FEDERAL DEPOSIT INSURANCE PREMIUMS: ISSUES, PROPOSALS, AND CRITIQUES (I)

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摘 要

本文旨在全面檢視美國聯邦存款保險費率的評價理論。由於存款保險費率的訂價模式究竟應維持現行單一費率制度（Flat－rate premiums）還是應採行風險基準的變動費率制度（Risk－based Variable rate premiums）在美國已引起長達十多年的爭辯，至今仍然是熱門的討論課題。由於我國銀行經營競爭日趨劇烈，國內的存款保險制度也須未雨綢繆而有必要藉助於先進國家的制度和經驗，因此本文將現行被提出的各種存保費率訂價模式作全面性的深入探討，並且針對各種可能的改進方案作比較分析及評論，希冀提供國人對存保費率的評價問題上能有更深一層的認識與瞭解。

III.3. ON THE COST OF DEPOSIT INSURANCE CONSIDERING BOTH REAL AND FINANCIAL SECTOR — A MACROECONOMIC APPROACH

The present flat-rate deposit insurance system does not discourage risk-taking by financial institutions. Hence, the variable-rate deposit insurance is under consideration by many proposals of reforming the current deposit insurance system. Without deposit insurance, the higher risky banks would have to pay a higher return on deposits to attract depositors. Under the current system, this risk-deterring function just disfunction because the banks will have incentive to take more risk.

In this section, we are going to investigate the impact of variable-rate deposit insurance on the financial and real sectors of the economy from a more global macroeconomic viewpoint based on the model of Goodman and Santomero (1986). The design of an appropriate financial institution insurance pricing system must consider the social costs associated with both financial-sector firm failure and real-sector firm bankruptcy. If we just consider the issues of actuarially fair insurance pricing and the effects of alternative deposit insurance pricing system on the financial sector, then we might miss an important effect of deposit insurance. This effect is absorbing the risk of real-sector bankruptcy losses.

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When FDIC charges each bank a flat-rate insurance premium, this will encourage a banking firm to take more risk. To the whole economy, the more risk the financial institutions take, the less risk the real-sector firms will assume. A banking firm will make more risky corporate loans at the same rate or make same risky loans at lower rate under the current insurance system than under a variable-rate insurance system. Even though this will increase the risk of bank failure, it will lower the probability of bankruptcy in the corporate sector at the same time.

From a social point of view, it may be more desirable to shift risk from an uninsured real sector to an insured financial sector. Hence, any one proposing an optimal deposit insurance pricing system must incorporate social costs into their considerations. This might come up with the conclusion that the current flat-rate insurance system might be a second-best solution (Goodman and Santomero [1986]).

III.3.1. The Valuation Model of a Banking Firm and Corporate Firm

In this section, I will briefly review the valuation model of the banking firm and corporate firm developed by Goodman and Santomero (1986). Then, we will extend their model by considering the CES production function in the corporate firm. In their model, Goodman and Santomero investigated the role played by the insurance-pricing regime. They also showed that if the FDIC change from the current fixed-rate deposit insurance regime to a risk-based variable-rate regime. then the bank risk taking behavior will be constrained. Hence, the social costs of financial sector bankruptcy will be lowered while the social costs of real-sector bankruptcy will be raised.

III.3.1.a. The Valuation Model of A Banking Firm

In this model, the following assumptions are made:

(1) Among a bank's balance sheet, the assets are composed by risky loans (L), and risk-free loans and securities (S) while the liabilities are composed by Deposits (D) and capital (C) where L, S, D, and C are positive for all banks. The capital (C) is exogenously given and all loans (L) have the same riskiness with a stated rate of interest (r_L), i.e., any bank takes the lending rate r^L as given.

(2). If the bank fails, the FDIC is assumed to cover all liabilities up to the point where its net worth is zero.

(3). Assume that the total variability of bank earnings stems from credit risk, no interest-rate risk considered[11] [12].

(4). There will be some probability that a risky loan will not be repaid in full such that the actual return on the loan is $(r_L - ß)$ where ß is the loan-loss rate or bankruptcy payoff. Hence, the expected return on the loan is $(r_L - E(ß))$. We also assume that a change in r_L shifts the mean of the ß distribution.

(5). Assume there is an operating cost K for the bank to process the loans where K (L) is a convex function of L, $K' > 0$, $N'' > 0$.

(6). Assume that the risk-free loan and securities carry a interest rate r_f and deposits pay interest rate r_D.

(7). Assume that with flat-rate deposit insurance premium regime, FDIC will impose the same premium rates on loans and securities regardless of the bank's asset composition while with variable-rate deposit insurance regime, FDIC will levy a heavier penalty on banks holding a larger amount of loans by imposing a higher rate on loans than on securities.

(8). Assume a bank is a price taker in the deposit market but faces an upward sloping curve for deposit gathering services. So when the number of depositors increases, the required r_D must be higher, $r'_D(D) > 0$.

Based on the above assumptions, the objective of the bank is to maximize its expected value at the end of the period E(V) subject to the balance sheet constraint, i.e.,

$$\begin{aligned} \text{Max} \quad & E(V) = L(1+r_L - E(ß)) + S(1+r_f) - K(L) - D(1+r_D) + \\ & C - \beta_1 L - \beta_2 S + G(L,S,D,C,\beta_1, \beta_2, r_L, R_f) \qquad (3.5) \\ \text{s.t.} \quad & S + L = D + C \end{aligned}$$

where β_1 and β_2 are insurance rates on loans and securities separately, and G is the expected value of the insurer's bailout. The bank will fail if its value at the end of the period is negative, i.e.,

$$L(1+r_L - ß) + S(1+r_f) - K(L) - D(1+r_D) + C - \beta_1 L - \beta_2 S < 0 \quad \text{or}$$

$$ß > \{L(1+r_L) + S(1+r_f) - K(L) - D(1+r_D) + C - \beta_1 L - \beta_2 S\}/L = ß^* \qquad (3.6)$$

where $(ß^*, \infty)$ is the bankruptcy range. The expected cost of the insurer's bailout will be

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[11] Credit risk is the that borrowers will default on promised repayments.

[12] Interest-volatility risk is the risk that changes in the level of market interest rate will affect the market value of asset and liabilities differently. (Kane [1983]

$$G=\int_{ß^*}^{\infty}\{-L(1+r_L-ß)-S(1+r_f)+K(L)+D(1+r_D)-C+\beta_1 L+\beta_2 S\}f\ (ß)\ d \qquad (3.7)$$

where f(ß) is the density function of ß. The FOCs of equation (3.5) for the maximization problem are

$$(\partial\ E(V)/\partial L)=((1+r_L-E(ß))-(1+r_f)-(\partial K(L)/\partial L)-(\beta_1-\beta_2)+(\partial G/\partial L)=0$$
$$(\partial\ E(V)/\partial D)=(1+r_f)-(1+r_D)-D\ (\partial r_D/\partial D)-\beta_2\ +(\partial G/\partial D)=0 \qquad (3.8)$$

From the FOCs, we can see only the differential between the insurance premium ($\beta_1 - \beta_2$) enters the determination of the lending quantity while the insurance premium on securities β_2 enters the determination of optimal deposit quantities. As shown in Goodman & Santomero (equations [7] & [7']), if the lending rate increases, then the amount of loans a bank undertakes will go up. In other words, the bank will provide more loans at a higher lending rate and hence has an upward-sloping supply curve for loans. They also showed that when the FDIC raises the insurance rate for loans or reduces the insurance rate on securities, the bank will make fewer loans and/or issue more securities and deposits.

Summing up, for the whole banking industry, a change in the cost structure of deposit insurance from fixed-rate to variable-rate will result in a contraction in the loan supply curve. With a constant downward slopping demand curve for loans, this will result in the lending market clearing at a higher interest rate and a lower volume.

III.3.1.b The Valuation Model of A Corporate Firm

Let P be the output price, f(L) be the output quantity produced with f' (L)>0 and f'' (L)<0, L be the loan quantity which equals the total cost of production, A be the value of firm's total assets and A' be the liquidation value of firm's assets determined by its alternative use. Suppose that the goal of manager is to maximize the expected value of the firm (EV) from the shareholder's viewpoint, i.e., Maximize

$$EV=E_P[pf(L)-(1+r^L)L+A]\ \Big|_{a(L)}^{\infty}\ +E_P\ [pf(L)-(1+r^L)L+A]\ \Big|_{b(L)}\ a(L) \qquad (3.9)$$

where $a(L)=[(1+r_L)L/f(L)]$ and $b(L)=[(1+r_L)L-A'/f(L)]$
set the FOC $\partial EV/\partial L=0$, then $\partial L/\partial r_L$ can be shown to be negative (see Goodman and Santomero, 1986). Hence, the firm will have a downward-sloping curve for loans, i.e., when the lending rate rises, the firm's demand for the loan decreases. However, when the lending rate increase, the bank's expected payout will also

increase. This can be seen as follows. The value of the bank's claim (R^C) can be written as

$$R^c=(1+r^L)L - E_P [-pf(L)+(1+r^L)L-A'] \Big|_0^{b(L)} \quad (3.10)$$

and $\partial R^c / \partial r_L > 0$.

So, if FDIC changes fixed-rate deposit insurance premium system to variable rate deposit insurance, the equilibrium lending rate will increase. This will reduce the probability of bank failure in the one hand, but will increase the chance of going bankruptcy for the real sector on the other hand.

The production function f(L) with $f'(L)>0$ and $f''(L)<0$ assumed in this model only depends on the amount of loan quantity, L. We also can weaken the assumption by letting the production function depend on both the amount of loan quantity (or capital), L and the amount of labor used, N. For example, let the amount of output quantity Q = f(L,N) be either Cobb-Douglas production function or CES production function. For the Cobb-Douglas production, $Q = f(L,N) = \lambda L^{\alpha} N^{(1-\alpha)}$ and for the CES production function,

$$Q = f(L,N) = \lambda [\delta L^{-\rho} + (1-\delta) N^{-\rho}]^{(-1/\rho)} \quad (3.11)$$

where the production function f(L,N) has the properties $f_L>0$, $f_N>0$, $f_{LL}<0$, $f_{NN}<0$, $f_{LN}>0$. The parameters in these functions are defined as follows. First, λ is the efficiency parameter representing the state of technology. Second, δ is the distribution parameter, which plays the same role as α in the C-D function and has to do with the relative factor shares in the product. Finally, ρ is the substitution parameter and will determine the value of the constant elasticity of substitution.

III.3.2. The Social Cost and Optimal Insurance System

The social costs of financial sector insolvency can be characterized as a monotonic function of the costs incurred by the insurance fund. The resolution policy FDIC chooses when bank fails will have a wealth transfer from both the taxpayers and solvent-bank equityholders to depositors of troubled banks. The social cost of real sector insolvency is the amount lost when the assets can not have their ongoing concern value in liquidation. Hence, the total social cost should consider both

the social cost of bank insolvency and the social cost of firm insolvency.

A shift of deposit insurance premium from flat-rate to variable-rate, i.e, an increase in the insurance rate on risky loans (β_1) and a decrease in the insurance rate on securities (β_2), will reduce the value of FDIC's guarantee by raising the costs of making loans. The reduction of loans will increase the lending rate and increase the likelihood of corporate failure.

The objective of social planner/financial regulator is to minimize the social costs. Hence, the optimal deposit insurance scheme (β_1, β_2) can be achieved when the marginal social costs of bankruptcy in both the real and financial sectors of the economy are equal. However, as discussed in Goodman and Santomero [1986], Kareken and Wallace [1978], John, John, and Senbet [1991], the insurance premium should be underpriced and the optimal insurance premium structure will not be actuarially sound from a social planner viewpoint.

III.3.3. Conclusion

Summing up, the optimal insurance scheme must incorporate the social cost associated with both bank failure in financial sector and firm bankruptcy in real sector. Based on this argument, the current flat-rate premium system may work better than variable-rate system. This model as well as John, John and Senbet (1991) proposes alternative way to examine the bank risk-taking behavior under both the flat-rate and variable-rate system. They conclude that the variable-rate/risk-based deposit insurance cannot stand out to be the right solution of today's insurance crisis. Conversely, when considering both the real sector and financial sector from the social planner's point of view, the current flat-rate premium system may be the second-best solution or in the minimum, the excessive risk-taking incentives of banks are not solely embedded in the flat rate insurance system (John, John and Senbet [1991]).

III.4. INCENTIVE-COMPATIBLE AND RISK-SHIFTING PRICING MODEL

III.4.1. The pricing Model of Deposit Insurance with Incentive-Compatibility

As discussed in section III.2, Buser, Chen and Kane (1981) extended Sharpe's (1978) Model by considering both explicit and implicit deposit insurance price

where the explicit price is the subsidized risk-insensitive insurance premium and the implicit price is the 'regulatory interference' that the insured banks must tolerate. Chan, Greenbaum and Thakor (hence C-G-T) (1988) examined the feasibility of using the bank's readily observable capital as the attribute to develop an incentive compatible, risk-sensitive deposit insurance premium system by requiring each bank choose both its capital requirement and the periodic deposit insurance premium per dollar of deposits simultaneously.

By assuming two types of banks with either high risk or low risk, C-G-T showed that with deposit-linked subsidies, the optimal arrangement, which includes both fair pricing and incentive-compatibility, can be achieved. Under this arrangement, the regulator will ask each bank to report its risk attribute. Then, it will ask banks reporting low-risk to pay a lower deposit insurance premium but satisfy a higher capital requirement than banks reporting themselves to be high risk.

In other words, if deposit insurance is fairly priced for both types of banks, all banks will be indifferent to capital structure. Then, it will not pay for any bank to increase financial leverage if its insurance is correctly priced. Without deposit-linked subsidies, a risk-sensitive, incentive compatible deposit insurance pricing system may still be possible. But this can be true only if the deposit insurer is less risk averse than any other agent in the economy.

Let L, D and E denotes a bank's loan size (fixed), deposits and equity separately. Also, they satisfy the balance sheet constraint $L=D+E$. Suppose the bank uses the loan to finance a single-period project which pays off R with success probability p in successful state and zero with probability 1-p otherwise. Then, the project will be socially optimal if and only if $p\ R > L\ r_f$ ($r_f = 1 +$ riskless interest rate).

Let π represent the periodic deposit insurance premium per dollar of deposit. Assume there are two types of banks in the economy. Let P_h, P_l be the succes proability of the project for type h and 1 respectively with return R_h, R_l. Assume $P_h < P_l$ and $R_h < R_l$. Then, in the risk-neutral world, the periodic premium per dollar of deposits for the high-and low-risk banks will be $\pi_h = 1-P_h$ and $\pi_l = 1-P_l$ respectively.

If the deposit insurance premia were linked to capital requirements, the deposit insurer can enforce risk-based capital requirements by offering banks a choice between combination of insurance premia and capital requirements $\{\pi_h, E_h\}$ and $\{\pi_l, E_l\}$. Then, if the bank is type i and choose the pair $\{\pi_j, E_j\}$, the expected combined payoff to a bank and its borrower will be $P_i [R_i - D_j r_f] - E_j r_f - \pi_j D_j r_f$, for all i,j=h, l.

By the revelation principle, the optimal scheme will induce truthful revelation and hence the incentive compatibility will be met if the following non-mimicry constraints are satisfied:

$$P_h [R_h - D_h r_f] - E_h r_f - \pi_h D_h r_f \geq P_h [R_h - D_l r_f] - E_l r_f - \pi_l D_l r_f \quad (3.12)$$

and

$$P_l [R_l - D_l r_f] - E_l r_f - \pi_l - \pi_l D_l r_f \geq P_l [R_l - D_h r_f] - E_h r_f - \pi_h D_h r_f \quad (3.13)$$

Let θ be a "weight factor" scaler and ϵ be a positive scaler, representing a risk-insensitive subsidy attached to deposit insurance. Then, the objective of the regulator is to

$$\text{Miximize } P_h [R_h - D_h r_f] - E_h r_f - \pi_h D_h r_f + \theta \{P_l [R_l - D_l r_f] - E_l r_f - \pi_l D_l r_f\} \quad (3.14)$$

subject to (c) $\pi_h = 1 - P_h - \epsilon$

(d) $\pi_l = 1 - P_l - \epsilon$

and (3.12), (3.13).

If the equality (3.12) holds, then by substituting (c) & (d) into (3.12) we obtain

$$\epsilon [L - E_h] = [L - E_l] [P_l - P_h + \epsilon] \quad (3.15)$$

Since $P_l > P_h$ (implies $\pi_l < \pi_h$) and $\epsilon > 0$, then (3.15) implies that $E_l > E_h$. Therefore, the incentive compatible scheme of deposit insurance premium requires the deposit insurer offering the low-risk bank a lower periodic insurance premium (i.e., $\pi_l < \pi_h$) per dollar of deposits while imposing a higher capital requirement ($E_l > E_h$). In other words, the optimal risk sensitive insurance pricing scheme relates capital requirements inversely to insurance premia in order to persuade the higher risk bank paying higher insurance premium to truthfully reveal its type.

III.4.2. The Pricing Model of Deposit Insurance with Risk-Shifting Incentives and Tax Structure

Under the current flat-rate insurance premium system, the financial institutions will have excessively risk-taking behavior and risk-based deposit insurance premium seems to be useful way to eliminate the incentive to take more risk. (Merton [1977]; Sharpe [1978]; Buser, Chen and Kane [1981]; Pyle [1983]; Marcus and Shaked [1984]; Ronn and Verma [1986]; Avery and Hanweck [1984], Pennacchi [1987a, 1987b] and others).Marcus and Shaked [1984] use the option pricing model to estimate the deposit insurance. They conclude that the large/safe banks are subsidizing the small/risky banks under the current flat-rate system. Lawrence and Arshadi [1988], by considering the impact of foreign deposits on federal insurance premia, shows that the smaller banks are substantially subsidizing the insurance costs of the larger, multinational banks.

With different findings of Scott and Mayer [1971], Buser, Chen and Kane [1981], and Marcus and Shaked [1984], it is not clear whether the current premium are inadequate or excessive. Based on the social objective, Goodman and Santomero [1986] developed a pricing model by considering both real and financial sector. They argued that switching from current flat-rate premium system to a variable-rate deposit insurance system may increase the social costs connected with real sector bankruptcy even though this will decrease the costs of financial firm failure. Since an appropriate deposit insurance pricing must weight the total social costs arising from both sectors, the flat-rate system may come up as a second-best solutions (Goodman and Santomero [1986]).

III.5. CONCLUSIONS

In this section, We have examined alternative non-option Pricing Model for Evaluating FDIC Deposit Insurance. In section III.1, We have examined the risk-based contingency model to predict the probability of bank future. In section III.2, We have investigated Sharp's state-preference model to estimate each bank's risk. In section III.3, We have critically examined the cost of deposit incentive-compatible and risk-shifting incentive model in the banking inducting have been examined in section III.4.

TABLE 3-1
SUMMARY OF THE METHODOLOGIES USED IN THE BANK-FAILURE PREDICITION MODELS

MODEL/ APPROACH	AUTHORS	SAMPLE
MDA (Multiple	Altman, Edward (1977)	S&Ls
Discriminant	Sinkey, Joseph (1975)	C.B.
Analysis) Model	Pantalone & Platt (1987, PP.46-64)	C.B.
Logit Regression	Martin, Daniel (1977)	C.B.
Approach	Barth et al (1985)	S&L
	Whalen & Thomson (1988)	C.B.
Probit Model	Boveniz et al (1983)	C.B.
Approach	Avery et al (1985)	C.B.
CAMEL Ratings Model	FDIC Examination Report	C.B.
Two-Step Logit Model	Demirguc-Kunt (1989)	C.B.

Notel: C.B. stands for the Commercial Banks

IV. PROPOSALS ON FEDERAL DEPOSIT INSURANCE REFORMS

IV.1. INTRODUCTION

Our current deposit insurance system came into existence in the United States with the enactment of the Banking Act of 1933. The FDIC was set up to insure deposits in commercial banks (and mutual savings banks in some states). The Federal Savings and Loans Insurance Corporation (FSLIC) was set up to provide similar insurance for deposits in thrifts (see table 4-1). That Act established an initial temporary arrangement insuring bank deposits up to $2,500 per account; today it stands at $100,000 and $200,000 under planning.

TABLE 3-2: Summary of the Literature on Bank-Failure Estimation

Author (Year)	Sample (Period) Dependent Variable (Size) (CAMEL) Independent Variables	Methodology Ratios
Sinkey (1975)	C.B. (1969-1972) Problem (110)/Nonproblem (110)	MDA 6/10
	(A) LRTR (M) OETR (C) LCR (E) SLRTR (A) LR	
Altman (1977)	S&L (1966-1973) Serious (56)/Temporay (49)/No Problem (107)	MDA 7/32
	(A) RETA (A) TLTS (A) SRETA (C) HLBANW (C) ESTA (C) NWTA (E) NOIGOI	
Martain (1977)	C.B. (1970-1976) Closed (58)/ Nonclosed (5462)	Logit 4/25
	(A) C12LN (A) GCONI (C) GCARA (E) NITA	
Avery & Hanweek (1984)	C.B. (1978/1983) Closed (100)/Nonclosed (1190)	Logit 7/9
	(C) LNTA (C) KTA (A) CILNNL (E) NITA (E) HERF (E) PTD	
Barth et al (1985)	S&L (1981-1984) Closed (318) /Nonclosed (588)	Logit 5/12
	(C) NWTA (E) NITA (E) ISFTF (L) LATA (L) LNTA	
Benston (1985)	S&L (1981-1985) Closed (178) /Nonclosed (712)	Logit 4/28
	(C) NWTA (E) RETTA (E) YLDEAC (E) COSTFDC S&L	
Gajewski (1988)	C.B. (1984-1986) Closed (134) /Nonclosed (2747)	(Two-Step) Logit 10/25
	(A) LPDR (A) NALR (C) PKTAHAT (M) NLTA (M) SENSDTD (M) AGTOTTL (M) CILTL (E) NITA (E) OGINR82 (F) HCN	
Boveniz et al (1983)	C.B. (1981-1983) Failed (61) /Non-Failed (150)	PROBIT 6/2
	TLEC OOETA MRALEC GCOTL TSDLEC ODLTA	
Avery et al (1985)	C.B. (1980-1984) Failed (155) /Non-Failed (5241)	PROBIT 3/17
	NITA CILNNL KTA NCONL NLTA LIQTA NIITA CFDIC	
Spahr (1989)	C.B. (1985/1986) Failed (117/134) /Non-Failed (117/134)	MDA −/8
	NIREA IFLTR TANEM NITA ALTA CILTA NSLTA DRCOTL	

Note: C=Capital Adequacy; A=Asset Quality; M=Management Competence; E=Earnings
L=Liquidity; F=Fraud; C.B.=Commercial Banks; S&L=Savings & Loans Associations

TABLE 4-1
IMPORTANT EVENTS FOR THE FINANCIAL REGULATOR (FDIC & FSLIC)

1.	1932	Congress passed the FHLBA (Federal Home Loan Bank Act). FHLBA created 12 FHLBs and FHLBB as supervisory agent. The goal of FHLBA is to provide thrift with an other sources of funding for "home mortgage lending".
2.	1933	Congress passed the HOLA (Home owners' Loan Act). This Act authorized the FHLBB to charter and regulate S&L association.
3.	1934	Congress passed the NHA (National Housing Act). This Act created a deposit insurance fund for S&L association and set up the FSLIC under the FHLBB supervision. FSLIC assessed an annual insurance deposit of 1/4 of 1% on the total deposits of insured S&Ls.
4.	1935	FSLIC set 1/8 of 1% insurance rate to S&Ls. FDIC set 1/12 of 1% (1/2 of 1% before) by the Banking Act.
5.	1950	FSLIC set 1/12 of 1% insurance rate.
6.	1966	Basic coverage for S&Ls is $15,000.
7.	1966	Congress placed a ceiling on maximum deposit rates paid by thrifts (S&L: 5.75% and Bank: 5.5%) due to rising inflation and high interest rate.
8.	1969	Basic coverage for S&Ls is $20,000.
9.	1974	Basic coverage for S&Ls is $40,000.
10.	1980	Congress passed DIDMCA (Depository Institutions Deregulation & Monetary Control Act). This Act raised the basic coverage to $100,000, phased out the interest rate regulations, and permitted thrifts to diversify their loans.
11.	1981	FHLBB implemented a Income-Capital certificates Program. S&Ls were authorized to freely negotiate variable-rate mortgage loans with borrowers.
12.	1982	Congress passed the Garn-St Germain Act. This Act set up the Net-Worth certificates to forestall forced mergers or other regulatory action against insolvent thrift.
13.	1987	GAO announced that the FSLIC become officially insolvent (with 3 billion deficit). The CEBA (Competitive Equality Banking Act) authorized the issue of $10.8 billion in Bonds to recapitalized the FDIC.
14.	1988	The S&Ls crisis up to $100 billions.
15.	1989	Congress passed the FIRREA (Financial Institutions Reform, Recovery and Enforcement Act) based on Bush Plan. This Act re-regulated S&Ls by restricting their investment powers and requiring them to specialize more in mortgage lending, dissolved the FSLIC, created a new deposit insurance fund "SAIF" (Savings Association Insurance Fund) under the FDIC auspices and a new agency "RTC" (Resolution Trust Corporation).

(Source: The FDIC Annual Report)

The origins of the savings and loans crisis are rooted in the system of regulation imposed on the industry. (see figure 4-1 and 4-2). The historical data on bank losses suggest that neither the FDIC nor the FSLIC deposit insurance fund has had the necessary reserves to deal with the contingency of widespread bank failures. The first signs of trouble surfaced in the mid 1960s when rising inflation and high interest rates created funding problems for savings and loans. Regulations prohibited federally-insured savings and loans from diversifying portfolios that were concentrated in long-term, fixed rate mortgages (table 4-1).

There are three forms of Regulation which have important implications: (1) Interest Rate Ceilings (2) Reserve Requirements (Capital Adequacy) (3) Deposit Insurance. The FDIC performs four regulatory functions besides selling deposit insurance at bargain explicit rates: (1) Entry regulation on the new bank application (2) Examination of bank records and managerial activities (3) Regulation of deposit rates and conditions for withdrawal (4) Disposition of failed banks (Figures 4-1 and 4-2).

The first significant step to deregulate the thrift industry came in 1980 with the passage of the Depository Institutions Deregulation and Monetary Control Act (DIDMCA). The DIDMCA provided for the phase-out of interest rate regulations. The DIDMCA also permitted thrifts to diversify their asset portfolios to include consumer loans other than mortgage loans, loans based on commercial real estate and corporate debt securities. However, this act came too late and many thrifts experienced heavy losses as funding costs rose.

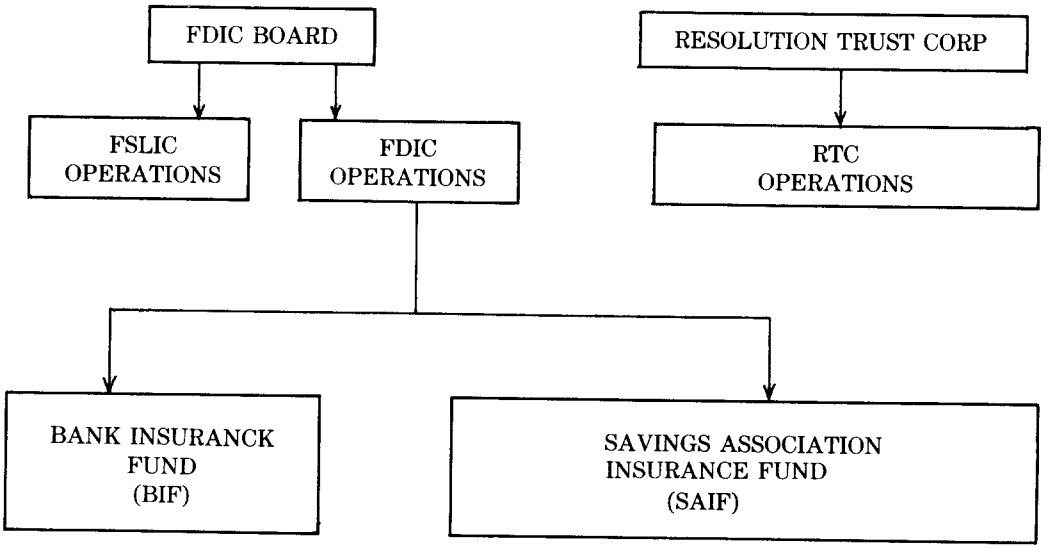
In 1982, the Garn-St Germain Act attempted to reform the elements of the regulatory structure. This regulation structure is most often blamed for the industry's problems by liberalizing investment powers of federally charter thrifts. These policies were adopted in an effort to avert the need for a federally-financed rescue of the FSLIC (table 4-1).

Early in 1987 the General Accounting Office (GAO) accounced that the FSLIC had become officially insolvent. On February 6, 1989, Congress unveild its plan to deal with the burgeoning crisis in the savings and loans industry. Under this plan, the FDIC was called upon to assume supervisory control of insolvent savings and loans until the proposed legislation was ratified by Congress. With passage of the 1989 FIRREA Act, the FDIC has now emerged as the most prominent and powerful financial regulatory agency in the country.

The major features of the FIRREA are as follows. First, it represents an effort to re-regulate savings and loans by restricting their investment powers and requiring them to specialize more in mortage lendings. Second, it dissolved the FSLIC

Figure 4-1
THE ORGANIZATION OF FDIC AFTER FIRREA ACT

OVERVIEW OF FDIC OPERATIONS



Major Responsibilities:

* Pre-1989 S&L liquidation activity
* Monitor, review, and renegotiate 1988 FSLIC assistance agreements
* Supervision of banks and S&Ls.
* FDIC and RTC support services (Accounting, legal, etc)
* Bank liquidation activities
* Resolutions and operations
* RTC funding operations
* Asset and real estate management
* Federal Asset Disposition Association oversight & dissolution

Note: FHLBB → OTS (Treasury Office of Thrift Supervision)
FSLIC → SAIF

FDIC ┬—BIF (FDIC)
└—BIF (FSLIC)

<THE ORGANIZATION OF FDIC AFTER 1989 FIRREA ACT>

Figure 4-2
BANK REGULATION IN U.S.A.

I. DEPOSIT INSURANCE

INSURING AGENCY	TYPE OF INSTITUTIONS	INSURANCE LIMITS
FDIC	Commercial Banks & Savings Banks	First $100,000
FSLIC	S&L and Savings Banks	First $100,000
NCUA	Credit Unions	First $100,000

II. DEPOSIT INTEREST RATE RESTRICTIONS

Payments of interest on corporate transfer accounts prohibited. Ceilings on other accounts eliminated March 31, 1986.

III. RESTRICTIONS ON SECTURITIES ACTIVITES

TYPE OF INSTITUTIONS	NATURE OF RESTRICTIONS
Commercial Banks	Discount brokerage through subsidiaries. May underwrite municipal Securities. Equity participation restricuted to 5% of a compay's voting right.
Savings and Loan	Full brokerage powers through subsidiaries. Equity participation.

IV. BRANCHING RESTRICTIONS ON DEPOSITORY INSTITUTIONS

TYPE OF INSTITUTIONS	NATURE OF RESTRICTIONS
Commercial Banks, Savings and Loans, and savings Banks	Branching varies on a state by state basis. Interstate holding companies permitted through supervisory merger or by special state laws. Federally chartered thrifts permitted to branch statewide.

Source: Bank Structure and Competition [1985])

and established a new deposit insurance fund, the Savings Association Insurance Fund (SAIF) under the supervision of the FDIC. Also, it created a new agency called the Resolution Trust Corporation (RTC) to take control of the FSLIC's caseload of insolvent S&Ls and disbanded the Federal Home Loan Bank Board (FHLBB). Then, FIRREA replaced the FHLBB with the Office of Thrift Supervision (OTS) under the direction of the Secretary of the Treasury Department (see Figure 4-1).

Depending on which appears least expensive for the FDIC insurance fund, the FDIC handles a failed bank (see tables 4-2, 4-3 and figure 4-3) in any one of the following approaches. First, the FDIC can arrange a merger or Purchase & Assumption (P&A). In a P&A, a healthy institution assumes all the deposits and other liabilities of a failed bank and purchase a portion of its assets. Recently, the FDIC has made extensive use of "whole bank" P&As which is where the prospective acquirers submit bids to purchase essentially all of the assets of a failing bank "as is" on a discounted basis. Secondly, the FDIC can arrange "insured deposit transfers" instead of directly paying off depositors up to the insurance limit. In this type of transaction, insured deposits are made available to their owners by transferring the accounts to an existing healthy institution or a newly-formed bank. Account holders are then able to withdraw their funds from the assuming bank or keep them there if they so choose. Finally, the FDIC can liquidate a failed bank and pay off the bank's depositors in full. The FDIC directly pays the depositors their insured claims when neither a P&A nor an insured deposit transfer could be arranged. The FDIC may establish a full-service national bank called "bridge bank". The bridge bank will assume the deposits, certain libabilities and the assets of failed bank when an insured bank is closed and more time is needed to find a permanent solution. (FDIC annual report, 1989)

In the following sections, we will review the institutional issues of federal deposit insurance system and the alternative proposals for reforming federal deposit insurance system. In section IV.2, we will examine and compare both the strength and weakness of the flat-rate and variable-rate insurance system. The alternative variable-rate pricing models, including both the option-pricing models and non-option pricing models, will be discussed in the next two chapters. In section IV.3, we will compare both the advantage and disadvantage of the private deposit insurance and federal deposit insurance systems. In section IV.4, we will investigate how to assess the deposit insurance premiums for the bank-holding company (BHC) and for the banks having foreign deposits. In section IV.5, we will briefly discuss the alternative proposals for reforming the current Federal Deposit Insurance system.

TABLE 4-2
NUMBER AND DEPOSITS OF BANKS CLOSED BECAUSE OF FINANCIAL DIFFICULTIES (1934-1991)

YEAR	TOTAL	NON-INSURED	INSURED			YEAR	TOTAL	NON-INSURED	INSURED		
			TOTAL	without disbursements by FDIC	with disbursements by FDIC				TOTAL	without disbursements by FDIC	with disbursements by FDIC
TOTAL	1533	136	1397	8	1389	1963	2	0	2	0	2
1934	61	52	9	0	9	1964	8	1	7	0	7
1935	32	6	26	1	25	1965	9	4	5	0	5
1936	72	3	69	0	69	1966	8	1	7	0	7
1937	84	7	77	2	75	1967	4	0	4	0	4
1938	81	7	74	0	74	1968	3	0	3	0	3
1939	72	12	60	0	60	1969	9	0	9	0	9
1940	48	5	43	0	43	1970	8	1	7	0	7
1941	17	2	15	0	15	1971	6	0	6	0	6
1942	23	3	20	0	20	1972	3	2	1	0	1
1943	5	0	5	0	5	1973	6	0	6	0	6
1944	2	0	2	0	2	1974	4	0	4	0	4
1945	1	0	1	0	1	1975	14	1	13	0	13
1946	2	1	1	0	1	1976	17	1	16	0	16
1947	6	1	5	0	5	1977	6	0	6	0	6
1948	3	0	3	0	3	1978	7	0	7	0	7
1949	9	4	5	1	4	1979	10	0	10	0	10
1950	5	1	4	0	4	1980	10	0	10	0	10
1951	5	3	2	0	2	1981	10	0	10	0	10
1952	4	1	3	0	3	1982	42	0	42	0	42
1953	5	1	4	2	2	1983	48	0	48	0	48
1954	4	2	2	0	2	1984	79	0	79	0	79
1955	5	0	5	0	5	1985	120	0	120	0	120
1956	3	1	2	0	2	1986	138	0	138	0	138
1957	3	1	2	1	1	1987	184	0	184	0	184
1958	9	5	4	0	4	1988	200	0	200	0	200
1959	3	0	3	0	3	1989	206	0	206	0	206
1960	2	1	1	0	1	1990	169	0	160	0	169
1961	9	4	5	0	5	1991*	37	0	37	0	37
1962	3	2	1	1	0						

Note: Sources are from FDIC annual report and division of corporate communication, FDIC.
* The data for 1991 bank closings and assistance transactions is only calculated as of April 29, 1991.

TABLE 4-3: FAILED BANKS BY STATE (CROSS-SECTIONAL)

	FAILED BANKS					P & A				PAYOFFS				INSURED DEPOSIT TRANSFER			
STATES	1990	1989	1988	1987	1986	1989	1988	1987	1986	1989	1988	1987	1986	1989	1988	1987	1986
ALABAMA	0	0	0	2	1	0	0	2	1	0	0	0	0	0	0	0	0
ALASKA	0	2	1	2	1	2	1	1	1	0	0	0	0	0	0	1	0
ARIZONA	5	6	1	0	0	5	0	0	0	0	0	0	0	0	0	1	0
ARKANSAS	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALIFORNIA	4	1	3	8	8	1	1	6	5	0	1	1	0	0	1	1	3
COLORADO	7	7	10	13	7	5	7	10	3	1	0	0	2	1	3	3	2
CONNECTICUT	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
DELAWARE	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
DISTR., COL.	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	7	5	3	3	3	4	2	2	2	1	0	0	1	0	1	1	0
IDAHO	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
ILLINOIS	0	0	1	2	1	0	0	2	1	0	0	0	0	0	1	0	0
INDIANA	0	0	1	3	1	0	1	2	1	0	0	0	0	0	0	1	0
IOWA	0	0	6	6	10	0	4	6	9	0	0	0	1	0	2	0	0
KANSAS	1	5	6	8	14	3	6	4	11	1	0	2	3	1	0	2	0
KENTUCKY	1	0	0	1	2	0	0	1	1	0	0	0	0	0	0	0	1
LOUISIANA	4	21	11	14	8	19	10	14	8	1	0	0	0	1	1	0	0
MASSACHUSETTS	7	1	0	2	0	0	0	0	0	0	0	0	0	1	0	2	0
MICHIGAN	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
MINNESOTA	1	1	7	10	5	1	7	5	4	0	0	0	0	0	0	5	1
MISSISSIPPI	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
MISSOURI	1	1	2	4	9	0	2	2	6	0	0	2	2	1	0	0	1
MONTANA	0	2	1	3	1	2	1	3	1	0	0	0	0	0	0	0	0
NEBRASKA	0	1	1	6	6	1	0	6	6	0	1	0	0	0	0	0	0
NEW HAMPSHIRE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW MEXICO	2	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0
NEW YORK	5	3	1	1	0	0	0	0	0	3	0	1	0	0	1	0	0
NORTH DAKOTA	3	2	1	2	0	1	1	1	0	0	0	0	0	1	0	1	0
OHIO	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0
OKLAHOMA	9	12	23	31	16	12	19	22	7	0	0	0	4	0	4	9	5
OREGON	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0
PENNSYLVANIA	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
SOUTH DAKOTA	0	0	1	2	1	0	0	1	1	0	0	0	0	0	1	1	0
TENNESSEE	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1
TEXAS	103	133	113	50	26	115	95	37	19	2	4	5	4	16	14	8	5
UTAH	0	0	2	3	3	0	2	2	3	0	0	0	0	0	0	1	0
VIRGINIA	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
WISCONSIN	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
WEST VIRGINI	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
WYOMING	0	0	1	4	7	0	1	0	2	0	0	0	4	0	0	4	1
PUERTO RICO	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
TOTAL	168	206	200	184	138	174	164	133	98	9	6	11	21	23	30	40	19

(Sources: The FDIC 1988 & 1989 annual report and division of corporate communication, FDIC).

A summary of this section will be given in section IV.6.

IV2. FLAT-RATE VERSUS VARIABLE-RATE PREMIUMS SYSTEM

The federal insurance agencies (FDIC, FSLIC and NCUSIF) currently charges all banks the same premium rate, regardless of their perceived risks to the insurer[13]. In return, the agency insures certain types of bank deposits against loss in the event of a bank's failure. Despite a statutory limit on its liability to a failed bank's depositors, the insurer has acted in the majority of cases to protect all liability holders via a transaction called "purchase and assumption" in which a solvent institution purchase some or all of the failed bank's assets and assumes its outstanding (insured and uninsured) liabilities. As of early 1989 these premiums were $0.0833 per $100 of deposits insured by the FDIC and 20.83 cents per $100 of deposits insured by the FSLIC (which is 12.5 cents more than that of FDIC). According the FIRREA, the premium rate for banks was set at 12 cents per $100 for 1990 and 15 cents per $100 in 1991.

Under the current flat-rate deposit insurance, more risky financial institutions do not have to pay a higher return on deposits in order to attract deposits. Thus, the usual market process-whereby riskier activities are funded only if they offer a correspondingly higher expected return-becomes inoperative. As shown in Merton (1977), shareholders of financial institutions prefer additional risk as they can capture the upside potential while sharing the downside loss with the insurer, FDIC. In other words, banks can profit by making riskier investments than they would in the absence of federal deposit insurance: if the more risky assets pay off, the bank owners gain; but if the assets do not pay off and the bank fails, the federal insurer compensates bank creditors for their losses.

However, a variable-rate deposit insurance scheme would impose a marginal penalty associated with additional risk-taking. The FDIC in its report "deposit Insurance in a Changing Environment" (April, 1983) proposed a small step toward risk-sensitive deposit insurance premia. Under the current law, the FDIC would be able to vary the amount of rebate it gives to individual insured banks. In addition to its CAMEL ratings, FDIC proposed to evaluate each bank's exposure to interest rate risk and to credit risk as "normal," "high," or "very high." Only banks

[13] In 1970, Congress established the National Credit Union Share Insurance Fund (NCUSIF) to provide deposit insurance to credit unions.

judged to have "normal" risk will receive their full insurance premium rebate, which is 60 percent of premium income less expense. "High" risk banks will receive a 30% rebate and "very high" risk banks will receive no rebate at all.

Based on pre-1981 experience, the resulting net insurance costs would then be approximately 4.3 basis points to normal risk banks, 7.1 basis points to high risk banks, and 8.3 basis point to very high risk banks. Under this scheme, riskier banks will wind up paying higher insurance premia, though some observer doubt whether the range of the variation is sufficiently broad to induce substantial changes in behavior from insured institutions. All the arguments made here implicitly assume that we are based on the microeconomic viewpoint, i.e., only focus on the financial sector.

IV.3. PRIVATE INSURANCE VERSUS FEDERAL DEPOSIT INSURANCE

There are many articles identifying the basic weaknesses of the current deposit insurance system in the economic literature. The current flat-rate premium system will force relatively safe banks to subsidize those banks which are more likely to fail. The current system also will provide incentives to excessive risk taking. Without regulation, the current system of federally provided deposit insurance would give bank managers and their stockholders an incentive to take on additional risk in an effort to improve their returns. Since the federal deposit insurers represent a monopoly, the current system has no way to determine the "correct" or optimal degree of risk taking. Basides, there are also the political pressures to which federal insurers would be subject. Hence, regulatory decisions about the relative risk of various loan categories would be subject to public debate, challenge, and review.

The primary advantages of having a private deposit insurance is the flexibility that is theoretically available to private insurers monitoring the behavior of bankers (England, 1985). For example, a private insurer could apply rules tailored to the strengths and weaknesses of each institutions. By eliminating the need to submit for public comment every proposed change in their methods of evaluating risks, private insurers could engage in a constant search for better ways to evaluate or control risks. The absence of political pressures would also allow private insurers to react more quickly to deteriorating situations or to new risks. Effective private deposit insurers would also escape another trap of federal insurers by making an effort to measure future risk. Finally, the options and tradeoffs available to private

entities improve the opportunities for mutually agreeable arrangements.

However, the private deposit insurance cannot be viewed as a perfect substitute for federal insurance. Under some circumstances, an imperfect substitute may be acceptable or necessary. A more useful role for privte deposit insurance might be a supplement federal insurance (Benston et al [1986]). In reality, the private insurance companies have begun to nibble eagerly around the edges of the deposit insurance market. Currently, they also focus primarily on offering supplementary guarantees for individual account holders that, beginning where federal guarantees stop, greatly extend the size of the balance covered by FDIC (Kane [1985]). Hence, such coverage for large deposits or brokered deposits might be a means to inject additional market discipline or market pricing into the current deposit insurance system (Benston [1986]).

IV.4. BANK-HOLDING COMPANY, FOREIGN DEPOSIT AND INSURANCE

Regulators have long been concerned about unsafe practices by bank holding companies. These concerns intensified in the late 1980s with the sharp increase in bank failures in Texas, where multibank holding companies were especially common (see table 4-2). A bank holding company (BHC) is simply any organization (e.g., corporation, partnership, or association) that controls one or more banks in the United States (Sinkey [1989]).

> "In the 1970 Amendment to the Bank Holding Company Act of 1956, the U.S. Congress defines a commerical bank as an institution that (1) accepts deposits that the depositor has a legal right to withdraw on demand, and (2) engages in the business of making commercial loans. Any Corporation can own and operate a bank without subject to Federal Reserve regulation as a bank holding company (BHC) by not engaging in one of the above specified activities[14]. Banks that fit this mold have been referred to as "non-bank banks or limited-service banks." Also, since most of them have chosen to forgo commercial lending, these nonbank banks also have been called consumer banks." (Sinkey [1989], pp.183-184)

[14] For example, Bank of New York, Chase Manhattan, Chemical, Citicorp, Mellon, First Interstate.

Under present BHC laws, direct/indirect control of more than 25% of a bank's voting shares requires an organization/company to register with the Fed as a BHC. There are three major forms of BHCs: (1) those that control only one bank or one-bank holding companies (OBHCs), (2) those that control two or more banks or multibank holding companies (MBHCs) and (3) those that not only control/own one or more banks but also own nonbank assets (usually in the form of shares in a nonbank subsidiary) (Sinkey [1989] and Keeton [1990]). BHCs often set up nonbank subsidiaries to carry out activities prohibited for banks. BHCs were developed for three primary reasons: (1) to circumvent geographic restrictions regarding branching, (2) to provide a broader menu of financial services, and (3) to reap potential tax benefits from the BHC organizational form (Sinkey [1989]).

Based on the Texas experience, the BHCs can reduce bank safety and soundness based on the Texas experience for the following reasons. Firstly, geographical and product diversification through BHCs may not significantly reduce the rate of bank failures if profits and losses are not pooled. Secondly, BHCs may encourage their banks to engage in transactions with affiliates that boost the holding company's profits at the expense of the FDIC. Finally, BHCs may rely too heavily on debt as their source of funds, which reduces their incentive to manage their banks prudently (Keeton [1990]). Hence, how banking regulation should respond to the added risk of bank failure is an important issue in the pricing of deposit insurance premiums[15].

As proposed by Black, Miller and Posner (1978), the banking regulator can response to the increased risk of bank failure and risk of losses to depositors (or FDIC) by (1) do nothing (2) increase the bank's capital requirements (3) allow federal deposit insurance premiums to vary with the risks of failure (4)reduce the bank's contingent liability for the debts of other units of the holding company or (5) impose secondary-reserve requirements on the bank.

Basides, under the 1989's FIRREA Act, Congress created a new system of "cross-bank guarantees". These guarantees required the BHCs to use the net worth of their healthy banks to reimburse the FDIC for the losses from their troubled banks. The Federal Reserve also advocated a more comprehensive approach to make BHCs serve as a "source of stregth" to their troubled banks.

[15] The BHC's nonbanking activities were created by affiliation between a bank and an enterprise engaged in activities that are not banking technically or functionally.

To evaluate the "safety and soundness" of BHCs, the Fed employs a so-called "BOPEC" rating system designed to assess the condition of BHCs in a systematic way. To arrive at an overall assessment of financial condition, the following elements of the BHC are evaluated and rated on a scale of 1 (excellent) to 5 (lousy) in descending order of performing quality: (1) Bank subsidiaries (B), (2) Other (nonbank) subsidiaries (0), (3) Parent Company (P), (4) Earnings-consolidated (E), and (5) Capital adequacy-consolidated (C). This "BOPEC" rating system is driven by CAMEL rating system and hence driven by bank examines' perceptions of asset quality and bank capital adequacy (Sinkey [1989]).

As vividly demonstrated by the near failure of Continental Illinois Bank in Chicago, it is no longer possible to ignore the destabilizing effect foreign deposits can have on the banking system. Lawrence and Arshadi (1988) in their paper analyzed the influence of deposits in foreign branches of U.S. banks on the distribution of deposit insurance costs. They argued that it is not fair for the nation's largest banks to pay insurance premiums on domestic deposits that are only a fraction of their total deposits. For example, the government bailout of Continental Illinois suggest 100 percent de factor insurance for large banks without requiring them to pay additional insurance fees. They showed that the present insurance system has created a situation in which smaller banks are substantially subsidizing the insurance costs of the larger, multinational institutions. Their empirical evidence is just exactly opposite to that of Marcus and Shaked (1984) which argues that the large/safer commercial banks are subsidizing the smaller/riskier banks under the current flat-rate premium system. The latter conclusion might arise from their ignoring to include foreign deposits into their total deposits when they compute the total liability of the large commercial banks.

IV.5. ALTERNATIVE PROPOSALS FOR REFORMING FEDERAL DEPOSIT INSURANCE

The reform of deposit insurance is clearly of great importance. There are many articles addressing the issues of reforming the federal deposit insurance system[16]. These authors also made alternative proposals to reform the current deposit

[16] For example, Scott and Mayer (1971), Humphrey (1976), Barnett, Horvitz and Silverberg (1977), Kareken (1983), White (1989), and Dotsey and Kuprianov (1990)

insurance system. These alternative proposals of reforming the deposit insurance can be categorized as follows:

(1) 100% Deposit Insurance.

According to Barnett, Horvitz and Silverberg (1977), there are both advantages and disadvantages for the 100% deposit insurance system. These advantages include (a) full protection for those currently not fully protected, (b) runs on problem banks unlikely to cause a failure, (c) fully public disclosure of adverse information facilitated, (d) beneficial impact on competition among banks, and (e) no necessity of governmental pledging requirements. However, there are also disadvantages for the 100% deposit insurance, namely (a) failure of market restraints, (b) stronger restrictions by FDIC to offset the greater risk exposures and costs, (c) higher potential losses to the insurance fund, and (d) reluctant to close the insolvent banks.

(2) Automatic Purchase and Assumption.

Using this approach, we can achieve all the benefits of 100% deposit insurance by always arranging for purchase and assumption transactions for all failed bank cases (Barnett et al [1977]). If an assumption proves impossible, then the FDIC need to provide direct assistance to the failing bank to keep the bank in operation. Otherwise, the FDIC will be required to arrange assumption in all cases.

(3) Combination of 100% Insurance and Regulation of Capital Adequacy.

Under the current system, the regulatory agencies'attitude toward capital adequacy is not objective. It includes a subjective variable — the quality of bank's management — into the factors determining whether a bank's capital is adequate. It would be desirable if all insured banks were required to adhere to an explicit minimum capital-deposit or capital-loan ratio.

(4) Combination of 100% Insurance and Variable Rate Insurance Premium.

This approaches will give us the advantages of 100% deposit insurance and variable-rate insurance premiums system. Since the variable rate premium could provide a substitute for the market discipline that is lost under 100% deposit insurance, there is no necessary link between 100% deposit insurance system and variable-rate insurance system.

(5) Variable-Rate Insurance System.

The advantage of a variable rate insurance premiums that the premiums are connected to the risk level of each bank. For the low risk bank, the FDIC rewards it by the lower premium rate and vice versa. It would be feasible to establish a simple, seemingly arbitrary system that has the effect of putting banks into a few categories, say two, three, or four. If premiums were set sufficiently high for banks in the highest risk category, the system might have self-regulating quality such that the discipline of the uninsured depositor might not be necessary.

(6) Private Deposit Insurance System.

Scott and Mayer (1971), Campbell and Glenn (1984), and White (1989) focused on the feasibility of private deposit insurance. Since the existing system of federal deposit insurance does not provide appropriate incentives with respect to risk-taking by insured institution, the private deposit insurance system might be a promising solution. If part, not all, of the pricing judgment could be transferred to the private sector, then the resulting demand would bring a new form of private insurance into existence.

IV.6. SUMMARY

In this section, we examine the institutional issues of federal deposit insurance, including the comparison of flat-rate versus variable-rate insurance system, and how bank-holding company and foreign deposits will affect the deposit insurance pricing. In section IV.2., both the strength and weakness of the flat-rate and variable-rate insurance system were examined. In section IV.3., we also compare and analyze both the advantage and disadvantage of the private insurance and federal insurance systems. We also investigate the possible difficulties in assessing the deposit insurance premiums for the bank-holding company and for banks with foreign deposits. Finally, we also examine and summarize the alternative proposals for reforming the current deposit insurance systems in section IV.5. We conclude that any special system among alternative proposals is free of criticism and hence further research is required. Summary and conclusions is given in last section.

V. CONCLUSIONS AND EXTENSIONS

The reform of the financial services industry became a hotly debated issue in the 1980s and this debate continues to rage in the 1990s. The declining size of the Banking Insurance Fund (BIF), which was less than $9 billion as of 1989, and the insolvency of the FSLIC has raised the concern among regulators. They concern that the mistakes of the S&Ls mess should not be repeated for the FDIC insured commercial banks. The reform of Federal Deposit Insurance System and the deposit insurance contract in particular are hence needed.

To solve the S&L crisis, Congress announced on February 6, 1989 a legislative proposal, titled the Financial Institutions Reform, Recovery and Enforcement Act (FIRREA). This Act details a set of wide-ranging reform and recovery measures to deal with the deposit insurance fund crisis. Recent legislation has increased aggregate funding by raising the nominal premium rate and without addressing the cross-sectional distribution of premia across banks of different risk levels. Due to the problems of current flat-rate insurance system, there are many pricing models of deposit insurance being proposed to resolve the problems.

In this paper, we have examined the alternative pricing models for estimating FDIC deposit insurance premiums using both option-pricing models and non-option pricing models. The alternative option pricing models for assessing the insurance cost were discussed in section II. The alternative non-option pricing models for evaluating FDIC deposit insurance were discussed in section III.

In section II, we have examined the alternative option pricing models for assessing the deposit insurance in the banking industry. We started out with Merton's (1977) model of deposit insurance pricing and concluded with introducing the theoretical application of OPM with stochastic volatility to the valuation of deposit insurance premiums.

In section III, we have examined both the risk-based contingency model and the macroeconomic model of pricing deposit insurance. The macro models considers the incentive-compatibility and risk-shifting issues. Since the financial institutions will have excessively risk-taking behavior under the current flat-rate insurance premium system, the risk-based contingency model seems to be a useful way to eliminate the incentives of bank to take more risk.

Summing up, we have examined and integrated alternative pricing models for estimating the cost of FDIC deposit insurance premiums in the financial service industry. Also, we have introduced the theoretical application of OPM with stochastic volatility to the pricing of the cost of deposit insurance.

This paper can be extended in the following ways. First, based on the empirical findings in option literature that the Black-Scholes price always overprices at-the-money options but underprices options that are sufficiently deeply in or out of the money, we can apply this argument to the deposit insurance pricing. Hence, once we allow the volatility of the underlying asset to be stochastic, then for low risk or large banks, the estimate of their deposit insurance premiums should be higher than those estimated by Marcus and Shaked. Further empirical study to estimate the FDIC insurance with this model will be particularly interesting to be performed.

Moreover, we have integrated the alternative pricing models using both the OPM and non-OPM approaches. Both approaches have their own strength and weakness. We still cannot draw conclusion from this paper about whether FDIC should apply the OPM or simulation approach to estimate the risk-based bank-specific insurance premiums. Further research will be needed along this line.

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