

Contract Design for Problem Asset Disposition

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As a result of declining real estate values and the receivership of numerous financial institutions, government regulators like the Resolution Trust Corporation (RTC) and Federal Deposit Insurance Corporation (FDIC) have large inventories of distressed assets. This paper develops a model of the principal/agent issues associated with management and disposition of problem assets. In the model, optimal contracts balance risk sharing with incentives for effort. We argue that the RTC will minimize the ultimate cost of the thrift crisis by placing managerial control of distressed assets in the private sector, while retaining full or partial ownership of the assets for risk-sharing purposes. Recoveries are maximized, however, only when an asset manager is incented to expend a first-best level of effort by indexing asset management and disposition contracts to market movements.

The Resolution Trust Corporation (RTC) has sold over \$170 billion in assets, over half of the total seized from failed thrift institutions.¹ The bulk of these have been marketable assets like mortgage-backed securities and performing loans. Much of the remainder is illiquid distressed assets such as real estate and nonperforming loans. Distressed assets pose special problems for the RTC. These assets often require specialized asset management and disposition resources that are concentrated in the private sector. Because of the magnitude of the thrift crisis and the RTC's finite life,² the RTC has neither the incentive nor the budget to duplicate this

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¹ More precisely, as of September 1991, \$179 billion had been sold of the \$344 billion in assets it had acquired. (*Wall Street Journal*, 10/3/91).

² The finite life of the RTC creates an incentive problem for employees of an in-house effort to liquidate assets. Good performance means that the employee must eliminate his own job by liquidating the assets.

expertise.³ Thus, maximizing the net present value of distressed assets means transferring control of problem assets to the private sector.

One approach is to sell distressed assets outright to private asset managers. In this case, the bundling of assets and the design of auction mechanisms for efficient liquidation of such bundles should be the primary focus of the RTC's efforts. Given the extraordinary number of distressed assets in their inventory, efficiencies can undoubtedly be realized by bundling assets for sale.⁴

We argue, however, that selling assets outright may not maximize value. Distressed assets are concentrated in the southwest and western regions of the country and more recently in New England. These pools pose substantial idiosyncratic risks for the potential acquirers who have the local market expertise needed to manage the assets. This local market expertise gives acquirers an advantage when acquiring local assets, but at the same time, a local focus makes it difficult to efficiently diversify. As a result, acquirers purchase pools only at significant discounts. For example, the winning bidder for a pool of assets from two failed Texas thrifts recently paid an estimated 70% of fair market value.^{5,6}

The problem is further aggravated when capital market financing is limited as suggested in the popular press (for example, *Business Week*, December 24, 1990). This liquidity constraint is particularly binding where the concentration of assets is great, as it is in regions like Texas. With large percentages of both lenders and normal purchasers in receivership,

³ Kane (1990) argues that such constraints on the RTC's salvage activities reflect political and bureaucratic efforts to delay official recognition of the magnitude of the thrift crisis.

⁴ See the recent work of Crockett (1990) and Vandell and Riddiough (1991) for discussion of the sale of distressed assets and the impact on markets.

⁵ Maxxam, Inc. was the winning bidder for certain assets of the Alamo and Commonwealth savings and loans that were auctioned in 1992. Their bid was 70% of the value established under the marking instructions specified in the transaction.

⁶ Curry, Blalock and Cole (1991) outline some of the issues that arise when trying to assess recovery percentages. They report average recoveries for the Federal Savings and Loan Insurance Corporation (FSLIC) on a sample of 236 assets of 64% of net transfer value which is the historic cost less amortization while the loan was current and less any writedowns prior to takeover by the FSLIC.

financing, if available, is provided by nontraditional lenders who can demand large premiums for new activities.

The Federal Deposit Insurance Corporation (FDIC) and RTC, as agencies of the federal government, maintain a comparative advantage in bearing the idiosyncratic risks and providing liquidity. Thus, we argue that the FDIC and RTC will minimize the ultimate cost of the thrift crisis by placing managerial control of distressed assets in the private sector, while retaining full or partial ownership of the assets for risk-sharing purposes.⁷

In this paper, we develop a general framework for designing and evaluating asset management and disposition (AMD) contracts within a capital structure context.⁸ Within this framework, we analyze a specific RTC contract, the standard asset management and disposition agreement (SAMDA) and highlight the potential sources of inefficiency. We then use the framework to design a contract that more efficiently aligns the interests of managers and the RTC. The model highlights the potential for large efficiency gains from the use of indexing of contracts to market movements.

Our analysis is in the spirit of the literature devoted to the resolution of principal-agent problems in the modern corporation (for example, Jensen and Meckling 1976). It is well understood that agency problems can be eliminated by simply requiring that managers retain the entire equity stake in the assets they manage. This solution leads to inefficient risk sharing. On the other hand, reducing the manager's equity stake to improve risk sharing weakens the incentive to expend effort and resources in the management of the assets, since the manager will no longer realize the full value of his efforts. Thus, an efficient AMD contract seeks the optimal tradeoff between risk sharing and incentives toward managerial effort.

Of course, the incentive for managers to expend a suboptimal level of effort can be mitigated through a variety of monitoring and bonding

⁷ In practice, this advantage in bearing idiosyncratic risks and providing liquidity can be compromised by inadequate funding of the agencies. This could produce an efficient solution involving third-party financing. We assume that Congress, if confronted with a lower cost alternative, will provide adequate funding. Also, we note that the models of this paper specifically address the renegotiated contracts arising from the so-called "1988 deals." These renegotiated contracts are being held by the FDIC, which is less constrained by liquidity than the RTC.

⁸ The framework we characterize was applied by the RTC in the restructuring of two large portfolios of assets. For a description of the implementation of this framework in the New West Federal Savings and Loan transaction see Karr (1993).

mechanisms (compare Smith and Warner 1979). In fact, there is extensive monitoring in current management agreements. The sheer number and variety of assets that need management, however, makes monitoring particularly costly. Given the resource constraints faced by the RTC, we conjecture that on the margin it is advantageous to substitute improved contract incentives for monitoring and bonding mechanisms.

In the next section, we develop the general framework for the design and evaluation of asset management and disposition contracts. The fundamental goal is to balance optimally the incentive for a manager to expend effort created by an equity stake against the undiversifiable idiosyncratic risk imposed by equity. In the third section, we show that the widely used SAMDA contract may not achieve the first-best expenditure of managerial effort nor is it likely to achieve an optimal balance between risk sharing and managerial incentives. In the fourth section, we show that the first-best effort expenditure can be obtained by using an indexed debt contract to assign the idiosyncratic risk exposure to the federal government. A final section concludes and discusses how to adjust capital structure to avoid adverse selection when the asset manager has private information about an asset pool.

The Model

The Owner-Manager's Problem

The owner of a distressed asset faces two alternatives: dispose of the asset in its distressed state or devote effort to stabilizing⁹ the asset prior to liquidation. We assume throughout that efforts to stabilize distressed assets represent positive net present value projects. Thus, under perfect market conditions, the owner's problem reduces to determining the optimal level of effort to devote to asset stabilization.

We formalize this intuition in a simple two-period model. At time zero, the owner can either liquidate the asset or expend effort, e , to stabilize the asset and then liquidate it at time one. The asset is assumed to generate no income prior to time one. If effort is expended, the value of the asset at time one will be composed of two elements. First is the random

⁹ Stabilizing the asset usually means correcting deferred maintenance problems and leasing the building to market occupancy rates. Stabilization may take several years to complete.

value of the asset independent of any stabilization effort. We define \bar{y} (> -1) to be the one-period random yield generated by the asset, r_f to be the risk-free rate of interest, and assume that $E(\bar{y}) = r_f$. Therefore, the asset's risk is strictly idiosyncratic and can be efficiently diversified by the owner-manager.

The second element reflects the contribution of stabilization efforts to the asset's present value. This contribution is represented by the function $h(e)$. We assume that the technology represented by $h(\bullet)$ is certain and concave with $h(0) = 0$, $h'(e) > 0$, $h''(e) < 0$, and $h'(0) = \infty$. Thus, the random value of the stabilized asset at time one is

$$\tilde{P}_1(e) = (1 + \bar{y})P_0 + (1 + r_f)h(e), \quad (1)$$

where P_0 is the initial value of the portfolio and $P_1(e)$ is the value in time one.

The present value of the asset for a given level of effort is then

$$P_0(e) = E[\tilde{P}_1(e)](1 + r_f)^{-1} = P_0 + h(e). \quad (2)$$

The opportunity cost of expending effort at time zero to stabilize and dispose of the distressed asset, $c(e)$, is convex in effort with $c(0) = 0$, $c'(e) > 0$, $c''(e) > 0$, and $c'(0) = 0$. In the contracts we analyze, the direct property costs¹⁰ of managing an asset pool are usually reimbursed and can present fewer monitoring problems. We ignore the direct costs in the model by assuming full reimbursement. Thus, the costs in $c(\bullet)$ are indirect costs like the opportunity cost of the manager's time and effort that cannot be easily reimbursed or monitored.

¹⁰ For example, expenses like property maintenance, property management, legal expenses, brokerage and leasing commissions are normally reimbursed. In the deals to date, direct costs have been reimbursed from asset cash flow before distribution of cash flow occurs. This amounts to a sharing of costs consistent with the sharing of cash flows and therefore does not distort incentives. The reimbursed costs are those that are easily observed. Those that are not reimbursed are largely unobservable. While expense reimbursement is not without its own set of incentive and monitoring problems, they are of second order to the monitoring of indirect costs like the manager's time and effort. These are the primary source of moral hazard and thus the focus of our analysis.

If the asset owner's objective is to maximize the net present value of the asset, the owner's objective function can be expressed as¹¹

$$\max_{e \geq 0} : P_0(e) - c(e) = P_0 + h(e) - c(e). \quad (3)$$

The necessary and sufficient condition for maximization of equation (3) is the standard first-order condition calling for expenditure of effort, \bar{e} , such that the marginal benefit of effort is equal to its marginal cost, or

$$h'(\bar{e}) - c'(\bar{e}) = 0. \quad (4)$$

Thus, in this simple two-period model where the asset owner is able to diversify idiosyncratic risk, concentration of ownership and control of the asset produces the first-best expenditure of effort, \bar{e} . As our introductory discussion suggests, however, at least two factors preclude the RTC and private sector managers from fulfilling both the ownership and control functions. First, the specialized resources necessary for efficient management of distressed assets are concentrated in the private sector of the economy. Second, the federal government has a comparative advantage in the diversification of the idiosyncratic risks associated with distressed assets.

Separation of Ownership from Control

We capture this intuition in the model by assuming that the owner of the asset can efficiently diversify idiosyncratic risk but does not have the technology to manage the asset efficiently. However, the owner can contract with a risk averse manager with access to the technology $h(\bullet)$. To capture the manager's inability to diversify idiosyncratic risk,¹² we assume the manager has a quadratic utility function¹³ over the uncertain distribution of time-one wealth, (\bar{w}_m) , of the form

$$U(w_m) = (1 + r_f)^{-1} [E(w_m) - a\sigma_w^2], \quad (5)$$

¹¹ Although the cost of the thrift crisis will be minimized by maximizing the net present value of failed thrift assets, political considerations may require that speed of resolution take precedence when the two are in conflict.

¹² For the model of this paper to apply, we need only that the acquirers (managers) are less diversified than the RTC. Given the size and diversity of the RTC portfolio, this condition is easily met for most potential acquirers.

¹³ Any concave utility is sufficient to illustrate our results.

where σ_w^2 is the variance of w_m . Thus, the manager's utility is the certainty equivalent value of future wealth discounted to the present at the risk-free rate of interest.

Both the owner and the manager observe the initial unstabilized value of the asset, P_0 , the distribution of the asset's random yield, \bar{y} , and the manager's production technology, $h(\bullet)$. Because only the manager can observe his effort, e , only the manager can disentangle the realization of \bar{y} from the final period-one value of P_1 . Further, the manager's production technology, although observed by the owner, cannot be credibly conveyed to the capital markets so that securitization is costly.¹⁴ This rules out securitization in these situations. Finally, the opportunity cost of the manager's effort, $c(e)$, is known only to the manager, and the manager bears the entire cost of his efforts.

The owner optimally designs a contract so that the manager's incentives are compatible with the owner's objective to maximize the present value of the asset. If the owner could observe the realization of the manager's effort, the interests of the owner and manager could be aligned by a contract allocating to the manager his entire contribution to the asset's value, $h(e)$, and the (risky) residual to the owner. Since the owner cannot observe the effect of the manager's effort, however, the manager will have an incentive to expend less than the optimal effort and understate the realization of \bar{y} .

The owner can also write a contract conditioned on total proceeds from sale of the asset. For example, consider a contract with both a fixed payment independent of the realization of \bar{y} and a variable payment conditioned on total proceeds which are a function of \bar{y} . The contract commits the manager to making a fixed payment D_1 to the owner upon liquidation of the asset at time one and entitles the manager to some fraction, α , of the residual cashflow generated by the asset. The owner determines both D_1 and the manager's fractional residual claim, α . The manager, in turn, takes these elements of the contract as given and expends effort e to maximize his utility of wealth. The management contract can be characterized (loosely) as a partnership between the owner and manager with recourse

¹⁴ While securitization is always possible, the relative costs of contracting with the government are lower. The government would also be a desirable intermediary in any effort to securitize distressed assets. In this case, the government would act as an agent for the ultimate owners of the assets by supervising the management contract. If the government attached a guarantee to any securitization, it would retain an equity stake through the guarantee.

debt, $D_0 = D_1(1 + r_f)^{-1}$, and equity shares α and $(1 - \alpha)$ split between the manager and owner, respectively.¹⁵ The optimal contract design selects a capital structure which balances risk-sharing considerations against managerial incentives toward expenditure of effort.¹⁶

The Manager's Optimization

We express the manager's random payoff from the contract at time one as

$$\alpha[\tilde{P}_1(e) - D_1] = \alpha[(1 + \bar{y})P_0 + (1 + r_f)h(e) - D_1]. \quad (6)$$

Using equations (5) and (6), the manager's objective function, if he chooses not to liquidate the asset immediately, can be expressed as

$$\max_{e \geq 0} : \alpha[P_0 + h(e) - D_1(1 + r_f)^{-1}] - c(e) - a\alpha^2\sigma_y^2P_0^2. \quad (7)$$

The first-order condition for maximization of equation (7) is thus,

$$\alpha h'(\underline{e}) - c'(\underline{e}) = 0, \quad (8)$$

where \underline{e} is the manager's optimal expenditure of effort.

Equations (7) and (8) highlight the two key dimensions of the problem of aligning the interests of the owner and the manager. From equation (8), it is clear that the manager's effort is a function of α which we rep-

¹⁵ We note in passing that D_1 could be made contingent on market-wide information ("indexed"). We discuss this possibility in the next section. With an indexed contract, the manager's residual cash flow is never negative so that bonding arrangements are unnecessary. Notice also that this contract structure separates the expertise in stabilizing from capital since D can be set so that the owner (RTC) provides almost all the capital. If the owner has an enforceable claim on the manager in states where the value of the portfolio falls below D , there will be no distortions in incentives. On the other hand, if the owner does not have recourse to the manager in these states, the contract will have the usual incentive problems of risky debt. In this case, a slightly more complicated model is needed, and optimization occurs over both α and D . In the extension of the next section, D is indexed to market movements. In this contract, the owner bears the entire residual risk, and the incentive problems with risky debt disappear.

¹⁶ We have referred to the model as a two-period model, but strictly speaking, it is a two-date one-time interval model. The one-time interval precludes the modeling of a reputation return. However, since the RTC is a limited life agency without the ability to play a multi-period game with reputational returns, there is no compelling reason to include a reputation game.

resent as $e(\alpha)$. Given the assumptions on $h(\bullet)$ and $c(\bullet)$, it can be shown that e is an increasing function of α . Thus the first-best expenditure of effort, \bar{e} , is achieved only when the management contract allocates the entire residual cashflow to the manager ($\alpha = 1$).

For the manager to hold the asset into period 1, the value of the expected payoff to holding, $\alpha[P_0 + h(e) - D_0] - c(e) - a\alpha^2\sigma_y^2P_0^2$, must exceed the payoff from immediate liquidation, $\alpha[P_0 - D_0]$. This implies that $ah(e) - c(e) - a\alpha^2\sigma_y^2P_0^2$ must be positive. Even if the manager is granted the entire residual cashflow, a very risk-averse manager may not expend the first-best level of effort. Rather, if this risk term, $a\alpha^2\sigma_y^2P_0^2$, is large relative to the present value of the manager's expected proceeds from stabilizing the asset, $ah(e) - c(e)$, the manager will simply liquidate the asset immediately. Assuming the manager's production technology is unique, he will then realize P_0 immediately. If the manager is granted only a fraction of the residual cashflow so that the manager's optimal effort, e , is less than the first-best effort, \bar{e} , the incentive to liquidate the asset immediately is heightened.

Note also that the fixed payment, D , in the contract has no influence on the level of effort expended nor does it influence the risk term in the manager's objective function. This implies that the owner of the asset influences the manager's optimal expenditure of effort only through the management contract's allocation of residual cash flows to the manager. Thus the owner optimizes the present value of its claim on the cashflows from the asset by setting α alone. This arises because the manager cannot affect the risk of the asset.

On the other hand, the fixed payment, D , does influence the value of the contract to the manager and the amount he will be willing to pay for the contract. In a liquidity constrained market where potential bidders on real estate are poorly capitalized and institutions hesitate to lend, it will be desirable to set the fixed payment close to P_0 so that the contract can be bought with little capital. We pursue this issue in the next section.

The Owner's Optimization

The present value of the owner's stake is composed of three elements in the present example. First, the owner receives at the outset of the contract a cashflow reflecting the value of the contract to the manager. We assume the owner conducts an auction among competitive managers which in-

duces the managers to bid their reservation price for the contract.¹⁷ Thus the manager is willing to pay the owner of the asset

$$\alpha\{P_0 + h[e(\alpha)] - D(1 + r_f)^{-1}\} - c[e(\alpha)] - \alpha\alpha^2 P_0^2 \sigma_y^2 \quad (9)$$

to enter into the contract. The owner also receives D_1 and a share of the asset's residual cashflow at time one. The present value of D_1 is just $D_1(1 + r_f)^{-1}$, and the present value of the owner's share of the asset's residual cashflow is

$$(1 - \alpha)\{P_0 + h[e(\alpha)] - D_1(1 + r_f)^{-1}\}. \quad (10)$$

Combining these three elements, we express the owner's objective function as

$$\max_{\alpha \geq 0} : P_0 + h[e(\alpha)] - c[e(\alpha)] - \alpha\alpha^2 P_0^2 \sigma_y^2, \quad (11)$$

where $e(\alpha)$ is the solution to the agent's problem.

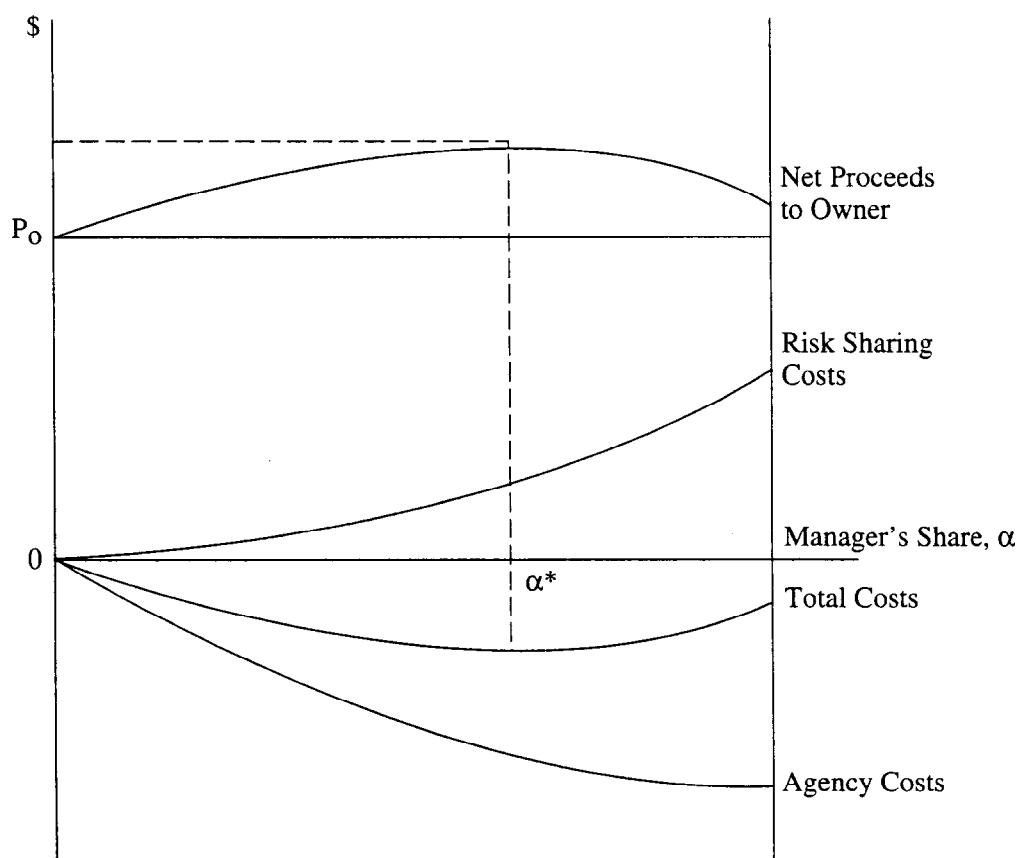
Equation (11) can be interpreted as the initial value, (P_0), plus the value the manager is willing to pay for the contract, ($h(e) - c(e) - \alpha\alpha^2 P_0^2 \sigma_y^2$). Equation (11) shows that the owner can improve the incentives toward effort faced by the manager by increasing α but only at the cost of a demand for a higher risk premium. Figure 1 illustrates that while agency costs are falling as α increases, risk-sharing costs are rising. As a result, an interior maximum is reached at α^* where total costs are minimized and total expected revenue is maximized.

The owner's first-order condition is

$$h'[e(\alpha^*)] e'(\alpha^*) - c'[e(\alpha^*)] e'(\alpha^*) - 2\alpha\alpha^* P_0^2 \sigma_y^2 = 0. \quad (12)$$

¹⁷ Kormendi, Bernard, Pirrong and Snyder (1989) discuss this issue in the context of the 1988 FSLIC-assisted acquisitions. Recent asset pool offerings by the RTC's National Sales Center call for potential acquirers to bid both a price and a cash down payment with the remainder to be financed by the RTC. Following Samuelson's (1986) analysis of the tradeoff between risk sharing and efficient contractor selection in contingent contracts, the capital structure component of the bid would appear to offer the potential for more accurately identifying efficient asset managers. Of course if the market for management services is not competitive, some excess returns may accrue to managers and bids may be below the manager's reservation price.

Figure 1 ■ Net Proceeds to the Owner.



The figure shows the net proceeds to the owner or the share allocated to the manager, α , varies. The owner's optimization balances agency and risk-sharing costs at α^* .

The owner solves equation (12) by setting the manager's equity share to α^* . When solving this problem, the best outcome for the owner occurs when the manager is risk neutral, that is, $a = 0$. In this case, $\alpha^* = 1$ and the first-best level of effort is achieved. From (11) it can be seen that as managerial risk aversion increases, the value of the asset to the owner decreases. This effect is only partially offset by allocating a smaller equity share to the manager. Finally, it can be shown that α , and therefore e , is a decreasing function of a . Thus, it is always true that $\alpha \leq 1$.

Indexing

It is possible to use a cost of carry as a risk-sharing device to improve managerial incentives. Suppose there exists an observable random variable that is correlated with \bar{y} . The ability to contract on the observable

random variable creates an opportunity for the owner to absorb some or all of the risk by indexing D_1 to the observable random variable. In other words, design the contract such that the manager's payoff is

$$\alpha[\tilde{P}_1(e) - D(1 + \tilde{I})] = \alpha[(1 + \bar{y})P_0 + (1 + r_f)h(e) - (1 + \tilde{I})D], \quad (13)$$

where \tilde{I} is observable and correlated with \bar{y} . If \tilde{I} is perfectly correlated with \bar{y} , it is possible to set D such that the manager's problem becomes

$$\max_{e \geq 0} : h(e) - c(e). \quad (14)$$

In other words, indexed debt permits the assignment of the entire risky component of the asset's payoff to the owner. Thus the owner optimally assigns the entire value of the manager's production technology to the manager so that the manager is induced to achieve the optimal effort expenditure \bar{e} . Assuming that the auction for the contract induces the bidding of reservation prices by potential managers, each manager will bid the surplus generated by his optimal expenditure of effort, $h(\bar{e}) - c(\bar{e})$. The present value to the owner of putting the asset out for management is then

$$P_0 + h(\bar{e}) - c(\bar{e}), \quad (15)$$

so that the owner realizes the maximized net present value of the asset.

Of course, if \tilde{I} and \bar{y} are not perfectly correlated, the manager's effort will be observed with error. Given the wide range of distressed assets under the control of the RTC, it is unlikely that there exists an observable index which is perfectly correlated with \bar{y} . Thus the benefits of using a noisy, albeit informative, index must be weighed against the additional risk introduced by the index. Harris and Raviv (1978) suggest that contracting on noisy information will be acceptable to risk-averse parties only under a limited set of circumstances. Holmstrom (1979) and Shavell (1979) show, however, that use of such information generally leads to Pareto improvement of the terms of the contract. The RTC is currently evaluating the potential for using existing real estate indexes (such as the Russell and National Real Estate Investment (NREI) indexes) in the design of contracts similar to an indexed version of the benchmark contract.¹⁸

¹⁸ There are other implementation issues with indexing. While indexed contracts are common in some settings, they are not widely used in the real estate industry. Potential managers are unfamiliar both with the concept and the proposed indices. As a result, there is considerable hesitancy to contract contingently. If indexed contracts become more common, this inertia should disappear.

Analysis of Existing RTC Contracts

In this section, we use the results established in the previous section as benchmarks to evaluate the performance of existing and proposed contracts.

The SAMDA Contract

The SAMDA is one of the RTC's most widely used management contracts. The SAMDA has been applied mainly to relatively small pools, but recently it was used for an asset pool with an estimated value of \$1 billion.

The SAMDA contract managers can earn both management fees and disposition fees. The asset pool underlying the contract is assigned an "estimated realized value" (ERV) designed to serve as a substitute for marking the assets to market. The contract is then bid competitively for the two elements of the fee structure. The (annual) management fee is bid as a percentage of the remaining balance (ERV) of the pool. The disposition fee is a percentage of net proceeds from asset sales and operations. Proceeds are net of direct management expenses and an assessment reflecting the owner's (RTC's) cost of financing the asset pool. Indirect management expenses are borne by the manager. The management fee is not conditioned on the performance of the assets, and therefore, has no impact on the manager's incentives toward effort other than it reduces the manager's incentive to liquidate the asset pool. Thus, we focus mainly on the disposition fee structure of the contract.

Early Liquidation

The SAMDA contract defines the manager's disposition fee as a continuous function of net proceeds from sale. In our framework, net proceeds from sale at time one is defined by

$$S - kM_0 = \tilde{P}_1(e) - kM_0 = [(1 + \tilde{y})P_0 + (1 + r_f)h(e)] - kM_0, \quad (16)$$

where S is sales, M_0 is the asset pool's time-zero ERV and k is the cost of capital per dollar of ERV. The cost of capital is usually a fixed spread above Treasury rates. It was introduced to offset the manager's incentive to hold the assets for capital appreciation while expending little or no effort on their management and disposition.

In practice, the manager's disposition fee in the SAMDA contract is a continuous function of proceeds from sales in equation (16). However, a simple discrete version of SAMDA highlights the managerial incentive problem created by the contract. We simplify the SAMDA contract by assuming a dollar threshold, t , for net proceeds from sales, $S - kM_0$. For $S - kM_0 \leq t$, the manager's share of net proceeds from sales is α_1 . For $S - kM_0 > t$, the manager's share of net proceeds in excess of t is α_2 where $\alpha_2 \geq \alpha_1$. Therefore, the manager's random payoff at time one is

$$\alpha_1 t + \alpha_2 (S - kM_0 - t) = \alpha_1 t + \alpha_2 [(1 + \bar{y})P_0 + (1 + r_f)h(e) - t] - \alpha_2 kM_0 \quad \text{for } S - kM > t. \quad (17)$$

Recall that the manager's payoff at time one from the benchmark contract analyzed in equation (6) of the first section was

$$\alpha[\tilde{P}_1(e) - D_1] = \alpha[(1 + \bar{y})P_0 + (1 + r_f)h(e) - D_1]. \quad (6)$$

For comparison purposes, set $\alpha_1 = 0$, $D_1 = t$ and subtract equation (6) from equation (17). The resulting difference between the two payoffs is the cost of capital assessment, $\alpha_2 kM_0$, imposed by SAMDA. If the manager holds assets until time one, the cost of capital assessment has no effect on the manager's marginal conditions. Therefore, the SAMDA contract can produce incentives toward effort identical to those produced by the benchmark contract. However, since the cost of capital assessment is zero if the assets are liquidated immediately (at time zero), there is an incentive to sell assets early ("dump" assets) under the SAMDA contract. Further, even if the manager is risk-neutral and given the entire residual cashflow ($\alpha_2 = 1$), the incentive toward early liquidation persists under the SAMDA contract. This contrasts with the benchmark contract where risk-neutrality eliminates the incentive to dump assets and ownership of the entire residual cashflow produces the first-best expenditure of effort.

An Illustrative Example

The incentive to liquidate assets early at the lowest possible resource and opportunity costs translates directly into the loss of positive net present value projects. For example, consider an asset for which $P_0 = \$1$ million and given an expenditure of effort of e would generate $E[P_0(1 + \bar{y}) + h(e)] = \1.05 million at time one.¹⁹ Assume that $k = 10\%$, $\alpha_1 = 0$,

¹⁹ This example is based on an example in Mid America Institute for Public Policy Research, Smith Breeden Associates, Inc., and Cooter and Gell (February 4, 1991).

$\alpha_2 = 5\%$, $M_0 = P_0$ and that a risk-neutral manager applies a discount rate of 10% to the time-one cashflows. Thus the manager's efforts to stabilize the asset represent a project with a net present value of \$45.5 thousand ($=\$50,000/1.1$) (ignoring opportunity costs and other indirect costs). Note, however, that if the manager simply sells the asset in its distressed state, he will realize a fee of \$50 thousand ($=1 \text{ million} \times 5\%$). On the other hand, if the manager were to expend effort to stabilize the asset, upon disposition of the asset he would earn a fee of \$52.5 thousand ($=11.05 \text{ million} \times 5\%$). Since the present value of this fee is only \$47.7 thousand ($=\$52,500/1.1$), the manager will reject the positive net present value project in favor of selling the asset at its distressed value.

In the present example, the manager's decision could be reversed by simply eliminating the cost of capital charged against net proceeds. Thus SAMDA may not provide incentives for optimal managerial effort since some assets may be sold too early. The management fee in the SAMDA contract, however, could be used to offset this incentive to dump. If the management fee is set equal to $\alpha_2 k M_0$, the incentive to sell early can be eliminated. In the illustrative example above, this is a management fee of .5%. In practice, the management fee is bid and can deviate widely from the offsetting value. On balance, SAMDA managers may have either an incentive to dump or hold depending on the relative sizes of the management fee and cost of carry.

In the actual SAMDA contract, the manager's disposition fee is a continuous function of net proceeds from sales and is defined by

$$\int_0^N \alpha(q/M_0) dq = \alpha N^2/M_0, \quad (18)$$

where N is the net proceeds from the sale ($=S - kM_0$). Since $\alpha(q/M_0)$ is the manager's share of the q th dollar of net proceeds, the cost of capital assessment imposed by the SAMDA contract effectively reduces the manager's ownership stake over time, and thus, creates the incentive for the manager to liquidate assets despite the opportunity to enhance their net present value through continued management of the asset. Note, however, that the inclusion of the cost of capital assessment is not inherently inconsistent with the interests of efficient managerial incentives. The benchmark contract also imposed an implicit cost of carry in the form of the fixed (debt) payment, D_1 . Introduced in this manner, however, the cost of capital assessment does not influence the manager's incentives toward effort. Thus it is the manner in which the cost of capital assess-

ment is introduced that influences managerial incentives, not the assessment itself.²⁰

Conclusion

In this paper, we have developed a framework for the design and evaluation of asset management and disposition contracts. Since market imperfections limit the potential for outright sale of failed thrift assets by the RTC, efficient design of AMD contracts is particularly important. The RTC's portfolio will be maximized only through significant expenditure of effort and resources to stabilize and dispose of the assets. The goal of the contracts is to optimally trade off managerial incentives toward effort with the manager's share of the undiversifiable risk. We have demonstrated that the widely used SAMDA contract can not achieve the first-best expenditure of managerial effort nor is it likely to achieve an optimal balance between risk sharing and managerial incentives. We show that an indexed contract can achieve the first-best effort expenditure by permitting the assignment of the entire idiosyncratic risk exposure to the federal government.

There remain important elements of the principal-agent relationship between the RTC and asset managers that we have not examined. For example, given the size and diversity of their portfolio, it is unlikely that the RTC could condition its liquidation decisions on all information relevant to the valuation of the portfolio. If the RTC portfolio is liquidated on an asset-by-asset basis or through pooling of relatively homogeneous assets, opportunities arise for acquirers with private information about idiosyncratic risks, such as regional economic forces, to self-select into the bidding process.²¹ The RTC must be particularly sensitive to the risk

²⁰ It can be argued that the market imperfections hindering sale may be eliminated if the RTC were to create a larger market by being more willing to take writedowns. The advantage of a properly designed contract is that it minimizes the need for writedowns.

²¹ The adverse selection problem arising in this context is widely recognized to act as a wedge between buyers and sellers. Akerlof (1970) provides the seminal treatment of this problem. Rock (1986) and Glosten and Milgrom (1985) analyze the consequences of adverse selection for primary and secondary equity markets, respectively. Amihud and Mendelson (1986) provide evidence that the required rate of return on stocks is positively related to the bid-ask spread. Glosten and Harris (1988), in turn, present evidence consistent with an adverse selection component in the bid-ask spread.

of being exploited by privately informed acquirers of assets in the wake of the widely criticized 1988 FSLIC-assisted acquisitions.^{22,23}

Although we have not developed this element of the problem formally, it is clear within the capital structure framework developed here that AMD contract design can be used to offset the risk of adverse selection. Specifically, if I and \bar{y} are less than perfectly correlated and the manager has private information about \bar{y} , the manager effectively gains a larger share of the equity in the asset pool than is warranted by the price they will pay for the contract. One potential solution to this problem is to attach a short position in a call option with a strike price at some level above the original mark-to-market value of the pool to the existing capital structure implied by the general contract discussed in the second and third sections. The call option then reduces the manager's equity share by capping unforeseen gains in the value of the asset that arise from economic forces beyond the stabilization and disposition activities of the manager.²⁴

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²² The so-called 1988 deals have been widely criticized as government giveaways as a result of, among other things, Federal Home Loan Bank Board and FSLIC efforts to complete as many assisted transactions as possible prior to December 31, 1988, at which point the tax benefits associated with certain forms of assistance were to be reduced by 50%. See Kormendi, Bernard, Pirrong and Snyder (1989) for a discussion of the 1988 FSLIC-assisted transactions.

²³ Benveniste and Spindt (1990), Benveniste and Wilhelm (1990) and Benveniste, Marcus and Wilhelm (1991) suggest one avenue for mitigating the consequences of adverse selection. In these papers, an intermediary uses its leverage over privately informed agents to induce the revelation of private information. The intermediary's leverage derives from the maintenance of long-term business relationships with informed agents and the consequent ability to sanction those identified as having exploited private information. Unfortunately, the months or years of investment and managerial effort necessary to stabilize many of RTC's distressed assets suggests that an acquirer will be identified as having exploited private information only after a relatively long period of time, during which it would be possible to further exploit their private information by participating in the bidding for additional asset pools. The RTC's power to sanction privately informed acquirers is further limited by the finite life of the agency established by the Financial Institutions Reform, Recovery and Enforcement Act.

²⁴ See Mid America Institute for Public Policy Research, Smith Breeden Associates, Inc., and Cooter and Gell (June 26, 1991) for an example of a contract that implicitly makes use of this insight.

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