System Based on Smart Home
Cao kerang, Hangil Jung and Hoekyung Jung 2501

Medial Rotation and Lateral Rotation in Musculoskeletal Diseases Associated with Shoulders
Seong-Yoon Shin 2507

Facial Image Denoising from Degraded Rough Casual Photographs using Hopfield Neural Network
Kwang Baek Kim and Doo Heon Song 2513

'WiFi Direct Neighbor Discovery' Search Method for IoT-based Pill Box Control
Yangmi Lim and Taejung Park 2519

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