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REAL DEPOSIT INSURANCE COVERAGE AT U.S. COMMERCIAL BANKS

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Deposit insurance legislation currently being considered by the U.S. Congress proposes to increase the nominal level of insurance coverage for the first time since the passage of DIDMCA in 1980. Since that time, the fixed nominal amount of coverage has resulted in an erosion of the real amount of coverage due to continued inflation. This paper examines the relationship between real coverage and bank risk at individual banks over the last 10 years. The findings suggest that the change in real coverage over time has not been associated with a change in risk at commercial banks. This result implies that legislation proposing to increase nominal and real coverage will not result in increased moral hazard behavior at banks.

INTRODUCTION

Deposit insurance legislation currently being considered by the U.S. Congress proposes to increase the nominal level of insurance coverage for the first time since the passage of DIDMCA in 1980. Since that time, the fixed nominal amount of coverage has resulted in an erosion of the real amount of coverage due to continued inflation. The new legislation under consideration would raise nominal coverage and then index that amount so that the real level of coverage will remain stable in the future. Proponents of the increase in nominal coverage argue that the steady reduction in real coverage has had a negative impact on banks that rely more heavily on insured deposits as a source of funds. Since these banks are typically smaller institutions, they are at an even greater disadvantage due to any implicit subsidy for banks that are too big to fail. Opponents of this legislation point to the moral hazard associated with deposit insurance. They argue that increasing nominal coverage would result in more risk-taking behavior as evidenced in the S&L crisis of the late 1980s-early 1990s.

This paper looks at the second of these arguments by examining the relationship between bank risk and real deposit insurance coverage. The testable hypothesis is that the amount of real deposit insurance coverage is positively related to bank risk, supporting the moral hazard argument. Under the alternative, real coverage is not related to bank risk, being consistent with the argument that the benefits to increasing coverage may outweigh any moral hazard issues. Using a panel of U.S. commercial banks, a model relating bank risk to real coverage and other relevant financial variables is estimated. Since real coverage has declined over time, bank risk should have also declined, all else held constant, according to the moral hazard argument.

Research on Deposit Insurance

There is a large amount of literature, both theoretical and empirical, on deposit insurance. Some recent examples are Cull, Senbet, and Sorge (2005) on the impact of deposit insurance on financial development and stability; So and Wei (2004) on deposit insurance and forbearance; Laeven (2004) on the political economy aspects of deposit insurance; and Demirguc-Kunt and Kane (2002) on an international comparison of deposit insurance regimes.

The most frequent topic throughout deposit insurance research relates to the issue of pricing deposit insurance premia. Acharaya and Dreyfus (1989) derive a deposit insurance premium related to the deposit to asset ratio and bank investment. They find that deposit insurance premia is a non-decreasing function of the deposit to asset ratio and a monotonically increasing function of the risk of bank investment. Flannery (1991) looks at the case where the insurer measures bank risk with error, finding that a combination of risk-based premia and risk-related capital standards is optimal. Matutes and Vives (2000) look at the welfare effects of different deposit insurance regimes, including both flat-rate and risk-based premia. Duffie et al. (2003) apply methods for fixed-income securities to compute fair-market deposit insurance premia. These articles provide a sampling of the literature but are not exhaustive of the research on risk or market based premia.

The one area largely neglected in this body of work is the explicit study of the amount of coverage, either real or nominal, provided by deposit insurance. Some recent research has attempted to look at the amount of coverage, focusing on cross-country differences. Demirguc-Kunt and Detragiache (2002) find evidence that higher coverage levels increase the likelihood of banking crises. Demirguc-Kunt and Huizinga (2004) find that higher levels of coverage reduce interest rates while weakening market discipline. Laeven (2004) uses a political economy approach to explain differences in coverage across countries. His findings suggest that private interests rather than political institutions influence the amount of deposit insurance coverage.

The following is an attempt to expand current research on the amount of deposit insurance coverage. By focusing on U.S. commercial banks and exploiting the fact that real deposit insurance has steadily fallen throughout the sample period, this paper attempts to examine the effect of coverage on the amount of risk at individual banks. Building on empirical models of bank risk used by Hassan (1993), Hassan and Sackley (1994), Hassan, Karels, and Peterson (1994), and Khorassani (2000), the amount of real coverage is added as a determinant of bank risk. The study by Hassan and Sackley (1994) provides empirical evidence of capital market reactions to the growth and riskiness of bank off-balance sheet loan commitment activities. Using data for the 100 largest U.S. banks and BHCs

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from 1984 through 1988, this paper reports strong evidence that loan commitments reduce bank risk. Hassan, Karels, and Peterson (1994) examine the market discipline of OBS activities on the default risk premia of bank subordinated debt. They find that OBS activities reduce bank risk. Therefore, they conclude that it may be inappropriate to incorporate some OBS activities in the calculation of risk-based capital requirements. Khorossani (2000) using a cross-sectional data set on U.S. commercial banks empirically examines the argument that during the mid 1980s to early 1990s depositors were insensitive to bank risk. Little support is found for this argument. Hassan (1993) has examined market discipline of commercial letters of credit, loan sales, standby letters of credit, interest rate swaps and other OBS banking activities by using implied asset risk. His empirical results suggest the existence of market discipline of these OBS activities.

Hypothesis and Model Specification

This paper investigates the relationship between real deposit insurance coverage and bank risk. If deposit insurance results in moral hazard behavior, then bank risk should be related to the level of coverage. To examine this relationship, the following moral hazard hypothesis is tested:

> Bank risk is positively related to the level of real deposit insurance coverage.

Under the null hypothesis, the amount of real deposit insurance coverage is associated with bank risk. This result would imply that increasing the amount of real coverage, as is being considered in current legislation, would result in more risk in the banking system. Under the alternative hypothesis, bank risk would be unrelated to real coverage, suggesting that raising the amount of coverage would not be associated with additional risk. To test this moral hazard hypothesis, an empirical model is constructed that relates bank risk to a set of explanatory variables, including real coverage, and other control variables that might influence bank risk. The model is estimated for individual banks using cross-section and annual time-series data from 1995-2004. The data was obtained from the FDIC's Reports of Income and Condition provided by Financial Information System.

For the dependent variable in the regression model a measure of risk is needed. In this context, what is important is the risk exposure of the deposit insurance system. Since this type of risk has different dimensions, three separate models are estimated, each using a different measure of risk to the deposit insurance system as a dependent variable. One dependent variable is the ratio of bank equity to total assets (EQUITY). The amount of equity measures the size of the cushion a bank has to absorb losses on the asset side of the balance sheet. If deposit insurance results in moral hazard behavior, then banks will hold a smaller cushion against potential losses, due to the safety net provided by the insurance. The capital ratio is regulated by federal as well as international standards so banks may not be completely free to alter this ratio. During the time period under examination, real coverage fell, so if the relationship reflecting moral hazard is present, the ratio should have risen. This type of change would not be prohibited by capital standards since they set minimums only.

Since a larger amount of equity represents a smaller amount of risk, small values of the dependent variable imply more risk. Hence, an independent variable that is positively related to bank risk would have a negative coefficient. The dependent variable of the second model is the ratio of insured deposits to total liabilities (INSURED). This variable measures the proportion of bank liabilities that the deposit insurance system could be liable for if a bank became insolvent. The dependent variable of the third model measures the ratio of brokered deposits to total liabilities (BROKERED). Brokered deposits typically provide a way for large depositors to exploit the nominal coverage limit, so similar to INSURED, this variable measures potential exposure to losses faced by the deposit insurance system. For both INSURED and BROKERED, a larger amount would represent more risk exposure so an independent variable with a positive relationship with risk would have a positive coefficient.

For the explanatory variables the primary focus will be placed on RCOV, the real level of deposit insurance coverage measured in 2004 dollars. This variable will vary over time, but be constant across banks at a point in time. According to the moral hazard hypothesis, RCOV should be positively related to bank risk. For the model with EQUITY as a dependent variable, a significant negative coefficient would support the idea that deposit insurance is associated with moral hazard behavior. For the other two dependent variables, a significant positive coefficient would support the moral hazard hypothesis.

In addition to RCOV, other explanatory variables are included to control for other factors that may be related to bank risk. The full model with expected signs is given by the following:

$$R = f(\underset{-}{RCOV}, \underset{-}{LLATL}, \overset{+}{LNSIZE}, \overset{+}{DERCON}, \overset{+}{SECINVAR}, \overset{+}{NIAR}, \overset{+}{LAAR}, \overset{?}{CILLR}, \underset{-}{NPATA}, \underset{-}{ROE}), \quad (1)$$

Where:

R	=	bank risk;
RCOV	=	level of real coverage (thousands of 2004 dollars);
LLATL	=	ratio of loan-loss allowance to total loans;
LNSIZE	=	logarithm of total bank assets;
DERCON	=	derivatives position indicator;
SECINVAR	=	ratio of total security investment of each bank to total assets;
NIAR	=	ratio of total net income of each bank to its total assets;
LAAR	=	ratio of total liquid assets of each bank to its total assets;
CILLR	=	ratio of total commercial and industrial loans of each bank to total loans;
NPATA	=	ratio of nonperforming assets to total assets;
ROE	=	return on equity.

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LLATL and LNSIZE are proxies for credit risk and bank size, respectively (Hassan & Sackley, 1994). The variable LLATL accounts for credit risk and represents the probability of future defaults. Higher credit risk reflects a higher degree of expected loss in the loan portfolio; therefore, LLATL is positively related to bank risk. A larger bank has more options to diversify its asset portfolio and lower its earning variability. Moreover, investors believe that large banks are protected from failure by a greater degree of regulatory support. Therefore the bank risk and LNSIZE are expected to be negatively related.

As a measure of off-balance sheet activities, DERCON has been constructed from activities listed on schedule RC-L of the FDIC's report of condition. DERCON is defined as the sum of four categories of contracts: interest rate contracts, foreign exchange contracts, equity derivative contracts, and commodity and other contracts. Each category of contracts is calculated as the sum of the gross amount of futures contracts, forward contracts, and swaps. Gross contracts are used to construct DERCON since the focus of this variable is the overall volume of these activities instead of the bank's net position. Hassan, Karels, and Peterson (1994) in their study construct five off-balance sheet variables from 19 items included in the RC-L schedule. They find that off-balance sheet activities tend to reduce bank risk by providing diversification to the bank. From this, DERCON and bank risk are expected to be negatively related.

Other explanatory variables include measures of the composition and quality of assets and bank profitability as found in Khorossani (2000). The ratio of total security investment to total assets is a measure of asset quality. U. S. government securities provide both liquidity and income to a bank and are free of default risk, therefore the SECINVAR is expected to have a negative effect on bank risk. The ratio of net income to total assets (NIAR) is a measure of bank profitability relative to assets. This profitability measure also accounts for the composition of bank activities between traditional and nontraditional area. It is expected to be negatively related to risk since higher profits should strengthen a bank's condition, all else constant. The ratio of liquid assets to total assets (LAAR) is a measure of a bank's ability to meet the increased liquidity needs of its depositors. Liquid assets provide safety and at the same time reduce profitability of a bank. Liquid assets should also be negatively related to bank risk since they reflect a more stable mix of assets. The ratio of total commercial and industrial loans to total loans (CILLR) is included to control for the composition of a bank's loan portfolio.

According to Khorassani (2000), there is no clear relationship between CILLR and bank risk. In her study modeling bank risk as the likelihood of failure, the coefficient on this variable was positive in some instances and negative in others. The ratio of nonperforming assets to total assets (NPATA) is included to control for the quality of a bank's assets. It is expected to be positively related to bank risk since nonperforming assets add to overall risk. Return on equity (ROE) is also included to measure bank profitability relative to stockholder's equity. ROE is expected to be positively related to bank risk since it reflects bank performance. The model also includes individual bank and time effects, since the data used in the study combines cross-section and time series data.

EMPIRICAL RESULTS

Data

A panel of 6,754 banks over the years 1995-2004 was employed to perform the econometric analysis. All financial variables were constructed annually using information from the December call report in each year. Figures 1, 2, and 3 display a time series plot of nominal and real coverage along with each dependent variable. Figures 1, 2, and 3 also show the steady decline in real coverage over the ten years of the sample. Real coverage expressed in 2004 dollars has fallen from approximately $140,000 in 1995 to $100,000 in 2004. Figure 1 shows that bank risk as measured by the ratio of equity to assets, follows a slight U-shaped pattern over time. Figure 2 shows that bank risk measured by the ratio of insured deposits to total liabilities declines until 2000, then it rises till the year of 2003, and after this year it starts declining again. Figure 3 shows that bank risk measured by the ratio of brokered deposits to total liabilities steadily increases from 1995 through 2004.

Figure 1: Nominal and Real Coverage vs. Risk: Ratio of Equity to Total Assets

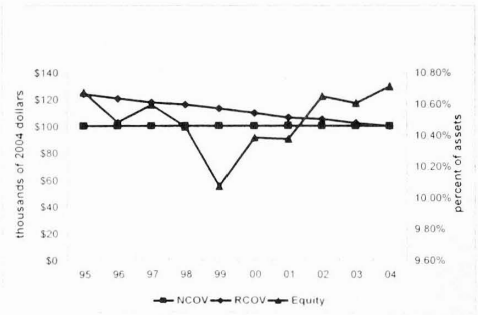

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Figure 2
Nominal and Real Coverage vs. Risk: Percentage of Insured Deposits

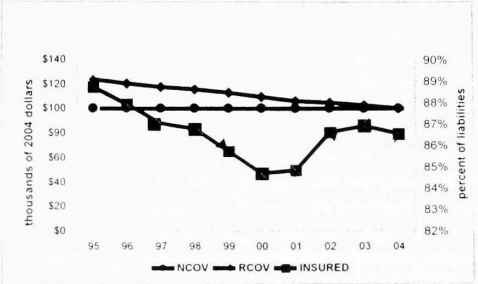

Figure 3
Nominal vs. Real Risk: Percentage of Brokered Deposits

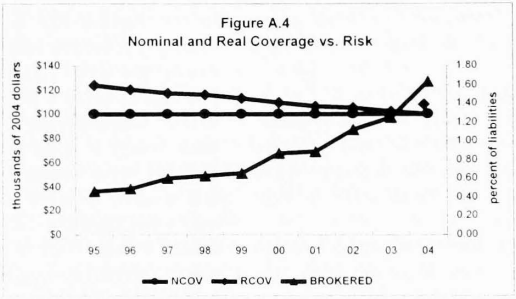

Table 1: Fixed Effects Results (standard errors in parentheses)

Independent Variables	Dependent Variables		
	(1) EQUITY	(2) INSURED	(3) BROKERED
RCOV	0.389E+10 (.171E+11)	-0.822E+09 (.401E+11)	-0.244E+10 (.231E+11)
LLATL	0.227*** (.011)	0.160*** (.0257)	-0.131*** (.0148)
LNSIZE	-0.038*** (.805E-3)	-0.019*** (.189E-2)	0.045*** (.109E-2)
DERCON	0.730E-12 (.539E-12)	0.524E-11*** (.126E-11)	0.385E-12 (.729E-12)
SECINVAR	0.485E-04*** (.185E-4)	-0.688E-04 (.434E-4)	-0.629E-04** (.25E-4)
NIAR	0.272E-02*** (.312E-3)	0.336E-03 (.732E-3)	0.233E-03 (.422E-3)
LAAR	0.909E-02*** (.785E-3)	0.432E-02** (.184E-2)	-0.178E-02** (.106E-2)
CILLR	-0.01*** (.243E-2)	-0.046*** (.571E-2)	0.016*** (.329E-2)
NPATA	-0.129*** (.997E-2)	0.755E-02 (.023)	0.030** (.0135)
ROE	-0.027*** (.155E-2)	0.447E-02 (.364E-2)	-0.274E-02 (.210E-2)
Adj. R2	0.798	0.738	0.651
F-statistic	5734.54	4683.07	3478.03

*significant at 10%, **significant at 5%, ***significant at 1%

Regression Results

Table 1 above presents the coefficients of the estimated regression models. The equations were estimated using the ratio of equity to total assets (column 1), the ratio of insured deposits to total liabilities (column 2), and the ratio of brokered deposits to total liabilities (column 3) as measures of risk. Given the large sample size for each year of data, the central

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limit theorem suggests the variables are normally distributed. Hence, both fixed and random effects models were estimated. The Hausman (1978) test for fixed vs. random effects was conducted and led to the rejection of the random effects model in each case. For models (1), (2), and (3) Chi-square values with p-values in parentheses are respectively 1440.2(.0000), 179.04(.0000), and 1112.3(.0000).

Potential multicollinearity between the two profitability measures (ROE and NIAR) was addressed. The estimated correlation coefficient between ROE and NIAR is -0.01405, therefore multicollinearity does not appear to be a problem. A full correlation matrix of the independent variables is presented in appendix A. As a further check for multicollinearity, each model was re-estimated omitting the insignificant dependent variables (except for the variable of interest, RCOV). RCOV remained insignificant while the other variables were still significant with the same signs. Individual fixed effects were estimated for each bank and for the first nine years of the sample. An overall intercept was not included to avoid perfect collinearity. Coefficient estimates of the fixed effects are not reported due to space limitations.

Overall, the regression models seem to provide a good fit. The F-statistics were significant for all three models. Adjusted R^2 is 0.798 for model (1), 0.738 for model (2) and 0.651 for model (3). Most of the independent variables have significant coefficients with the expected sign. Confidence intervals of the coefficients are given in appendix B.

The primary focus of this paper is the relationship between the amount of real deposit insurance coverage and bank risk. According to the moral hazard hypothesis above, bank risk is positively related to the level of real deposit insurance coverage. As a result, the coefficient of real coverage (RCOV) is expected to be significantly negative in column (1) and significantly positive in columns (2) and (3). As can be seen in table 1, the estimated coefficients on RCOV are consistently insignificant. This result does not support the moral hazard hypothesis. It implies that the steady decline in real deposit insurance coverage in the last ten years has not affected bank risk, as measured by all three dependent variables. By extension, current legislation proposing to increase the amount of nominal coverage and then index it to inflation should not add significantly to the risk-taking behavior of banks. This policy would result in an initial increase in real coverage followed by a constant amount of real coverage. According to the above findings this policy change would not expose the banking system and the FDIC to increased risk brought about by moral hazard behavior. This result is robust to all three model formulations.

For the regression model using EQUITY as the dependent variable the coefficients of other explanatory variables are all significant except one, with most having the expected sign. The derivatives position indicator (DERCON), the off-balance sheet variable, is not statistically significant suggesting that for the time period used in the present study off-balance sheet activities by commercial banks did not have an impact on bank risk measured by the ratio of total equity to total assets. These results are not consistent with those of Hassan (1993), and Hassan, Karels, and Peterson (1994) who have found evidence that off-balance sheet activities are negatively associated with bank risk, as measured by the implied asset variance derived from Gorton and Santomero's (1990) subordinated debt option pricing model and the implied asset variance with the leverage ratio augmented by OBS debt.

As expected, the coefficient of liquid assets to total assets ratio (LAAR) is positive and statistically significant at a 1% level. A higher ratio of liquid assets to total assets is associated with a higher ratio of total bank equity to total bank assets implying lower bank insolvency risk in this case. This agrees with Khorossani's (2000) result that a bank's ability to meet depositors' increased liquidity preferences has a negative effect on bank risk. Net income to total assets ratio (NIAR) has the expected positive sign and it turns out to be statistically significant at 1%. A higher ratio of net income to total assets is associated with a higher ratio of total bank equity to total bank assets. Therefore, banks with higher profits are less likely to become insolvent. This result also supports Khorossani's (2000) finding that a measure of a bank's profitability is inversely related to bank risk. The nonperforming assets to total assets ratio (NPATA), approximating asset quality, is negative and significant at a 1% level. A higher ratio of nonperforming assets to total assets is associated with a lower ratio of total bank equity to total bank assets and higher insolvency risk. Holding more nonperforming assets in its portfolio suggests that a bank is more likely to become insolvent. Return on equity (ROE), the most common measure for bank profitability related to stockholders' equity, has the expected negative sign and is statistically significant at a 1% level. A higher return on equity is associated with a lower ratio of total bank equity to total bank assets implying more risk. The ratio of total security investments to total assets (SECINVAR) is significantly positive at a 5% level. A higher ratio of total security investment to total assets is associated with a higher ratio of total bank equity to total bank assets. Securities are free from default risk, moreover, they provide liquidity and income to a bank, and therefore a large amount of securities in asset portfolios improves bank asset quality and decreases insolvency risk. This outcome supports the empirical findings by Khorossani (2000).

The effect on bank risk of the ratio of commercial and industrial loans to total loans (CILLR) was indeterminate according to Khorossani (2000). The result in table 1 for model (1) shows that the effect of this ratio on bank risk is negative and significant at a 1% level. A higher ratio of commercial and industrial loans to total loans is associated with a lower ratio of total bank equity to total bank assets. CILLR reflects the composition of a bank's loan portfolio. Banks with a high concentration of commercial and industrial loans and consequently a less diversified loan portfolio exhibit more risk. Moreover, loans are subject higher risk than securities.

The ratio of loan loss allowances to total loans (LLATL), a proxy for credit risk and the probability of future default, is significant and positive. The anticipated sign for LLATL is negative suggesting that banks with higher credit risk are more likely to become insolvent. The positive coefficient implies that a higher ratio of loan loss allowance to total loans is associated with a higher ratio of total bank equity to total bank assets. A

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possible explanation of this result is that banks with additional loan loss exposure decide to hold more equity as a way to protect themselves from loan losses.

The proxy for bank size (LNSIZE) doesn't retain the anticipated sign and it is significantly negative at a 1% significance level. This result, similar to the result for LLATL coefficient, is not in agreement with Hassan and Sackley (1994). The reason behind this result may be that for large banks it is easier to hold less equity since they have a greater ability to diversify their asset portfolio. Moreover, they have better access to capital markets, increasing their ability to borrow. Large banks also receive a greater degree of regulatory support and plus any implicit subsidy for banks too big to fail. Due to all of these factors, large banks do not have to hold as much equity.

Each dependent variable used in models (1), (2) and (3) measures different aspects of risk. EQUITY measures insolvency risk, INSURED measures risk exposure of the insurance fund to possible losses, while BROKERED measures abuse of the system and consequently potential exposure to losses faced by the deposit insurance system. For EQUITY a larger amount represents less risk exposure, for INSURED and BROKERED a larger amount represent more risk exposure. Under the moral hazard hypothesis RCOV is expected to be negative for the model using EQUITY and positive for models using INSURED and BROKERED. However, due to the fact that dependent variables measure different aspects of risk, the signs of other independent variables included in the models to account for other factors that influence risk may not correspond across all three models. Results may not be consistent for the same independent variable.

For the model using INSURED as the dependent variable the results are presented in column (2). Loan-loss allowance to total loans ratio (LLATL) is positive and statistically significant at 1%. A higher degree of expected losses in the loan portfolio is associated with a higher ratio of insured deposits to total liabilities. The proportion of bank liabilities that the deposit insurance system could be liable for if a bank became insolvent is higher for banks that experience greater credit risk.

The logarithm of total bank assets (LNSIZE) is negative and statistically significant at 1%. A large bank, as measured by assets, has a lower ratio of insured deposits to total liabilities and is associated with less exposure of the insurance fund to possible losses. This implies that larger banks rely less on insured deposits, consistent with the previous findings by Hassan and Sackley (1994) that large banks have greater ability to borrow as well as to diversify asset portfolio, and large banks enjoy a greater degree of regulatory support.

DERCON is positive and statistically significant at 1%. After controlling for bank size, banks with more off-balance sheet activities also have relatively more insured deposits. Banks, with more involvement in off balance sheet activities rely more on insured deposits to finance their asset portfolio.

The liquid assets to total assets ratio (LAAR) is positive and statistically significant at 5%. A higher ratio of liquid assets to total assets is associated with a larger amount of insured deposits as a percentage of total liabilities. Hence, banks with a better ability to meet increased liquidity preferences of depositors rely more heavily on insured deposits vs. uninsured deposits, implying a greater risk for the insurance system.

The commercial and industrial loans to total loans ratio (CILLR) is negative and statistically significant at 1%. A higher ratio of commercial and industrial loans to total loans is associated with a smaller amount of insured deposits as a percentage of total liabilities. Since loans are in general riskier than securities banks with riskier assets and a less diversified loan portfolio rely less on insured funds.

The other variables such as the ratio of total security investment to total assets (SECINVAR), the ratio of net income to total assets (NIAR), the ratio of nonperforming assets to total assets (NPATA), and return on equity (ROE) are statistically insignificant.

For the model using ROKERED as the dependent variable results are presented in column (3). Loan-loss allowance to total loans ratio (LLATL) is negative and statistically significant at 1%. Banks with a larger cushion to absorb possible losses on the asset side have a smaller proportion of brokered deposits.

The proxy for bank size (LNSIZE) is positive and statistically significant at 1%. Larger banks have relatively more brokered deposits. The rationale behind this result may be that large banks hold a greater number of deposits over $100,000 compared to small banks. Therefore large depositors exploit the nominal coverage limit and increase the risk exposure of the insurance fund to possible losses.

The ratio of total security investment to total assets (SECINVAR) is negative and statistically significant at 5%. A higher ratio of total security to total assets is associated with a smaller amount of brokered deposits and less abuse of the deposit insurance system. This result is consistent with the results obtained in the models using INSURED and EQUITY as a dependent variable. Banks with better asset quality are less likely to become insolvent and in case of insolvency the proportion of bank liabilities the deposit insurance system could be liable for is smaller. Thus there is less risk exposure of insurance fund to possible losses.

The liquid assets to total assets ratio (LAAR) coefficient is also negative and statistically significant at 5%. A higher ratio of liquid assets to total assets implies a smaller amount of brokered deposits. This result illustrates that banks with better asset quality don't rely on brokered deposits as heavily. Thus they represent less risk exposure to the insurance fund.

The ratio of commercial and industrial loans to total loans (CILLR) is positive and statistically significant at 1%. Banks with a large amount of commercial and industrial loans rely more on brokered deposits. Banks with less diversified loan portfolios are more likely to become insolvent and in case of insolvency represent more risk exposure to the insurance fund due to large depositors exploiting the nominal coverage limit.

The ratio of non-performing assets to total assets is positive and statistically significant at 5%. Nonperforming assets add to overall risk, so the more nonperforming assets a bank holds, the more brokered deposits on their balance sheet. Hence in case of insolvency, banks with a high ratio of nonperforming assets to total assets present more risk exposure to the insurance fund

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due to abuse of the nominal coverage limit.

The derivatives position indicator (DERCON), the ratio of net income to total assets (NIAR), and the return on equity (ROE) are all statistically insignificant.

Conclusion

This paper attempts to analyze the impact of the amount of real deposit insurance coverage on the amount of risk at an individual bank. This is an important question for both academic researchers and practitioners since an increase in the nominal amount of coverage is being considered that would also result in an immediate rise in real coverage. If the rise in real coverage increases moral hazard among banks, then the policy change could expose the FDIC and taxpayers to a greater risk of loss and threaten the overall stability of the financial system. Contrary to these conjectures, the empirical model in this paper finds no support for the moral hazard argument. The steady decline in real deposit insurance coverage did not have a significant impact on bank risk as measured by the ratio of equity to assets, the amount of insured deposits, or the amount of brokered deposits. To the extent that these variables measure bank risk, it appears that raising real coverage will have a minimal impact on risk taking behavior. This would seem to support the argument that coverage should be raised to help depositors and institutions that rely more heavily on insured deposits for funding. Clearly this has implications for regulators and practitioners. The cost associated with increased moral hazard should be relatively small, so if the benefits of increased coverage are nontrivial, then at the margin the increased coverage should be beneficial to the banking system and depositors alike. This result should inform the debate on the level of real deposit insurance coverage.

Any future research on the level of real coverage needs to address one major limitation of this study. A longer time series containing at least one change in nominal coverage would provide a much richer evaluation of the moral hazard hypothesis. If a change in nominal coverage is enacted, then an extension of the current data set to include numbers for at least a few periods after the change would allow for a more thorough analysis of the question addressed above. Other extensions of this line of research might employ a more complex model of bank risk allowing interaction between the three models estimated. Such a system approach to estimation would provide a more comprehensive analysis of the hypothesis in question.

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Appendix A: Correlation Matrix

	EQUITY	INSURED	BROKERED	RCOV	LLATL	LNSIZE	DERCON	SECINVAR	NIAR	LAAR	CILLR	NPATA	ROE
EQUITY	1												
INSURED	.015	1											
BROKERED	-.006	.185	1										
RCOV	.008	-.001	0.013	1									
LLATL	.238	.005	.031	-.023	1								
LNSIZE	-.169	.097	.150	.184	-.065	1							
DERCON	-.012	.621	.161	.011	.004	.109	1						
SECINVAR	.036	.016	-.003	.010	.033	-.059	.010	1					
NIAR	.034	.021	-.002	.003	.022	-.043	-.008	.695	1				
LAAR	.120	.012	-.003	.029	.050	-.086	.017	.017	.009	1			
CILLR	.038	.011	.015	-.022	.096	.079	.000	-.002	.000	.041	1		
NPATA	-.006	-.003	.005	-.008	.188	-.076	-.001	-.006	-.000	-.001	.038	1	
ROE	-.204	.006	.040	-.005	-.094	.226	.004	-.020	-.015	-.040	.041	.201	1

Appendix B: 95% Confidence Intervals of Regression Coefficients

Independent Variables	Dependent Variables			
	EQUUITY (1)	**INSURED (2)**	**BROKERED (3)**	**95% Confidence Intervals**
RCOV	-2.96E+10	-7.94E+10	-4.77E+10	lower
	3.74E+10	7.78E+10	4.28E+10	upper
LLATL	2.05E-01	1.10E-01	-1.60E-01	lower
	2.49E-01	2.10E-01	-1.02E-01	upper
LNSIZE	-3.96E-02	-2.27E-02	4.29E-02	lower
	-3.64E-02	-1.53E-02	4.71E-02	upper
DERCON	-3.26E-13	2.77E-12	-1.04E-12	lower
	1.79E-12	7.71E-12	1.81E-12	upper
SECINVAR	1.22E-05	-1.54E-04	-1.12E-04	lower
	8.48E-05	1.63E-05	-1.39E-05	upper
NIAR	2.11E-03	-1.10E-03	-5.94E-04	lower
	3.33E-03	1.77E-03	1.06E-03	upper
LAAR	7.55E-03	7.14E-04	-3.86E-03	lower
	1.06E-02	7.93E-03	2.98E-04	upper
CILLR	-1.48E-02	-5.72E-02	9.55E-03	lower
	-5.24E-03	-3.48E-02	2.24E-02	upper
NPATA	-1.49E-01	-3.75E-02	3.54E-03	lower
	-1.09E-01	5.26E-02	5.65E-02	upper
ROE	-3.00E-02	-2.66E-03	-6.86E-03	lower
	-2.40E-02	1.16E-02	1.38E-03	upper