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The Role of Corrective Dynamic Market Discipline in the Relationship between Deposit Insurance System and Bank Moral Hazard: Case of Dual Banking System in Indonesia

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Abstract
This study purposes to develop a new concept of market discipline and to examine the role of its concept namely corrective dynamic market discipline in the relationship between deposit insurance system and bank moral hazard. The data of this study is obtained from semi annually financial statements of conventional banks and Islamic banks in Indonesia over the period from 2005 to 2011 that published by Bank Indonesia. Using path analysis to examine the existence of mediating factor, this study shows the important results. First, paid premium ratio and maximum coverage as the measurement of deposit insurance system negatively affect on solvency ratio and that indicate the existence of moral hazard. Second, paid premium ratio also negatively affects on corrective dynamic market discipline and shows the respond of market into banks decision in determining bank cost. Third, corrective dynamic market discipline positively affects on bank solvency and the result shows the role of market in mitigating bank moral hazard. Fourth, corrective dynamic market discipline doesn't mediate the relationship between deposit insurance system and bank moral hazard
Keywords: Deposit Insurance, Market Discipline, Moral Hazard

1. Introduction

Deposit insurance system is one of the bank regulations that intended to prevent bank runs (Diamond and Dybvig, 1983), to mitigate moral hazard (Maysami and Sakellariou, 2008), and to limit bank risk (Lakštutienė *et al.*, 2011). However, some studies shown the failure of the implementation in improving bank stability because of increasing moral hazard that drives banks to be more excessive in taking risks (Angkinand and Wihlborg, 2010; Wagster, 2007). There are three behavior of bank management that underlie to take excessive risk (Garcia, 2000). *First*, bank takes excessive risk when they have no mandatory to pay deposit insurance premium ultimately in blanket guarantee system. *Second*, the existence of incentive to take risk will available if bank capital ratio fall into the lowest level. *Third*, depositors seek bank with high risk to speculative motive in order to take high return.

In the deposit insurance system, bank management tends to shift risk into deposit guarantor institution to adjust with cost of deposit insurance or deposit insurance premium. The transfer of wealth occurs when deposit guarantor lacks ability to charge banks individually for increasing the cost (Duan *et al.*, 1992). Banks take the opportunity to maximizing bank value through the existence of deposit insurance.

Moral hazard behavior is due to asymmetric information when one party with more information has a tendency to behave that can harm those who have little information. Opportunistic behavior or moral hazard in the financial literature refers to an individual in an agreement that has an advantage in exploring inferior ex post information. Whereas manager or agent refers to the party that has access to the ex post information (Hickson and Turner, 1996) . Some researchers provide a similar definition of banks moral hazard that is as a tendency to encourage excessive risk-taking (Gropp and Vesala, 2004), and those behavior arises because of the opportunities in a financial regulation especially the regulation of deposit insurance (Yilmaz and Muslumov, 2008). Barth *et al.* (1992) defined banks moral hazard as an effort to maximize deposit insurance subsidies by lowering capital ratio or increasing leverage ratio.

Market has an important role in controlling moral hazard and bank risk through market discipline (Ellis and Flanery, 1992). Market discipline is a policy mechanism that delegate the tasks of supervision and monitoring not only to the national and international policy makers but also to the stakeholder who their wealth affected by bank behavior (Ceuster and Masschelein, 2003). According to the perspective, market discipline can be identified through depositor behavior into bank manager. For example, depositors may at any time withdraw their funds if bank is in problem. Depositor withdrawal on a large scale (bank runs) will disrupt bank stability. Market discipline also as a market-incentive based when uninsured depositors punish bank with greater risk by demanding higher return (Nier and Baumann, 2006).

The effect of deposit insurance implementation not only responded by depositor but also by borrower. Borrower discipline associated with supply-demand in which the interest rate and the amount of loanable funds are determined at the equilibrium (Önder and Özyildirim, 2008). If banks increase the cost of lending in order to adjust with the deposit insurance premium, borrower will reduces their demand. The equilibrium of depositor discipline and borrower discipline to monitor bank behavior in taking risk create a new concept model of market discipline.

This research develops a new concept of market discipline and examines it in the relationship between deposit insurance and bank moral hazard on the dual banking system in Indonesia. Indonesia adopts a dual banking system which recognizes conventional and Islamic banking. Conventional bank operates based on interest, while Islamic bank operates based on profit sharing. Although conventional banks and Islamic banks have a number of differences, however, according to Olson and Zoubi (2011) since all banks operate in the same competitive environment and are regulated in the same way so that it is have a similar financial statements and possible to be compared as an industry perspective.

The implementation of deposit insurance system in Indonesia started when 16 banks was liquidated at the end of 1997 and then government provided full guarantee (blanket guarantee) to protect banks and depositors and also to overcome economic disturbance. When the public confidence to banks declined, government guaranteed the payment of all banks liabilities including for public deposits. Hereafter, Indonesian government built deposit insurance agency or known as "Lembaga Penjamin Simpanan" or "LPS" in 2004 to response the financial crisis experience (McLeod, 2006). The tasks of LPS are to guarantee the depositors funds, actively participate in maintaining bank stability from irrational run, and to safeguard economic stability as a whole. In general, LPS also has a role in regulating the safety and soundness of banks and performs supervisory tasks by monitoring balance sheet, lending practices, and investment strategies.

The LPS became effective to guarantee depositors funds since September 22, 2005 to March 26, 2006 that all deposits are covered; from March 27, 2006 until September 21, 2006, the maximum deposit insurance coverage of IDR 5,000,000,000.00; since September 22, 2006 until March 21, 2007, the maximum deposit insurance coverage of IDR 1,000,000,000.00; Since March 22, 2007 until October 12, 2008, the maximum deposit insurance coverage of IDR 100,000,000.00; and since october 13, 2008 until now, the maximum deposit insurance coverage of IDR 2,000,000,000.00.

Based on the research gap and the implementation of deposit insurance system in Indonesia then the first problem of this research is how to develop a new concept of market discipline to fulfill the research gap between the influences of deposit insurance system on bank moral hazard. The second research problem is how the new concept mediates the influence of deposit insurance system on bank moral hazard in dual banking system.

2. State of The Art and Proposition of a New Concept

Market discipline also as a form of market sensitivity (Gorton and Santomero, 1990), market signaling (Lane, 1993), and supervision (Crockett, 2002) on the behavior of banks. The respond of market can be performed by some parties such as investor or owner (Hamalainen, 2006), subordinated debt principal (Goyal, 2005), and depositor (Zhang and Rong-Zhe, 2008). Market discipline mechanism is effective if it can push bank management to reduce their moral hazard and risk (Uchida and Satake, 2009).

The surveillance of market as a corrective action against the bank behavior in the implementation of deposit insurance system not only can be performed by bank owner or depositors but also by borrower. The measurements of supervision such as the deposit growth (Spiegel and Yamori, 2007), interest rate (Fueda and Konishi, 2007), and also in the changes of bank capital (Aggarwal and Jacques, 2001). The objective of market discipline is to drive bank in order to improve their soundness. The influence of deposit insurance systems also have an impact on the behavior of borrowers that create the balance of the interest rate (Önder and Özyildirim, 2008).

Maechler and McDill (2006) developed the concept of a dynamic market discipline, while Murata and Hori (2006) and Bond *et al.* (2010) formulated the market-based corrective action concept. Dynamic market discipline is the disciplinary action taken by the parties for which funds are not guaranteed by the bank, while the market-based corrective action is a disciplinary action by the market in order to improve bank soundness and performance. Supervision is performed by the parties that they wealth affected by bank activities with the objective to control bank managers of hidden action because of the differences in information between managers and stakeholders. The supervision is a signal for banks to act with due regard to the interests of stakeholders.

Based on the elaboration of several concepts of market discipline, this research proposes the proposition of a new concept namely corrective dynamic market discipline in a statement as below:

Proposition:

"Corrective dynamic market discipline is a market surveillance that is performed by the parties which the wealth

is affected by bank behavior such as depositors and borrowers actively and correctively in order bank to improve their risk. This action is determined by deposit insurance scheme and the integrated supervision of depositors and borrowers will reduce bank risk"

3. Previous Research and Hypotheses Development

3.1 Deposit Insurance System and Moral Hazard

Deposit insurance system is a protection scheme as a part of financial safety to protect bank depositors from banking instability that have consequences on funds losses. Design of deposit insurance involves deposit insurance premium, deposit insurance coverage, membership, financial safety net interrelationship, and bank failure resolution (Schich, 2008). The term of deposit insurance system was known since United States implemented the regulation that organized by Federal Deposit Insurance Corporation (FDIC) in 1930 and it's separated from central bank. The system that resulted in more than 9000 suffered and bankrupt banks (Garten, 1994).

The previous research found the impact of deposit insurance system on bank moral hazard. Keely (1990) noted a point that deposit insurance system worked to guarantee banks but it provides moral hazard. The concept of moral hazard refers to the adverse effects from guarantor view as a result from the behavior of guaranteed party (Cartwright and Campbell, 2003). The party is depositors and bank managers. When the depositor's funds are fully guaranteed by the guarantee agency, depositor's incentive to consider risk is being lost. The depositors placing funds for saving is due to a high return without giving attention of bank's risk. While moral hazard related to the bank agent in term of bank management. Bank's manager has an incentive to act unwisely and to take excessive risks if they know that the depositors would withdraw their funds when bank failed.

The increasing bank's leverage from depositors fund and followed with decreasing equity ratio of bank after flat-rate deposit insurance implementation indicate the existence of moral hazard (Gueyie and Lai, 2003). Enkhbold and Otgonshar (2013) found that the government-funded deposit insurance funds allow banks to take a higher risk. The implementation of risk-based deposit insurance recommended as an effective regulation to mitigate bank moral hazard especially in the countries with good regulatory framework and institutional quality. If deposit insurance premium is determined only based on expected losses to capture systemic risk, bank will create risky investment to take subsidized opportunity from deposit insurance (Acharya *et al.*, 2010; Pennacchi, 2006). Several other studies also shown that inappropriate determination of deposit insurance premium stimulate sensitivity to higher risk (Urrutia, 1990), even though can remove wealth transfer from guarantor agency to bank (Craine, 1995).

Deposit insurance premium assosiated with subsidy for banks losses. The higher subsidy and the low deposit paid premium, bank takes more excessive risk taken by banks (Mishra and Urrutia, 1995) especially in fixed rate premium regulation (DeLong and Saunders, 2011; Grenadier and Hall, 1996). Low deposit insurance premium attracted banks interest to join with guarantor agency but it is difficult to mitigate bank behavior in investing on risky projects (Chiang *et al.*, 2007). The higher paid deposit insurance premium affects the lower equity ratio because of the existence of asymmetric information (Bhuyan and Yan, 2007).

In the full deposit insurance coverage, banks decrease their solvency (Maysami and Sakellariou, 2008; McLeod, 2006). Equity ratio has a role in protecting depositors with absorb bank losses due to the failed of investment decisions (Louzis *et al.*, 2012). The lower equity ratio shifts agency conflict between principal and agent into guarantor agency (Shaffer, 2012).

Based on the review of previous research above, this research proposes the hypotheses as below:

H1: Deposit insurance premium affects on bank moral hazard. If equity ratio decrease when deposit insurane premium increase, it indicates the existence of bank moral hazard

H2: Maximum deposit insurance coverage affects on bank moral hazard. If equity ratio decrease when maximum coverage increase, it indicates the exiztence of bank moral hazard

3.2 The Role of Corrective Dynamic Market Discipline

Modern banking theories emphasized on the importance of creating policies with incentive that direct to positive behavior (Nagarajan and Sealy, 1997). Whereas, Llewellyn (2002) identified factors that causes of banking crises. The factors are moral hazard, ineffective regulation, and weak market discipline. Corrective dynamic market discipline measured by comparing of depositor discipline and borrower discipline (Önder and Özyildirim, 2008)

Some studies shown that deposit insurance system affects on depositor discipline (Demirgüç-Kunt and Huizinga, 2004; Osano, 2005). Deposit insurance premium negatively affect on deposit growth (Laeven, 2002; Pennacchi, 2000). Flat deposit insurance premium counterproductive with systematic risk thus limited deposit growth in the partial deposit insurance system (Fegatelli, 2010). Low deposit insurance premium can protect depositor funds (Chu, 2011)

Deposit insurance system non only impact on depositor response but also on borrower response. Bad safety net design impacts on banks instability thus encouraging lenders hesitation to access fund from bank (Brock, 2000). Limitation on bank deposit insurance decreasing cost of funding and increasing cost of lending thus reduce public access to bank funds (Goldberg and Hudgins, 2002).

The impact of deposit insurance on corrective dynamic market discipline based on agency theory and posits depositors as the owner of funds. Depositors can interpret and evaluate information if related to safety of their funds (Gilbert and Vaughan, 2001).

Market discipline encourages money market to provide signal in accordance with bank solvency. Bank risk will increase if credit quality and quantity growing excessively (Davis and Karim, 2008). In the abnormal lending growth, bank loan losses will increase and interest income decrease (Foos *et al.*, 2010). If banks have no early warning system, excessive credit growth will impact on external deficit (Kauko, 2012). The highly lending growth shows the weakness of market monitoring and gives opportunity for bank to take excessive risk.

Based on the review of previous research above, this research proposes the hypotheses as below:

H3: Deposit insurance premium affects on corrective dynamic market discipline

H4: Corrective dynamic market discipline affects on bank moral hazard. In the lower corrective dynamic market discipline indicates the lower of depositors and borrowers monitoring. If the ratio increase and followed with decreasing bank solvency, bank moral hazard does exist.

H5: Corrective dynamic market discipline mediates the influence of deposit insurance premium on bank moral hazard

4. Methodology and Model Formulations

This research applies unbalance panel data on conventional and Islamic commercial banks in Indonesia over the period from 2005 to 2011. The data is obtained from semi annually financial statements that published by Bank Indonesia. Deposit insurance system is measured by paid premium ratio and maximum coverage, bank moral hazard is measured by solvency ratio, and corrective dynamic market discipline is measured by lended fund to third party fund ratio. The research model using structural equation modeling or path analysis and the data processed with AMOS 21.0 software.

We address the model of this study to examine five hypotheses that proposed above. To test hypothesis 1, 2, and 3, the effect of deposit insurance and corrective dynamic market discipline on bank moral hazard then we use the following equation:

$$SR_{it} = \beta_{11}PPR_{it} + \beta_{12}MCOV_{it} + \beta_{13}LFTPFR_{it} + \varepsilon_{1it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where SR is solvency ratio that calculated with equity to total assets, PPR is paid premium ratio is calculated with 0.1% times the average of six month deposits that guaranteed by LPS divided by operational income. Guaranteed deposits of conventional banks contain of demand deposits, time deposits, certificates of deposit, saving, and other similar form. While guaranteed deposits of Islamic banks contain of demand deposits based on *wadiah* principle, saving based on *wadiah* principle, saving based on *mudharabah mutlaqah* or *mudharabah muqayyadah* principles that it risk borne by banks, and other similar deposit based on Islamic principles. Another measure of deposit insurance is MCOV or maximum coverage which we measure that ranges from 5 to 1. Higher values indicate the highest maximum coverage. LFTPFR is lended funds to third party funds ratio to measure the concept of corrective dynamic market discipline. Lended funds of conventional banks in the form of credit, and financing in form of *murabahah, mudharabah, salam, istishna, qardh*, and *ijarah* in Islamic banks. Moreover, third party funds of conventional banks contain of saving, demand deposits, time deposits, certificate of deposits, and other similar form. In Islamic banks, third party funds contain of demand deposits based on *wadiah* principle, saving based on *wadiah* principle, saving based on *mudharabah mutlaqah* or *mudharabah muqayyadah* principles that it risk borne by banks, and other similar deposit based on Islamic principles.

To test hypothesis 4, the effect of deposit insurance on corrective dynamic market discipline ratio and the equations as below:

$$LFTPFR_{it} = \beta_{21}PPR_{it} + \varepsilon_{2it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

While to test mediating factor in hypothesis 5, we compare direct effect and indirect effect in the relationship between independent variable and dependent variable using sobel test. If coefficient of the indirect effect higher than coefficient of direct effect, it indicates the existence of mediating factor.

The steps of structural equation modeling (SEM) test start from test of normality, multicollinearity, singularity, goodness of fit, direct and indirect effects, and model significance. In the SEM test requires normality data in the multivariate side with cut off value ≤ 2.58. To test goodness of fit includes absolute fit measure and incremental fit measure. Absolute fit measure to measure overall fit model both structural model and simultaneous measurement model that includes: (1) Likelihood-Ratio-Chi-Square Statistic (χ^2) with cut off value expected low; (2) CMIN/DF or chi square value divided by degree of freedom with cut off value ≤ 5; (3) Goodness of Fit Index (GFI) as a non statistic measurement with value between 0 (poor fit) to 1 (perfect fit) and

recommended cut off value ≥0,90; and (4) Root Mean Square of Approximation (RMSEA) as a measurement to improve statistic chi square trend in rejecting model with large sample size and required value ≤0,08 .

Incremental fit measure is measurement to compare proposed model with specified other model. This test includes: (1) Adjusted Goodness of Fit Index (AGFI) as a development of GFI that fitted with degree of freedom ratio to proposed model with degree of freedom to null model and required value ≥0,90; (2) Tucker Lewis Index (TLI) as measurement that merges parsimony measurement into comparative index between proposed model and null model, and the recommended value ≥0,90; (3) Normed Fit Index (NFI) as measurement to compare proposed model and null model with value standard ≥0,90. After the test of goodness of fit, the next step is test of hypotheses significance to examine the relationship among variables.

5. Results and Conclusion

Table 1 reports the number of bank sample with semi annually financial statements over the period from mid 2005 to 2011. Total sample size is 378 and after the normality test, 15 data outlier were eliminated from sample to get data normality so remain 363 that examined in this research model. The value of normality distributed in multivariate is of 2.11 less than 2.58 (table 3).

Figure 1 shows the goodness of fit model that proposed in this study. Figure 1 shows the value of chi-square=0.032; Prob=0.858; GI=1.000; AGFI=1.000; NFI=1.000; TLI=1.096; CFI=1.000; and RMSEA=0.000. All values fulfill the recommended value and concluded that the model is very fit so that the test can be continued to examine proposed hypotheses. .

Table 3 as shown below explains the relationship among variables that proposed in this study. Hypothesis 1examines the effect of paid premium ratio on bank moral hazard that measured by solvency ratio and negatively significant in the level of 0.1. If bank cost of deposit insurance increase, bank tend to decrease the level of equity to total asset ratio. The result indicates the existence of bank moral hazard and supports the previous research that proves the influence of deposit insurance system on bank moral hazard. If bank cost increase, it means that the wealth of banks owner will reduced so that bank also would reduces their solvency as substitute.

Hypothesis 2 examines the effect of maximum coverage on bank moral hazard and also shows the negatively significant at the level of 0.1. If maximum coverage increases, banks tend to decrease their solvency ratio. The finding also shows the existence of bank moral hazard behavior in the implementation of deposit insurance system.

Hypothesis 3 examines the influence of corrective dynamic market discipline on bank moral hazard and result the negatively significant at the level of 0.05. If paid premium ratio increases, the ratio of lended funds to third party funds tend to decrease. The situation represents the respond of market, in this case borrowers and depositors, toward banks decision to increase their cost. Banks will charge in form of decreasing funding cost and increasing lending cost. In the efficient market, borrowers will restrict their access to banks fund and depositors will take their funds from banks if the expected return reduced.

Hypothesis 4 examines the influence of corrective dynamic market discipline on bank moral hazard and result the positively significant at the level of 0.05. This finding explains the role of corrective dynamic market discipline in mitigate bank moral hazard. If the ratio of lended funds to third party funds increases, banks tend to increase their solvency to take the opportunity of bank growth. This condition also supported by the implementation of bank capital so that they increase the bank capital to avoid punishment from bank regulator.

Finally hypothesis 5 examines the role of corrective dynamic market discipline in the relationship between deposit insurance system and bank moral hazard shows the insignificant effect. The coefficient of direct effect of the influence of paid premium ratio on bank moral hazard is higher than the coefficient of the influence of paid premium ratio on bank moral hazard through corrective dynamic market discipline. In this case, the situational decision will affect to bank management in take decision especially in determining bank capital.

This research supports the previous research that found the influence of deposit insurance system on bank moral hazard that described in the previous section. The result of this research imply to the importance of mandatory bank capital regulation to mitigate bank moral hazard. The increasing of bank costs affects the decreasing of bank solvency. Therefore, bank need to design bank efficiency model so that maintain shareholders wealth and also stand on depositor protection.

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Table 1:
Bank Sample over the period from 2005-2011

Period	2005	2006	2007	2008	2009	2010	2011	Total
I	-	33	28	29	29	29	29	177
II	33	27	26	29	29	29	28	201
Total	33	60	54	58	58	58	57	378

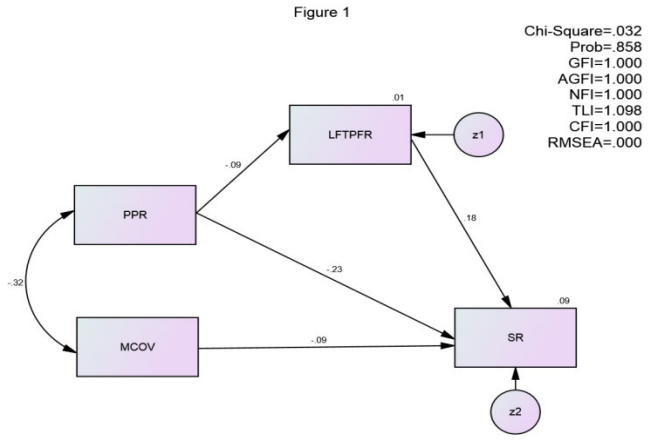

Figure 1
The Relationship among variables

Table 2: Standardized Estimate and Statistical Significant

Variables	Standardized Estimate	Critical Ratio	Value	
PPR → SR	-0.231	-4.348	0.095*	Moral hazard does exist
MCOV → SR	-0.090	-1.699	0.089*	Moral hazard does exist
PPR → LFTPFR	-0.087	-1.669	0.000***	Corrective dynamic market discipline does exist
LTFTPR → SR	0.181	3.589	0.000***	Moral Hazard doesn't exist
PPR → LTFTPR →SR	-0.016	-1.469	0.1416	Insignificance mediating factor
Value of Multivariate Normality Assessment = 2.211 *=significant at level 10% **=significant at level 5% ***=significant at level 1%				

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