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Federal Deposit Insurance, Regulatory Policy, and Optimal Bank Capital*

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ABSTRACT

This paper seeks to explain the combination of explicit and implicit pricing for deposit insurance employed by the FDIC. Essentially, the FDIC sells two products—insurance *and* regulation. To span the product space, it must and does set two prices. We argue that the need to establish regulatory disincentives to bank risk-taking is the heart of the controversy over the adequacy of bank capital and that the ability to close risky banks before exhausting their *charter value* (i.e., the value of their right to continue in business) stands at the center of these disincentives and in front of the FDIC's insurance reserves.

JUST AS A BOOK shouldn't be judged by its cover, a government agency shouldn't be judged by the words behind its initials. With the FDIC (Federal Deposit Insurance Corporation), the agency's name describes only *part* of its formal operations: the FDIC is quasi-governmental, has a regional structure and sells deposit insurance. However, the initials fail to convey the FDIC's critical place in the governmental regulatory structure as the sole federal overseer of the approximately 8900 state-chartered commercial banks that have chosen not to belong the Federal Reserve System.[1] Reflecting the Federal Reserve's membership problem, the number of these banks is growing year by year.

Besides selling deposit insurance at bargain explicit rates, the FDIC performs four regulatory functions: (1) *Entry regulation.* It passes on new banks' applications for deposit insurance and on branch and merger proposals as well, thereby protecting the value of existing bank charters; (2) *Examination.* Two-thirds of FDIC employees are concerned with inspecting bank records and supervising managerial activity; (3) *Regulation of deposit rates and conditions for withdrawal.* By tradition, FDIC policies on these matters conform entirely with regulations applicable to Federal Reserve member banks; and (4) *Disposition of failed banks.* When an insured bank fails, the FDIC usually chooses not to liquidate it.[2]

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[1] In December 1979, there were 14,364 insured commercial banks, of which 5425 were member banks. Until 1980, when federal charters became possible for mutual savings banks under the Federal Home Loan Bank Board, the FDIC was also the only federal agency regulating mutual savings banks.

[2] The FDIC may handle a bank failure in any of three basic ways: (1) it may liquidate a failed bank, paying off its depositors in full; (2) it may arrange a merger or sell some or all of the bank's assets to

With the exception of Merton's [14] effort to incorporate surveillance costs, previous models of the FDIC contract for deposit insurance [13, 22, 12] neglect the agency's regulatory functions. In the literature of bank regulation, studies of FDIC efforts to bolster bank capital [20, 17, 18, 6, 3, 2, 19, 10] have not integrated into their analyses the costs and benefits of deposit insurance *per se*. Our goal is to erect a descriptively realistic unified framework for analyzing the regulatory and insurance dimensions of FDIC activity. With Kareken and Wallace [8] (whose model can be viewed as a special case of ours), we believe that only such a framework can identify the true justification of FDIC attempts to regulate bank capital.

We believe that the FDIC deliberately sets its *explicit* insurance premium below market value to entice state-chartered nonmember banks to submit themselves voluntarily to FDIC regulatory dominion. Precisely because the explicit price of its product is subsidized, to control excess demand for insurance services (i.e., expanded risk-taking) the FDIC is forced to develop an *implicit* price structure. To restrain bank risk-taking, the FDIC must raise (or restructure) its explicit fees or maintain an active regulatory posture. Regulations imposed on client banks as a condition for receiving FDIC insurance reduce the value of deposit insurance to owners of the banking firm. In Section I, we interpret this deadweight loss in value as an additional *implicit* premium that banks "pay" for insurance. This charge develops over and above the FDIC's *explicit* fees.

Adopting Posner's [18] conception of regulation as a tax, we perceive the FDIC to organize its examination and supervisory functions in ways that establish disincentives to "excessive" risk-taking by client banks. FDIC procedures ensure that the regulatory tax on an insured bank increases with the bank's portfolio risk. Bankers that resist these incentives may be made to forfeit their bank's charter well before its value approaches zero. We argue that a bank's charter value serves the comparatively small FDIC insurance fund (which amounts to only about 0.80 per cent of total deposits in insured banks) as its first line of defense against losses arising out of a bank's operations. From this perspective, FDIC entry regulation and periodic examination of individual banks' balance-sheet ratios function *in tandem* to maintain charter value and to control the moral hazard inherent in the FDIC's insurance business.

Seeing FDIC regulatory activities as foci for implicit price discrimination gives further insight into the function performed by its explicit premium. The implicit dimensions of the FDIC pricing strategy convert the explicit premium into a convenient device for adjusting the net insurance subsidy that the FDIC finances in any year from tax-exempt earnings on its insurance fund. Currently the FDIC expresses its explicit gross annual premium as a *rebatable* fraction (1/12 of one per cent) of a bank's total domestic deposits. In 1977 (a year representative of recent experience), the rebate reduced the net assessment to 1/27 of one per cent [5].

From a corporate-finance perspective, rational bank managers must consider both explicit *and* implicit fees when analyzing the costs and benefits of deposit

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another bank, which then assumes liability for the bank's deposits; or (3) it may operate the bank itself or reorganize it. FDIC officials strive to choose the approach that appears least expensive for the FDIC insurance fund [1].

insurance and when optimizing the amount of their bank's capital funds. Our approach exemplifies Kane's [7] "Regulatory Dialectic" in that the equilibrium value of deposit insurance—both for the bank and for the FDIC—depends on the joint responses of regulator and regulatee. Banks respond to the structure of implicit and explicit insurance premia set by the FDIC, and the FDIC adjusts its implicit and explicit fee structure to recover its costs and to achieve supplementary objectives of public policy. However, because of the deadweight losses involved, it is unlikely that the FDIC's interactive strategy is *socially* optimal. We discuss the interactive process but stop short of modeling optimal FDIC response.

I. Deposit Insurance and the Value of the Banking Firm

In the absence of bankruptcy costs, corporate income taxation, or other market imperfections, Modigliani and Miller (M&M) [15] have shown that in competitive capital markets the value of a firm is independent of its financial structure. Restoring one or more of these excluded conditions can produce an optimal debt-equity ratio. For example, M&M have also shown that allowing interest on debt to be tax-deductible provides an incentive (in the form of tax savings) for firms to substitute debt for equity in their financial structure. Kareken and Wallace [8] generate a debt-incentive effect by assuming that entry restrictions permit banks to earn monopoly profits by attaching transaction services to the debt claims held by depositors. By themselves, positive incentives for debt would produce a zero-equity corner solution. However, when bankruptcy is costly, increasing leverage (which, for a firm with a risky asset portfolio, increases the probability of bankruptcy) provides a growing offset to the incentives to expand debt. Under these twin conditions, a value-maximizing firm may reach an internal optimum, with positive equity in its financial structure[3] [11, 9, 4, 24]. This is illustrated in Figure 1.

In the diagram, V_u denotes the value of the firm in an unlevered state (pure equity) and the V curve shows how the value of the firm would vary with increasing leverage. At the point of zero equity ($D^{\max}$), debt-capital by itself is sufficient to finance the firm's entire asset portfolio. In the case illustrated, the value of the firm is maximized at V^0 and D^0, which also represent optimal values for an uninsured bank.

Deposit Insurance Provided Free of Charge by an External Guarantor

In corporate finance, banks have traditionally been conceived of as more than just another business firm. They are alleged to offer a unique combination of product services. They hold some specialized assets, notably commercial loans, and issue some specialized liabilities, notably demand deposits. They operate under unusual regulatory restrictions, including entry limitations, interest-rate ceilings, reserve requirements, and governmental guarantees on their deposit-liabilities. In this paper, we analyze the effects of having a governmental agency

[3] Strictly speaking, an internal optimum occurs only if, at zero equity, the deadweight loss due to costly bankruptcy dominates the tax subsidy. However, the existence of an internal optimum is not critical to our analysis.

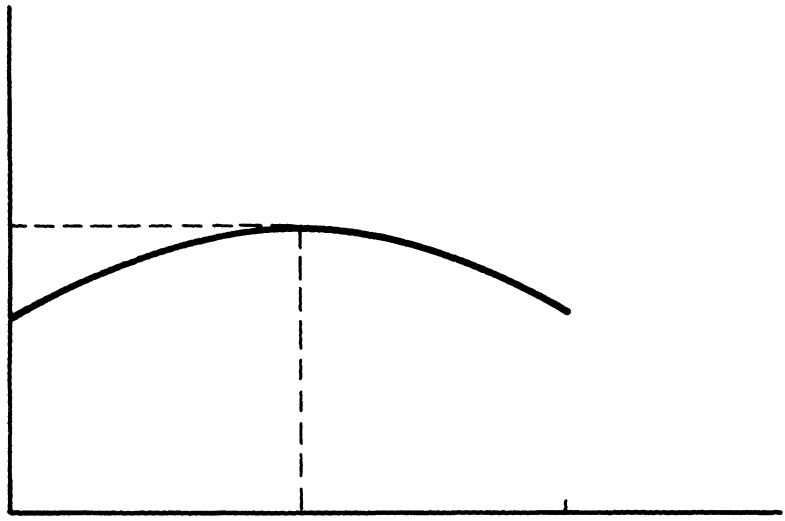

Figure 1. Value of the Banking Firm as a Function of Its Financial Structure with Costly Bankruptcy and Tax-Deductible Interest on Deposits

(the FDIC) guarantee a bank's debt. Under existing arrangements, only deposit liabilities are covered by insurance, and these only up to a specific limit per account. However, we abstract from these complications, by neglecting nondeposit debts and assuming that insurance coverage extends to *all* deposit balances. We also assume away any doubts about the ability or willingness of the guarantor (the FDIC) to meet its insurance obligations.

As the foundation of our subsequent analysis, we focus first on the case where FDIC insurance coverage is offered without charge; i.e., without either explicit fees or regulatory interference of any kind. With free deposit insurance, the FDIC commits itself to satisfy depositor claims in the event of bank insolvency without levying prior charges on the bank. In effect, free insurance reinstates the zero-equity corner solution that arises when bankruptcy is costless to the firm.

In Figure 2 we compare the value of the firm with free insurance (V_I) and without any insurance at all (V). At any level of deposits, the vertical distance between the two curves (V_I and V) portrays the value of free insurance as assessed by the banking firm. Merton [13] and Sharpe [22] join others in suggesting that the FDIC should charge an explicit insurance premium sufficient to exhaust this increase in value. When insurance fees are set according to this "fair-value" rule, the cum-insurance value of the bank, net of the explicit insurance premium, would coincide with its uninsured value at each and every level of deposits. With or without insurance, bank management that strives to maximize the value of the firm would under these circumstances operate at the debt level, D^0, and the firm would be worth V^0.

Although such a neutral insurance contract might arise in a competitive market for deposit insurance, it should be clear that a "fair-value" rule does little to persuade banks to accept FDIC regulation. This objective is euphemistically expressed in the FDIC's mandate from Congress, which focuses on protecting depositors and promoting sound banking practices.

To establish regulatory dominion, the FDIC must structure its insurance contract so that, on balance, deposit insurance offers a bank at least one opportunity to increase firm value above the bank's maximal value as an uninsured firm. In Figure 3, the boundary for bank indifference to deposit insurance is plotted as a horizontal line at V^0.

At the same time, maximum feasible increases in value are given by V_I, the locus of firm value under free insurance. As a way to close the opportunity set for illustrative purposes only, in drawing Figure 3 we assume that the FDIC insists that its insurance contracts carry incentives that prevent a bank from increasing

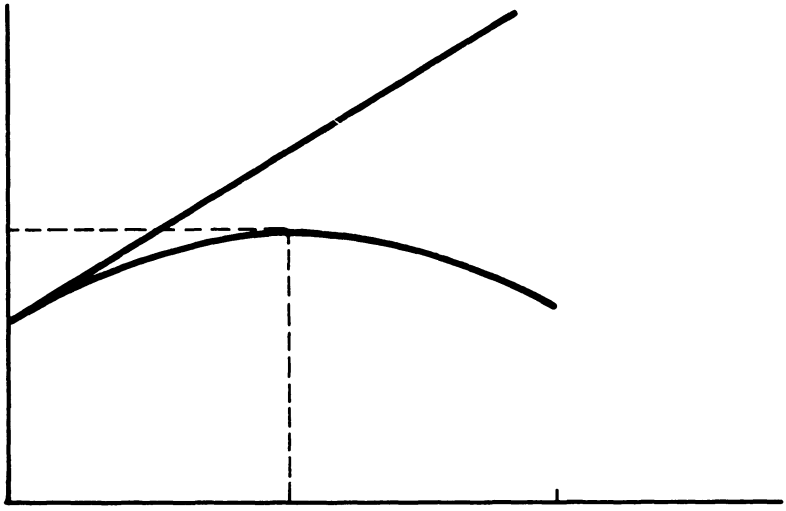

Figure 2. Impact of "free" Insurance on the Value of the Firm

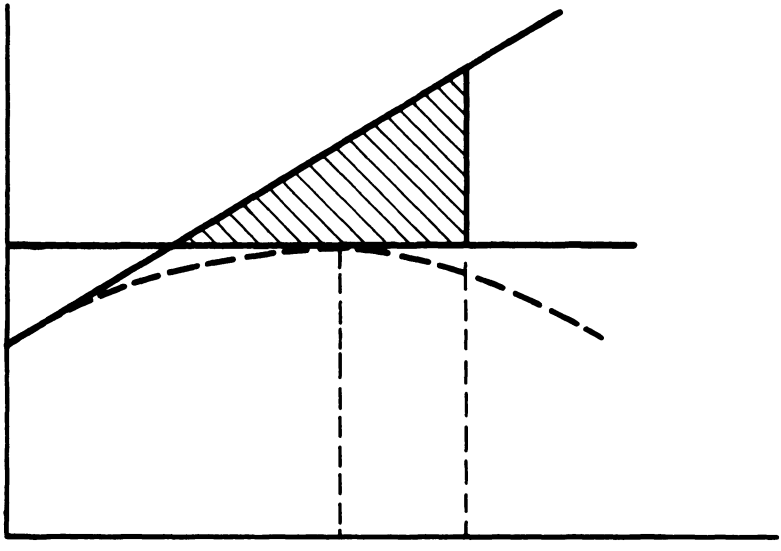

Figure 3. Limits on "Acceptable" Insurance Contracting

its deposit leverage beyond some maximum acceptable level, D^F. Taken together, these three boundaries mark off a shaded triangle of mutually acceptable contracting opportunities.

It is interesting to note that the "fair-value" pricing rules assumed by Merton [13], Sharpe [22], McCulloch [12], and Kareken and Wallace [8] do not permit contracts to be negotiated that would correspond to points strictly in the interior of this set.

The Value of the Banking Firm with FDIC Insurance and Regulation

In the real world, even uninsured banks are subject to regulation by state banking commissioners. To qualify for FDIC insurance, banks open themselves to federal examination and supervision.[4] Our model of FDIC behavior presumes that the FDIC imposes tougher restriction on a bank's activities and organization than state commissioners do. To keep the model simple, we neglect enforcement and compliance costs and assume that the FDIC's differentially severe regulation focuses along the single dimension of bank capital. In principle, other regulatory penalties may be subsumed in this regulatory-tax concept.

In the model, FDIC bank examiners appraise the economic value of the bank's assets and liabilities on an appointed date. The residual capital position (which includes an appropriate allowance for the value of the bank's charter or right to continue in business) is then compared to the FDIC's standard for capital adequacy, which may be unique for each bank. For example, a formula developed at the New York Federal Reserve Bank assigns a specific weight, ranging from zero to one, to each asset category and calculates the sum of these weighted values as the minimum level for capital adequacy. A more complex formula developed at the Board of Governors employs a liquidity test as well, making the standard for capital adequacy sensitive to the bank's mix of liabilities as well as its mix of assets.[5] In our model, we specify only that the standard is set by the FDIC and is known to bank management in advance of the examination date.

FDIC bank examinations place a bank into one of three basic states. These states range along the horizontal axis of Figure 4, which plots the probability density (conditional on the bank's current portfolio) against every possible value of the bank's capital on the next examination date.

Boundaries between different states are imposed by the FDIC. In state I, bank capital is judged to be *adequate*. In our model, banks with adequate capital are presumed to pose no moral hazard and are allowed until the next examination date to operate under broad supervision but without direct regulatory interference. When a bank's capital proves to be inadequate, its classification varies with the extent of the deficiency. As a condition for continued insurance (or to avoid undefined sanctions), we assume that in state II bank managers are asked to strengthen the bank's asset and liability portfolios to reduce its need for capital under the FDIC adequacy norms. Alternatively, the bank might be expected to

[4] In the modern U.S., many federal bank examiners operate under the auspices of the Comptroller of the Currency and the Federal Reserve. Moreover, in a few states the FDIC has experimented with letting the state banking commission perform examinations on its behalf. For convenience, the text portrays the FDIC as directly conducting examinations of all insured banks.

[5] Sinkey [23] offers a detailed discussion of standards for adequate bank capital.

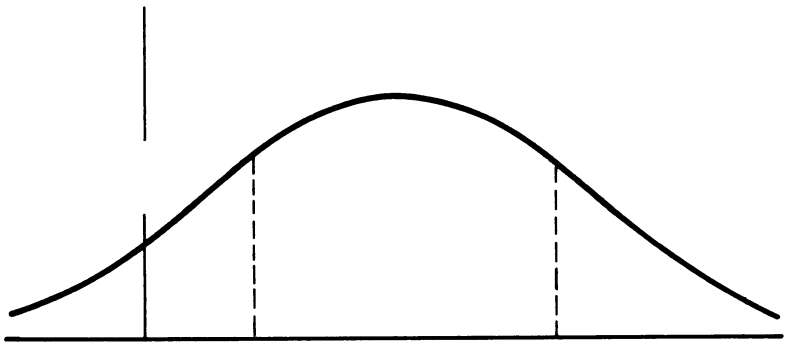

Figure 4. Probability Distribution for Bank Capital on the Next Examination Date

make up some of the equity deficiency by raising new capital or restricting current and subsequent dividend payments.

Whenever the *book value* of stockholder equity is assessed to be zero, the FDIC must declare the bank "technically insolvent." Since federal authorities can assist a bank to avoid this condition, a critical point cannot be strictly displayed in Figure 4. However, we assume that the FDIC forces a bank to technical insolvency only when the *market value* of its portfolio and physical assets (i.e., excluding the value of the charter) falls seriously below that of its deposit liabilities. This lets us bound state II at some positive fraction of the value of the bank's charter to continue in operation for future periods.

Although the FDIC must ask chartering authorities to close a technically insolvent bank, it need not liquidate it. The FDIC may permit the failed bank to merge with another institution; the FDIC may sell off the bank charter to another bank, which then accepts some subset of bank assets and assumes the failed bank's deposits; the FDIC may operate the bank itself for an interim period; it may assist the bank to reorganize under new management. Our model suggests that the FDIC would try to preserve the value of the bank charter, since the value of the charter reduces the FDIC's net liability to the depositors.

If the goal of the FDIC were only to minimize its own liability, the FDIC would pay off the depositors of a failed bank only as a last resort, and then only in markets where the costs of arranging a deposit assumption were high and/or the value of the bank's charter was very low. The FDIC would seek to effect a deposit assumption and asset transfer to one or more banks whenever this would be less than the costs of liquidating the bank.

Capital Regulation as an Implicit Premium for Deposit Insurance

For analytic convenience, we portray FDIC regulatory interference as restricting the set of profit opportunities that an affected bank's management may exploit in states II and III. We assume that throughout state II direct regulatory interference results in a reduction in firm value that increases with the size of the FDIC-assessed capital deficiency. In state III, we presume that the bank would be closed, with the residual value of its lost charter serving as the firm's cost of bankruptcy.

Prior to examination, the bank can, through its capital decision, influence the

probabilities of ending up in states I, II, and III as well as the magnitude of the anticipated regulatory tax applicable in state II. The regulatory structure we describe reduces the bank's incentive to substitute deposit debt for capital, since increased leverage increases the expected costs of being discovered either to be insolvent or to have inadequate capital. Referring back to the V_I curve (shown originally in Figure 2), for every positive value of debt, the value of the insured firm cum-regulation would be reduced by the corresponding deadweight losses as indicated by the curve, V_{IR}, in Figure 5.

In the diagram, the vertical distance between the V_I and V_{IR} curves portrays the varying value of *implicit* FDIC premiums for insurance levied in the form of contingent regulatory interference accepted as a condition for insurance. The vertical distance between V_{IR} and V measures the net benefit to the firm from trading prospective losses from costly bankruptcy without insurance for FDIC regulation. In Figure 5, this net benefit is favorable to the firm at low debt levels, but unfavorable at high debt levels.

Optimal Capital Structure with Implicit and Explicit Insurance Premia

When the explicit premium is fixed per dollar of deposits, the cum-regulation value of the insured firm may be shown in Figure 5 simply as the curve V_{IR} reduced by the appropriate constant fraction (w) of deposit levels.

In the diagram, D^* denotes the optimal level of insured deposits with implicit and explicit insurance premia. The corresponding point (V^*) on the curve denoting the cum-insurance value of the banking firm net of the explicit premium (V_{IR}-wD) denotes the new optimum firm value. As noted previously, unless V^* is strictly greater than V^0 a value-maximizing firm would not voluntarily sign up for federal deposit insurance at all.

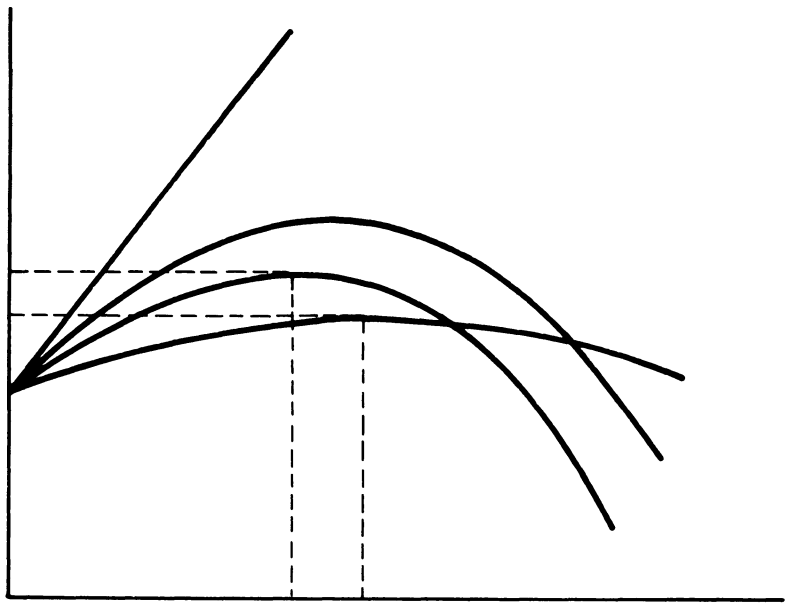

Figure 5. The Impact of Regulatory Interference on the Value of an Insured Banking Firm

Although our assumptions fix the size of the individual banking firm, in the real world the tax-cum-insurance net subsidy both helps to explain and serves to complicate regulatory policies with respect to entry, branching, mergers, and acquisitions. Supernormal profits rooted in this net subsidy tend to attract new competitors and to encourage existing firms to expand their scale of operations. If it is truly to manage its insurance liabilities, the FDIC cannot afford to be indifferent to entry and expansion in individual banking markets.

II. Summary and Implications

Exclusive reliance on an explicit flat-rate premium would interfere with the FDIC's simultaneous promotion of sound banking practices and federal regulatory oversight for nonmember banks. A value-maximizing nonmember bank would not join the FDIC if the explicit insurance premium per dollar exceeded the per-dollar tax subsidy on deposit borrowings. At flat rates below its break-even level, an insured bank would reap subsidies from taxes *and* insurance. In this situation, the combined subsidy would be a strictly increasing function of bank leverage.

To offset this structural incentive towards inordinate leverage, other authors (e.g., Scott and Mayer [21]) propose that the FDIC levy a risk-rated structure of explicit premia that would vary FDIC charges with a bank's portfolio risk. Recognizing the existence of implicit as well as explicit prices for FDIC insurance, we see that the FDIC currently achieves a comparable effect by employing a risk-rated structure of *implicit* premia in the form of regulatory interference. Regulatory standards for capital adequacy emerge as the critical element in the FDIC's pricing strategy, in that these standards determine the anticipated net value of deposit insurance to stockholders as a function of bank leverage.

Implications for the Capital-Shortage Controversy in Banking

Viewing capital standards as risk-rated implicit premia explains why managers of individual banks seem more concerned about capital standards than about the FDIC's explicit charges. These explicit charges serve mainly to align the overall FDIC subsidy to insured banks with the tax-exempt earnings of the agency's insurance fund.

Our model predicts that many insured banks would operate at leverage levels that closely border the FDIC's regulatory norm. At the margin, the net explicit subsidy for deposit debt is constant. Internal equilibrium is achieved only when this subsidy is offset by the risk-rated implicit premium. Since the implicit premium is triggered by proximity to regulatory standards for capital adequacy, this balance figures to be struck at a similar distance for every insured bank. This argument helps to explain why banks frequently shift on and off the FDIC's "problem list" in large numbers [23]. Their capital positions are carried across the adequacy threshold by unanticipated cyclical swings in economic activity.

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