Reputation and Discretion in Financial Contracting

By Arnoud W. A. Boot, Stuart I. Greenbaum, and Anjan V. Thakor*

We explain the use of legally unenforceable, discretionary financial contracts in circumstances where legally enforceable contracts are feasible. A discretionary contract allows a contracting party to choose whether or not to honor the contract. It is shown that such a contract liquefies reputational capital by permitting it to be depreciated in exchange for the preservation of financial capital and information reusability in financially impaired states. In addition, discretionary contracts foster the development of reputation. This explains discretion among highly confident letters, holding-company relationships, mutual-fund contracts, bank loan commitments, and other financial and non-financial contracts. (*JEL* G20, K12, D82)

"My Word Is My Bond"
—Lintel: London Stock Exchange

This paper explains why financial contracts often allow participants a measure of discretion as to whether to honor or repudiate them. An example is the "comfort letter" used by a parent company to assure the subsidiary's lenders that the parent will support it in financial distress. The British High Court recently ruled that comfort letters represent nothing more than a moral commitment (see *American Banker*, 6 June 1989), thereby reversing an earlier ruling by a lower court (see René Sacasas, 1989). Another example is the "highly confident" letter with which the investment banker promises to provide credit, but the promise is typically not legally enforceable. Other examples of such contracts are discussed in Section III.

Contracts that allow such discretion often give rise to what are called "illusory promises" in that they impose no legal obligation on the promisor. This lack of enforceability is central to the discretionary contract that we analyze. Our principal objective is to explain why such contracts exist in circumstances where legally binding contracts, called definite or enforceable, are neither technically nor economically infeasible. The class of contracts we focus on are guarantees that promise a state-contingent future payment in exchange for a payment made at the outset. The future payment may be cash or a credit extension on prespecified terms.

Our explanation for discretion rests on considerations of flexibility and reputation. Consider guarantees issued by a financial institution possessing both reputational and financial capital, but with only the latter reflected on its balance sheet. The reputa-

*Boot: Faculty of Economics, University of Amsterdam, Amsterdam, The Netherlands; Greenbaum: J. L. Kellogg Graduate School of Management, Northwestern University, Evanston, IL 60208; Thakor: School of Business, Indiana University, Bloomington, IN 47405. We gratefully acknowledge financial support from the Garn Institute of Finance at the University of Utah. For their helpful comments, we thank two anonymous referees, Steven Buser, William Emmons, Michael Fishman, Charles Kahn, Michael Metzger, George Pennacchi, John Persons, Edward Prescott, Jeremy Stein, René Stulz, workshop participants at the Board of Governors of the Federal Reserve System, Columbia University, University of Illinois, Indiana University, Rice University, Ohio State University, Hong Kong University of Science and Technology, Washington University of St. Louis, and participants at the 1992 American Economic Association Meeting, the 1991 Conference on Monetary Theory and Financial Intermediation at the Federal Reserve Bank of Minneapolis, and the August 1992 Conference on the Operation and Regulation of Financial Intermediaries and Financial Markets at the Stockholm School of Economics. The authors alone are responsible for remaining errors.

tional capital reflects the market's beliefs about the likelihood that the institution will honor its guarantees. The better the institution's reputation, the more the market should be willing to pay for its guarantees. If the institution writes an enforceable guarantee, it is legally bound. Thus, if a claim eventuates, the institution will honor it to the full extent of its financial capital. On the other hand, the institution can repudiate a discretionary contract with legal impunity. Thus, the institution has two choices. It can either augment its reputational capital by honoring the claim and accepting the nondissipative write-down of its financial capital, or it can conserve its financial capital by repudiating the claim and accepting a dissipative charge against its reputational capital. The discretionary contract therefore provides the institution with additional degrees of freedom in managing its assets. It liquefies reputational capital and also facilitates reputation enhancement.

The use of contractual discretion to manage jointly financial and reputational capital is illustrated by the recent experience of Robeco, a Dutch investment group that manages share, bond, and property funds. Most Robeco funds tacitly guarantee fund prices. For example, for 11 years prior to September 1990, Robeco bought back shares of its real-estate fund, Rodamco, at net asset value from any investor wishing to sell. In September 1990, however, following a dumping of Rodamco shares, Robeco suspended this policy, a move that could be interpreted as sacrificing reputational capital in order to conserve financial capital. We quote (emphasis ours):

> Trading is scheduled to resume today in Rodamco, the large Dutch property investment fund which stunned the Amsterdam bourse on Monday with the news that it was suspending its traditional policy of buying back shares when asked to do so by investors.
>
> Analysts say a substantial fall in share price is inevitable ... [and] Rodamco's move—*which came as a shock despite provisions in its statutes which allow for a reversal of policy*—had also caused a dent in confidence in its owner, the Rotterdam-based Robeco Group, Europe's biggest independent fund manager.
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> [*Financial Times*, 26 September 1990, p. 32]

This interplay between financial and reputational capital is central to the discretionary contracts we analyze. These are incomplete contracts in that they fail to legally bind in at least some states, thereby leaving residual discretion with the contracting parties. Since discretion in incomplete contracts takes many forms, ours is but one among a variety of possible explanations. One strand of the literature explains missing contingencies in incomplete contracts with the observation that future state-contingent outcomes may be too complex to permit precise contracting over all outcomes at reasonable cost (Oliver Williamson, 1975; Oliver Hart and John Moore, 1988; Gillian Hadfield, 1990). Thus, the contract specifies a sharing rule that pools across subsets of future states of nature. Bengt Holmstrom and Paul Milgrom (1991) explain the absence of contingencies in incentive contracts by suggesting that a contract that bases an agent's compensation on readily monitored, well-specified contingencies may not be used because it could distract the agent from poorly monitored but potentially more productive tasks. Franklin Allen and Douglas Gale (1992) suggest that contingencies that are only indirectly observable through noisy manipulable signals may be optimally excluded from a contract. A second strand of the literature shows that discretion may be useful in deterring moral hazard (see Richard Craswell and John Calfee, 1986; Boot and Thakor, 1992).[1] A third strand is the literature on implicit contracting (Clive Bull, 1987), which argues

[1] The moral-hazard explanation seems relevant in explaining the government's refusal to guarantee explicitly bank deposits in excess of $100,000 per account, and also in explaining the vagueness of conditions precedent to access to lender-of-last-resort facilities. These ambiguities may encourage greater care in bank asset selection (see Gerald Corrigan, 1989).

that incentive-compatible implicit contracts might be chosen if explicit ones are unenforceable in some states.[2]

Rather than explaining missing contingencies or imprecision in contract terms, we explain why unenforceable contracts may be optimal. We consider contractual obligations linked to state contingencies and assume that these are to be fulfilled by an agent, X, whose "type" is a priori unknown to the counterparty, Y. If all state contingencies were mutually and costlessly verifiable, the contract would precisely stipulate each party's obligation in each state. However, we assume that X privately observes some states, so that Y has a coarser partitioning of the state space. The question of discretion versus enforceability is whether the contract (legally) mandates that X satisfy the contractually stipulated obligation in each state *discernible to* Y (we call this an *enforceable contract*), or whether the contract permits X to repudiate the obligation with legal impunity in one or more states in which X has finer information (we call this a *discretionary contract*). The advantage of the discretionary contract is that it allows X to achieve a superior matching of the contractual obligation to the realized state. The disadvantage of the discretionary contract is that X may exploit its informational advantage by misrepresenting the state realization to Y's detriment. The incentive for X not to misrepresent is rooted in the potential gain from developing a reputation. Without this reputation-development incentive, there would be no role for a discretionary contract, because it would never be honored.

The principal contributions of our analysis are threefold. First, we establish conditions under which contractual discretion is preferred, even when greater enforceability is feasible. Second, we develop a link between contract choice and reputation. In the reputation literature (e.g., Kose John and David Nachman, 1985), the contract between the uninformed party and the party attempting to develop a reputation typically is exogenously specified, and reputational incentives for settling the contract are analyzed. We show that reputational incentives are sensitive to contract choice, and we endogenize the choice of contract on that basis. Third, contrary to the presumption of legal doctrine, we show that there *is* a difference between the discretionary contract and the "no contract" alternative. In particular, even though a discretionary contract lacks legal enforceability, it is preferable to having no contract in that it establishes a reputation mechanism. The public observability of the discretionary promise and its honoring (breaching) affects reputation.

The rest of the paper is organized in four sections. Section I describes the model and the legal and economic environments. Section II contains the analysis, Section III discusses applications, and Section IV presents conclusions.

I. The Model

Consider an intermediary, X (the guarantor), who promises a state-contingent future payment to Y (the guaranteed) in exchange for a fee paid at the outset. We will first rationalize such a contract.

A. *An Example of How the Guarantee Contract Can Be Endogenized*

Suppose that at time $t = 0$, a potential borrower Y anticipates that it will have the opportunity to invest in a project at $t = 1$ with a random return to be realized at $t = 2$. The return is $S_j > 0$ with probability ξ_j and zero with probability $1 - \xi_j$. The borrower, Y, can choose either a low-risk (ℓ) or a high-risk (h) project (i.e., $j \in \{\ell, \mathrm{h}\}$, with $\infty > S_\mathrm{h} > S_\ell > 0$ and $0 < \xi_\mathrm{h} < \xi_\ell < 1$). Suppose the low-risk project is socially optimal, in the sense that $\xi_\ell S_\ell > \xi_\mathrm{h} S_\mathrm{h}$. Each project requires a one-dollar investment which is to be funded with a bank loan. Let X be a bank that cannot observe project choices, and *ex post* can only observe whether or not the borrower's project succeeds (but *not*

[2]The implicit-contracting literature addresses different issues. For example, Costas Aziardis (1975) uses implicit contracts to explain risk-sharing, whereas George Akerlof (1982) addresses partial gift exchange between employees and firms.

the realized project payoff). At $t=0$, the $t=1$ spot risk-free interest factor (1 plus the interest rate) is a random variable $\tilde{R} \in \{\underline{R}, \bar{R}\}$, where $\bar{R} > \underline{R} > 1$. All agents are risk-neutral. The loan market is perfectly competitive in the sense that lenders earn zero expected profits on loans, and can avail themselves of an infinitely elastic supply of deposits at the spot risk-free interest rate.

If X anticipates that Y will choose project ℓ, then the competitive interest factor (i.e., one that yields the bank zero expected profit) charged for the \$1 spot loan will be $\tilde{R}[\xi_\ell]^{-1} \in \{\underline{R}[\xi_\ell]^{-1}, \bar{R}[\xi_\ell]^{-1}\}$, and if X anticipates that Y will choose project h, the interest factor charged will be $\tilde{R}[\xi_h]^{-1} \in \{\underline{R}[\xi_h]^{-1}, \bar{R}[\xi_h]^{-1}\}$. We then have the following result.

LEMMA 1: *If*

$$\underline{R} < [\xi_\ell S_\ell - \xi_h S_h]\xi_\ell[\xi_\ell - \xi_h]^{-1} < \bar{R}$$

then there is a Nash equilibrium in which Y chooses project ℓ if $\tilde{R} = \underline{R}$ and project h *if $\tilde{R} = \bar{R}$, and the competitive bank charges an interest factor of $\underline{R}[\xi_\ell]^{-1}$ if $\tilde{R} = \underline{R}$ and $\bar{R}[\xi_h]^{-1}$ if $\tilde{R} = \bar{R}$. There is no Nash equilibrium in which Y chooses project ℓ if $\tilde{R} = \bar{R}$.*

(See Appendix for the proof.)

Note that, given the parametric restriction stated in Lemma 1, the bank will never price the loan under the assumption that Y will choose project ℓ when the spot interest rate is high. That is, Y chooses h when $\tilde{R} = \bar{R}$, regardless of whether X anticipates a choice of h or ℓ in the pricing of the loan. The social cost of Y investing in the socially suboptimal (high-risk) project is

$$P = [\xi_\ell S_\ell - \xi_h S_h] > 0.$$

This cost is avoidable if Y were to purchase a loan commitment from X at $t=0$ that would permit Y to borrow \$1 from X at $t=1$ at a fixed interest factor of $R_0 = [\xi_\ell S_\ell - \xi_h S_h][\xi_\ell - \xi_h]^{-1}\xi_\ell$. Now Y will choose project ℓ regardless of the spot borrowing rate at $t=1$, although the commitment will be exercised only if $\tilde{R} = \bar{R}$. At $t=0$, X will charge Y a fee to recoup the expected loss from future lending to Y at $R_0 < \bar{R}$ in the high-interest-rate state.

Thus far we have implicitly assumed that X will honor its commitment to lend to Y at R_0 if Y wishes to borrow. If the loan-commitment contract is legally enforceable, it will bind X. However, if the contract is discretionary, X may choose to renege even if it is financially able to satisfy the claim. The price (fee) that Y is willing to pay X for such a commitment will increase with X's reputation for honoring discretionary contracts.

B. *Legal Environment and Contracting Options*

Michael Metzger and Michael Phillips (1990) note a trend toward reduced specificity/completeness in contract terms with a consequent increase in contractual discretion. Contracts can be thought of as lying in a precision continuum, with illusory and definite promises as endpoints.

Illusory Promise.—In the legal literature, an illusory promise is defined as "an expression cloaked in promissory terms, but which, upon closer examination, reveals that the promisor has committed himself not at all" (John Calamari and Joseph Perillo, 1977 p. 159), and as "words in promissory form that promise nothing; they do not purport to put any limitation on the freedom of the alleged promisor, but leave his future action subject to his own future will, just as it would have been had he said no words at all" (Arthur Corbin, 1952 p. 211).

For present purposes, it is sufficient to note that illusory promises are unenforceable in the sense that there is no legal remedy for breach. A related notion is that of *indefiniteness*. A contract is called too indefinite to enforce if identifying an appropriate breach for remedy is impossible because the contract terms make it difficult to determine what the promisee is supposed to receive. Both illusory promises and indefinite contracts are extreme manifestations of contractual incompleteness. Incomplete contracts leave discretion with a guarantor in unspecified contingencies; illusory promises and promises that fail for indefiniteness leave discretion in too many contingencies.[3]

Definite Promises.—These are commitments that are legally enforceable. The enforceable contract in our model is a definite promise. It is also a complete contract in the sense that it clearly spells out the obligations of the parties based on contingencies observable by a court.[4]

Transacting parties in our model thus have three choices: (i) no contract at all, (ii) a discretionary contract (illusory promise), or (iii) an enforceable (definite) contract.

C. *Information Reusability, Discretion, and Reputation*

The incentive for X to honor a discretionary contract will depend on considerations of reputational and financial capital. Suppose that X's financial capability evolves stochastically and X is privately informed about the probability distribution that determines this capability (i.e., its type). Moreover, suppose that X has a multiperiod planning horizon and produces a variety of information (e.g., market demand conditions and branch-specific information) in order to price its guarantees. Then X's information is potentially *reusable*, intertemporally and/or cross-sectionally (see Yuk-Shee Chan et al., 1986). Thus, the information that X possesses regarding Y is idiosyncratic to a particular *class* of customers that Y belongs to, and not to Y exclusively. Then, even if X does not contract with Y in the future, it can benefit from information reusability (i.e., enjoy a lower future information-production cost) in dealing with another customer like Y.

The realization of a state in which X is financially impaired makes it more costly for X to satisfy Y's claim because X may be forced to liquidate information-sensitive assets. This may result in a loss of reusable information (e.g., information available in bank branches that may need to be liquidated), or X may incur costs in selling inherently illiquid assets. Note that reusable information is just one example of an asset that may be damaged as a result of financial distress. In addition, information reusability reinforces reputational rents by providing higher profits to a longer-lived X.

The likelihood that X will enjoy these rents depends on its ability to meet its contractual obligation, which in turn depends on its financial capital. Since the financial capital evolves randomly, misfortune alone could threaten X's rents. This is where a discretionary contract can help. Since X is not legally bound, it can repudiate a claim whenever honoring it is too costly; and because X is privately informed about the expected evolution of its financial capability (its type), an improved reputation can enhance future fee income and thus provide an incentive for honoring even discretionary guarantees. Without uncertainty as to X's type, however, there would be no reputational concerns, and discretionary guarantees would not be in evidence because they would be repudiated whenever possible. Reputational concerns confront X with a trade-off in the state in which it is financially capable of honoring the guarantee. Honoring the guarantee reduces financial capital but increases reputation, whereas repudiating has the opposite effects.

[3]Not all incomplete contracts are unenforceable, only those that are "too incomplete." It is easy to envision a more general variant of our model that includes an additional state in which the discretionary contract is legally enforceable. In such a setting, the contract can be thought of as a collection of promises, one for each contingency, some of which will be definite and enforceable and (if the contract is incomplete) others of which will be illusory or completely absent. The generalization does not affect our results qualitatively; details are available from the authors upon request.

[4]Our definition of a complete contract is one that specifies obligations in all contingencies observable by a court (see Ian Ayres and Robert Gertner, 1992). However, our definite contract is not a "complete contingent contract" which specifies obligations in contingencies observable only to (at least one of) the parties and not to a court.

D. *Types of Contracts and Information Structure*

We begin by describing the sequence of moves and the available contracting options. Consider four points in time, $t = 0, 1, 2$, and 3, and hence three periods: period one ($t = 0$ to $t = 1$), period two ($t = 1$ to $t = 2$), and period three ($t = 2$ to $t = 3$). At the start of each period (i.e., at $t = 0, 1$, and 2), X and Y can enter into an enforceable or a discretionary contract, or no contract at all. Formally, this is a game in which the informed agent, X, moves first by offering Y a contract, and then Y (the uninformed agent) reacts by either accepting or rejecting the offered contract. If accepted, X incurs an information-production cost, and one period hence Y may submit a claim against X's financial capital. At the end of each period, the claim is exercised with probability q.

If a claim is made under an enforceable contract and X refuses to honor the claim, we assume that a court of law will force liquidation of enough of X's assets to satisfy the claim. Since X's financial capital is not mutually verifiable, such forced liquidation will result in X surrendering more by refusing to honor a claim than it would by honoring it in states in which it is financially able. This ensures that X will always honor an enforceable contract when it is financially capable of doing so.[5] With a discretionary contract, there is no legal enforcement, and X chooses whether or not to honor the contract in states where it has private information. Thus, X moves first and last in this game, and X's strategies involve the choice of contract and whether or not to honor a claim if one eventuates.

[5]Even if forced liquidation resulted in X suffering the same cost from not honoring the contract as it does from honoring it, X would be indifferent, and it would adopt the equilibrium choice of honoring the claim. With the standard remedy for breach of an enforceable contract—expectation damages—X will never prefer default if it is able to pay. This result will be reinforced if X sustains legal and other expenses upon breach of contract.

It is interesting to compare the discretionary contract with the "no contract" option. Neither is legally enforceable, but there is a key distinction between the two. Discretionary promises are publicly observable and often involve formal documents. By contrast, the no-contract alternative may include less formal (unwritten and unwitnessed) promises which would be difficult for outsiders to monitor (i.e., they would not inform outsiders about the guarantor's behavior). Consequently, the performance (breach) of a discretionary contract will affect the guarantor's reputation, whereas the no-contract alternative lacks analogous reputational implications. The importance of the discretionary contract then stems from the role that these publicly observable formal documents play in reputation-formation. Because of the reputation mechanism, the discretionary contract becomes a viable alternative to an enforceable contract. It will therefore dominate the no-contract alternative because, as indicated in Subsection I-A, there are social and private gains to contracting.

We turn now to the information structure. The guarantor, X, can be either of two types. Let $i \in \{L, H\}$ be X's type where L and H differ in the probability distributions that determine the evolution of their financial capital. Both start out at $t = 0$ with capital $K_0 > 0$. In each period, capital is perturbed by a random shock. We make the following simplifying assumptions. The capital of a high-quality intermediary (type H) increases in each period with probability p_H, while for type L this probability is p_L with $1 > p_H > p_L > 0$. In any period in which capital increases, X is financially sound and is capable of honoring its guarantee. With probability $1 - p_i$, X is financially impaired. We assume that, conditional on being financially impaired, there is a probability η that X is in a low-resource state in which it can satisfy Y's claim only at a dissipative cost arising from the liquidation of information-sensitive assets ("weak impairment"), and with probability $1 - \eta$, X is insolvent and will be terminated ("strong impairment"). Termination is a state in which X is left with no assets or

TABLE 1—DESCRIPTION OF STATES

State	Probability of occurrence	Description
N	$[1-q]\{1-[1-\eta][1-p_i]\}$	No claim and no termination
C_S	qp_i	Claim, X financially sound (only privately known)
C_I	$\eta q[1-p_i]$	Claim, X in low-resource state (only privately known)
T	$[1-\eta][1-p_i]$	X terminated, claim or no claim

information-reusability advantage. Even if X were allowed to continue, it would be no better off than a de novo guarantor. Note that $1-p_L > 1-p_H$ implies that, in any period, a low-quality guarantor faces both a higher probability of incurring dissipative costs in satisfying Y's claim and a higher probability of insolvency.[6]

The guarantor, X, is privately informed about its type. The commonly known prior belief of all agents other than X is that X is of type H with probability $\gamma \in (0,1)$. Also, while strong impairment (i.e., termination) is publicly observable and X always knows its financial state, the market cannot distinguish between the financially sound state and the low-resource (weak-impairment) state (i.e., X is then privately informed about its financial condition).

Table 1 lists the four relevant states in each period. In state N there is no claim under the guarantee, and X is not terminated. In state C_S, there is a claim, but X alone knows that it is financially sound. The assumption that X is privately informed about this state is crucial because it means that one cannot write a contract contingent on X's financial condition. In state C_I, there is a claim, but X knows privately that this is a low-resource state (i.e., Y cannot distinguish C_I from C_S). Note that, in state C_I, X would be compelled to honor the enforceable contract, but not the discretionary contract. Finally, in state T, X is terminated, and all claims are repudiated.

E. *Reputation and Fee Structure*

Let ψ_t be the probability assigned by the market at time t that X is of type H (i.e., the reputation of X). At $t=0$, $\psi_0=\gamma$, and thereafter ψ_t evolves in accord with the Bayesian posteriors formed by the market as it observes X's behavior. Let $f_t^j \equiv f^j(\psi_t)$ be the fee charged by X for a guarantee $j \in \{E, D\}$, where E stands for enforceable and D stands for discretionary. A guarantee is written to cover a contingency one period hence. Therefore, a guarantee made at time t can require a payment only at $t+1$. Assume that the fee f_t^j is equal to the expected value of the payment to be made by X under the guarantee, given Y's beliefs as represented by ψ_t. In the loan commitment, for example, the fee is equal to the present value of the interest rate subsidy under the commitment. Note that f_t^j does not compensate a type-H guarantor for the negative externality generated by type-L agents, nor does it compensate for the information-production cost. Thus, the type-H guarantor's participation constraint is violated if f_t^j is all that it receives.

We assume that adding a premium $\phi_t^j = \phi_t^j(\psi_t)$ satisfies the type-H guarantor's participation constraint. The reusability of information is captured by assuming that the information-production cost for a preexisting intermediary is $\underline{V}$, which is strictly less than $\overline{V}$, the cost for a de novo intermediary. If, however, the surviving intermediary is forced to honor a claim in the low-resource state, its information-production cost will be

[6] This is the simplest way to specify the intertemporal evolution of financial capital. It captures the notion that a type-H guarantor is more likely to be able to honor its commitments. Note that we could have chosen a more complicated formulation such that X's ability to honor claims in a specific period would depend on past actions and claims. This would have added substantial parametric complexity without obvious benefits.

TABLE 2—EQUILIBRIUM STRATEGIES OF X

	Probability		X's strategy with respect to honoring contracts			
			Discretionary contract at $t=0$		Enforceable contract at $t=1,2$	
State	H	L	H	L	H	L
N	$[1-q]\{1-[1-\eta][1-p_{\mathrm{H}}]\}$	$[1-q]\{1-[1-\eta][1-p_{\mathrm{L}}]\}$	—	—	—	—
$\mathrm{C_S}$	qp_{H}	qp_{L}	honor	default	honor	honor
$\mathrm{C_I}$	$\eta q[1-p_{\mathrm{H}}]$	$\eta q[1-p_{\mathrm{L}}]$	default	default	honor	honor
T	$[1-\eta][1-p_{\mathrm{H}}]$	$[1-\eta][1-p_{\mathrm{L}}]$	terminate (default)	terminate (default)	terminate (default)	terminate (default)

V^* in the next period, with $\underline{V} < V^* < \overline{V}$. This assumption captures the notion that a guarantor incurs a dissipative cost when it satisfies a claim in the low-resource state.

The premium that X can charge over the guarantee fee is anchored by the amount required for a new intermediary to participate. That is, $\phi_t^j = \phi_t^j(\gamma)$. A new intermediary charges $f_t^j(\gamma) + \phi_t^j(\gamma)$ so that its participation constraint holds tightly. An established intermediary, depending upon its reputation, can charge more. Moreover, the established intermediary enjoys a lower information-production cost, so that it earns a net rent relative to a new entrant.

II. Analysis of Equilibrium

The question is whether X and Y would choose a discretionary contract, given the availability of an enforceable one. Since X faces a potentially different Y in each period, we focus on single-period contracts and ensure that Y's utility in any period is invariant to the choice of contract in that period. Thus, Y is indifferent to contract choice. Because of the usual endgame problem, only enforceable contracts will be used at $t=2$.

A. *Conjectured Equilibrium Strategies and Intuition*

In Table 2 we summarize the conjectured equilibrium strategies of X with a discretionary contract at $t=0$ and enforceable contracts at $t=1$ and $t=2$. In each period, the conjectured equilibrium contract has both types H and L offering the same contract.

A key feature of this conjectured equilibrium is that the type-H guarantor prefers a discretionary contract at $t=0$. Discretion permits X to preserve information reusability, even in the impaired state, $\mathrm{C_I}$. The disadvantage of the discretionary contract is that it permits type-L guarantors to default in the good state, $\mathrm{C_S}$, and since Y will take this into account in deciding what it is willing to pay for the guarantee, the discretionary contract will amplify the negative externality type-L guarantors impose on guarantors of type H. This follows because the contract-honoring strategies of types H and L are identical with an enforceable contract; the only difference is that type-H guarantors have a lower probability of realizing the termination state, T. With a discretionary contract, however, there also is an additional behavioral difference between the types since type-H guarantors would not default in state $\mathrm{C_S}$ whereas type-L guarantors would. This externality, imposed by L with a discretionary contract, means that type-H guarantors will offer such a contract only if the expected incremental future surplus obtainable with a discretionary contract compensates for the externality. Recall that neither type can honor the contract in state T.

To see why type L defaults on a discretionary contract in state $\mathrm{C_S}$ at $t=1$ when type H does not, let us first examine H's incentive to honor the contract in $\mathrm{C_S}$ at

$t=1$. By honoring the contract, H can distinguish itself from L who never honors a discretionary contract in states $\{C_S, C_I\}$. The consequent reputational enhancement permits H to earn more on the second-period enforceable contract. Observe that this gain is also available to L, should it decide to mimic H and honor the contract in state C_S. Therefore, in a model with only two periods, the incentives for honoring the contract at the end of the first period (when there is only one period left) would be identical for both types. This is why three periods are necessary. For any state realization at $t=2$ that does not involve termination, a guarantor that honored a discretionary contract at $t=1$ is able to earn more on its third-period guarantee. This reputational benefit is unavailable if termination occurs at $t=2$. At $t=1$, H assigns a lower probability to facing termination at $t=2$ than does L. Hence, the benefit of developing a reputation by honoring a discretionary guarantee at $t=1$ is greater for H, and L behaves more myopically at $t=1$.

This reasoning also explains why, absent a fourth period ($t=3$ to $t=4$), the second-period contract (offered at $t=1$) as well as the third-period contract must be enforceable in the equilibrium we consider. To see this, suppose (counterfactually) that a discretionary contract is negotiated at $t=1$. Then, at $t=2$, since there is only one more contracting period left, both H and L face the same honoring incentives, and they will both honor or both renege. Now, both types honoring the discretionary contract at $t=2$ cannot be part of an equilibrium because the reputational gain from honoring the discretionary contract is greater (for either type) at $t=1$ than at $t=2$, and L reneged on the discretionary contract at $t=1$. Hence, L would surely renege on a discretionary contract at $t=2$. However, this applies to H as well, because both types face the same trade-off with only one period remaining. Thus, a discretionary contract cannot be sold (at a positive price) at $t=1$. The only way that such a contract can be sold at $t=1$ is if exogenous parameters are such that *both* types honor it at $t=1$ and $t=2$. This case is of no interest to us because it involves qualitatively identical reputational consequences for discretionary and enforceable contracts.

B. *Analysis and Results*

We begin by analyzing enforceable and discretionary contracts without reputational considerations.

LEMMA 2: *Ignoring second- and third-period payoffs, and given the conjectured equilibrium strategies in Table 2, the cost of the negative externality created by a type-L guarantor is greater in the first period with a discretionary contract than with an enforceable one.*

PROOF:

With the conjectured equilibrium strategies, the guarantee fees are

$$(1)\quad f_0^{\mathrm{D}} = q\gamma p_{\mathrm{H}} M$$

$$(2)\quad f_0^{\mathrm{E}} = q\{\gamma[p_{\mathrm{H}} + \eta[1-p_{\mathrm{H}}]] + [1-\gamma][p_{\mathrm{L}} + \eta[1-p_{\mathrm{L}}]]\}M$$

and $f_0^{\mathrm{D}} < f_0^{\mathrm{E}}$. At $t=0$, H assesses the expected transfer to Y on the first-period guarantee as L_0^j, where $j \in \{\mathrm{D}, \mathrm{E}\}$, and

$$(3)\quad L_0^{\mathrm{D}} = qp_{\mathrm{H}} M$$

$$(4)\quad L_0^{\mathrm{E}} = q\{p_{\mathrm{H}} + \eta[1-p_{\mathrm{H}}]\}M.$$

From (1), (2), (3), and (4) it follows that

$$(5)\quad f_0^{\mathrm{D}} - L_0^{\mathrm{D}} < f_0^{\mathrm{E}} - L_0^{\mathrm{E}} < 0.$$

Thus, the presence of a type-L guarantor imposes a strictly larger first-period externality on H with a discretionary contract than with an enforceable contract. The actual difference in externality is even greater since Y faces a social cost P (see Section I-A) if the guarantee is not honored (which is more likely with a discretionary contract).

Let $\psi_t^j(\mathrm{H}|\Omega_t)$ be the probability that Y attaches at time t to X being of type H, where the first-period guarantee was $j \in \{D, E\}$ and the information set of Y is Ω_t. The second- and third-period guarantees are assumed to be enforceable. For sequential rationality (David Kreps and Robert Wilson, 1982a), Y revises its beliefs in accordance with Bayes' rule following an equilibrium action. The set Ω_0 contains Y's prior beliefs regarding X's type (i.e., $\psi_0^j(\mathrm{H}|\Omega_0) = \gamma$ for $j \in \{D, E\}$.[7] At each time $t \in \{1, 2\}$, Y updates its beliefs in the states $\{C_S, C_I\}$ based on X's behavior. Let n_t denote "no claim and no termination," whereas h_t denotes "honor" and d_t denotes "default" in the states $\{C_S, C_I\}$ at time $t \in \{1, 2\}$.

Thus, for example, $\psi_2^D(\mathrm{H}|h_1, n_2)$ denotes the probability that Y attaches at time 2 to X being of type H, where the first-period guarantee was discretionary but was honored (i.e., h_1) and in the second period no claim eventuated and X's random shock to capital did not force termination. In the Appendix we provide explicit expressions for all $\psi_t^j(\mathrm{H}|\Omega_t)$. We can now examine the reputational gains from honoring enforceable and discretionary contracts.

LEMMA 3: *Honoring a discretionary contract at $t = 1$ leads to a strictly greater increase in reputation than honoring an enforceable contract.*

PROOF:
$\psi_1^D(\mathrm{H}|h_1) > \psi_1^E(\mathrm{H}|h_1)$, while $\psi_0^D(\mathrm{H}|\Omega_0) = \psi_0^E(\mathrm{H}|\Omega_0) = \gamma$.

This result shows that a discretionary contract enables a type-H guarantor to enhance its reputation more than would be possible with an enforceable contract. We now explore this issue further.

LEMMA 4: *Suppose that the first-period contract is discretionary and state C_S occurs at $t = 1$. Then, given the conjectured equilibrium strategies, the effect of adopting strategy h on the expected reputation of X at $t = 2$ is strictly greater if X is of type H than if X is of type L. The impact on the (expected) reputation at $t = 1$ is identical across types.*

PROOF:
The second part of the lemma is obvious; honoring or defaulting leads to $\psi_1^D(\mathrm{H}|h_1)$ and $\psi_1^D(\mathrm{H}|d_1)$, respectively, for both H and L. The effect on third-period reputation is only relevant if X remains in business. The expected improvement in a type-H guarantor's third-period reputation from honoring the discretionary contract (versus defaulting on it) at $t = 1$ is

$$
\begin{aligned}
(6)\quad K(\mathrm{H}) = {} & [1-q]\{1-[1-\eta][1-p_\mathrm{H}]\}\psi_2^D(\mathrm{H}|h_1, n_2) \\
& + q\{p_\mathrm{H} + \eta[1-p_\mathrm{H}]\}\psi_2^D(\mathrm{H}|h_1, h_2) \\
& - \{[1-q]\{1-[1-\eta][1-p_\mathrm{H}]\}\psi_2^D(\mathrm{H}|d_1, n_2) \\
& + q\{p_\mathrm{H} + \eta[1-p_\mathrm{H}]\}\psi_2^D(\mathrm{H}|d_1, h_2)\}.
\end{aligned}
$$

The corresponding expression for L is

$$
\begin{aligned}
(7)\quad K(\mathrm{L}) = {} & [1-q]\{1-[1-\eta][1-p_\mathrm{L}]\}\psi_2^D(\mathrm{H}|h_1, n_2) \\
& + q\{p_\mathrm{L} + \eta[1-p_\mathrm{L}]\}\psi_2^D(\mathrm{H}|h_1, h_2) \\
& - \{[1-q]\{1-[1-\eta][1-p_\mathrm{L}]\}\psi_2^D(\mathrm{H}|d_1, n_2) \\
& + q\{p_\mathrm{L} + \eta[1-p_\mathrm{L}]\}\psi_2^D(\mathrm{H}|d_1, h_2)\}.
\end{aligned}
$$

Compare (6) and (7) to see that $K(\mathrm{L}) < K(\mathrm{H})$.

For the first of our two major results, we assume that X is locked into the contract choices stipulated in the conjectured equilibrium.

PROPOSITION 1: *Given the contract choices stipulated in Table 2, there exists a set of parameter values for which the conjectured strategies are incentive-compatible [see the parameter restrictions (A11)–(A13) in the Appendix].*

(See the Appendix for the proof.)

[7] In the specification of beliefs we have fixed the contract choice. The derivation of the Bayesian perfect Nash equilibrium in the ensuing analysis is more general and allows X to choose between discretionary and enforceable contracts. This is a strategic choice, which may affect Y's beliefs.

To show that a discretionary contract is preferred in the first period, it is sufficient to identify conditions such that Y weakly prefers a discretionary contract in that period, and a type-H guarantor strictly prefers discretion. The reason for only considering the first period for Y is that contracts in the second and third periods are enforceable, and all future reputational rents accrue to X, so that Y's second- and third-period payoffs are independent of the first-period contract choice. We now have our final result.

PROPOSITION 2: *(i) The strategies stated in Table 2 and the Bayesian beliefs stated in the Appendix constitute a Bayesian perfect Nash equilibrium provided that the parametric conditions (A11)–(A13) hold. In this equilibrium, both H and L choose a discretionary contract in the first period. (ii) Holding Y's net payoffs fixed in each period, a type-H guarantor strictly prefers a discretionary contract in the first period over an enforceable contract, provided that the rents from information reusability exceed some lower bound.*

(See the Appendix for the proof.)

There is another Bayesian perfect Nash equilibrium in pure strategies, one in which both types choose an enforceable contract at $t = 0$. Part (ii) of Proposition 2 shows that H strictly prefers the stated equilibrium if there are sufficient rents from information reusability.

The equilibrium in Proposition 2 has a variety of interesting implications. First, defaults are more common with discretionary guarantees than with enforceable ones offered by a given guarantor. Second, the prices of discretionary guarantees are less than those of enforceable guarantees offered by the same guarantor. Third, across guarantors, prices for discretionary guarantees need not be lower than those for enforceable guarantees. This is because the likelihood of default on a discretionary guarantee provided by a guarantor with a good reputation may not be greater than the likelihood of default on an enforceable guarantee of another with a poorer reputation. Fourth, the price of a guarantee increases in the reputation of the guarantor, and the difference in prices for a given guarantee across guarantors is greater for a discretionary guarantee than for an enforceable one.

We have chosen to focus on parameter values such that a type-H guarantor honors a discretionary contract in state C_S, and type L does not. The general result is that type H always has a greater incentive than type L to honor a discretionary contract.

C. *Interpretation*

A discretionary contract is more costly to H than an enforceable one in the absence of reputational considerations because H is pooled with L, who always repudiates a discretionary contract. This cost is offset by two benefits of the discretionary contract. First, H is allowed to repudiate a discretionary contract in financially impaired states. This preserves financial capital and prevents the loss of reusable information. Second, because a discretionary contract leads to equilibrium behavior that makes guarantors more distinguishable, it enables H to develop a reputation more effectively. Thus, discretion aids reputation enhancement by facilitating the separation of high and low types.[8] Note also that Y will not purchase a discretionary contract if $\psi_0 = 0$. Thus, discretionary contracts are predictably the stock-in-trade of institutions with reputational capital at the outset.

[8]As in other reputation models (e.g., Kreps and Wilson, 1982b; Paul Milgrom and John Roberts, 1982), the possibility of *ex ante* separation of types through signaling has been suppressed in our analysis. It is possible that X could signal its type through an appropriately crafted fee structure that permits intertemporal adjustments that allow the bank to break even across the three periods, but not necessarily in each period. However, given the possibility of a new Y in each period, such fee structures are precluded. Other more complicated schemes are likely to involve *dissipative* signaling and may lead to a greater loss in welfare than that in our reputation-based model.

III. Examples

A. *Highly Confident Letters*

Highly confident letters are sold by banks to those concerned with demonstrating their ability to borrow, typically for the purpose of persuading a potential seller of assets of the seriousness of a purchase offer. The highly confident letter is an illusory promise. However, consistent with our theory, customers are willing to pay for these illusory promises. Consider the following quote:

> In February of 1985, Black had a better idea—Drexel would write a letter to advise the banks it was "highly confident" it could raise the money for Icahn. There was nothing legally binding about this letter; it was an expression of faith in Milken's ability to raise a fortune for this Drexel client from Drexel's other clients. But because Milken was known to be a maniac about keeping his promises, the simple fact of his involvement might give the commercial bankers all the courage they needed....
>
> Drexel's president [Fred Joseph] agreed that the lack of a legal commitment made the letter an interesting experiment—if it worked, great; if not, nothing significant was lost.
>
> [Jesse Kornbluth, 1992 p. 64]

The illusory nature of the promise embedded in the highly confident letter was illustrated by the October 1989 proposed buyout of UAL. Citicorp and Chase Manhattan Corp. jointly agreed to commit \$3 billion to the buyout and further indicated they were "highly confident" that they could provide an additional \$4.2 billion from other lenders. The two banks were paid combined fees of \$8 million for the commitments. The deal fell through, however, when other banks withdrew after initial indications of interest (see *Wall Street Journal*, 16 October 1989 p. A1).

B. *Holding-Company Cross-Guarantees*

Holding companies often provide "comfort letters" to assure creditors of their subsidiaries that they would come to their assistance in distress. Enforceable cross-guarantees are avoided, presumably because they reduce the holding company's flexibility in managing financial impairment and could also jeopardize the legal separation among the holding-company entities. Our theory explains why comfort letters (as opposed to implicit promises or no promises) are widely used, even though they are merely illusory promises.

C. *Mutual-Fund Contracts*

Managers of investment funds, such as the Dutch property investment fund described earlier, commonly provide publicly observable discretionary guarantees. Although its price-support promise was illusory, Robeco redeemed shares at net asset value. However, consistent with our theory, when confronted with a dumping of its shares, Robeco chose to violate its commitment rather than face financial impairment. This interplay between reputational and financial capital would not have been possible with an enforceable contract.[9]

Price support also has been provided by U.S. mutual-fund managers. For example, in 1989 Integrated Resources, Inc. defaulted on nearly \$1 billion of commercial paper, and in March 1990 Mortgage & Realty Trust defaulted on \$167 million of commercial paper. Rather than see their investors lose money, money-fund managers on both occasions voluntarily absorbed the losses by buying the defaulted paper at par from the money funds under their management (see *Wall Street Journal*, 22 October 1990, p. C1). Clearly, there was no legal obligation to do so; these actions were motivated by the desire to sustain investors' beliefs—explicitly engendered through mar-

[9] The information available on the Robeco case strongly suggests that the company's strategies were driven by reputational considerations. According to the *Financial Times* of 2 October 1990 (p. 30), "In the wake of the Rodamco about-face on share buying, Ronald van de Krol finds the Dutch property fund's owner busily reassuring shareholders that its share and bond funds will remain open-ended.

keting efforts—that the money-fund share price would not fall below $1.[10]

D. *The Loan Commitment*

Bank loan commitments are notable for their "general nervous" or "material adverse change" clauses. These permit the commitment to be voided at the sole discretion of the guarantor, conditional on material deterioration in the financial condition of the commitment owner. Material deterioration is typically left undefined, and there is rarely any provision for third-party adjudication of disputes. Bank discretion is therefore triggered in all states short of the borrower's unambiguous financial health or stability, and the bank's commitment then becomes an illusory promise. Thus, the loan commitment does not provide the guarantor unbounded discretion, and our model should be viewed as being applicable to loan commitments in states in which the borrower's financial condition is ambiguous.

Clearly, the loan commitment need not be designed as an illusory promise. The covenants in loan contracts are typically well specified, and the standby letter of credit, a companion contract to the loan commitment, incorporates no analogous lack of enforceability. The discretion–reputation nexus developed here thus provides a novel perspective on the design of loan commitments.

E. *Other Examples in Financial Contracting*

The investment banker's "firm commitment" underwriting contract has greater enforceability than a "best efforts" contract under which no commitment about the issue price, or even success in floating the issue, is provided. Success in raising capital with the latter contract should, according to our model, have a greater positive effect on the underwriter's reputation.

Price-stabilization promises for new bond and equity issues during the issuance period can be viewed as illusory promises as well. As with mutual funds, underwriters may choose to support new issues to enhance reputational capital.

F. *Nonfinancial Applications*

Although our analysis focuses on financial contracts, we believe it to have wider applicability, in particular to all situations involving illiquid reputational capital. For example, our theory suggests that firms may offer employment contracts that provide managerial discretion both in terms of the rewards for superior performance and the conditions under which employees may be terminated. That is, employment contracts often contain illusory promises that enable firms to avoid binding commitments and also facilitate the development of the firm's reputation. Note that since firms within the same industry can be expected to have different reputations, the discretionary components of employment contracts offered in an industry should display heterogeneity. Even within the firm, the manager often has discretion over the tasks assigned to subordinates, so that there are reputational effects associated with intrafirm task allocations. However, since the optimal amount of discretion will depend on the nature of the tasks, intrafirm heterogeneity in the discretion given to supervisors can be expected as well.

IV. Conclusion

We have shown that discretionary guarantees can be desirable. Contractual discretion offers two advantages. First, the guarantor can repudiate a claim in a state in which reputational capital is optimally sacrificed in order to preserve financial capital and reusable information. This substitution can promote efficiency because the (dissipative) sacrifice of reputation preserves the

[10]"Money funds are designed to keep a stable share price, typically $1. Many investors assume the $1 share price is guaranteed, and that money funds are as safe as a bank certificate of deposit or checking account. However, fund managers fear that as the economy weakens, more commercial paper defaults lie ahead; and next time it happens, fund managers may not be able to eat the loss" (*Wall Street Journal*, 22 October 1990, pp. C1).

reusability of information which may be lost if the guarantor is compelled to honor a claim in a financially impaired state. Second, the discretionary contract fosters reputation enhancement, thereby increasing future fee income.

The theory also provides a new perspective on reputation models which typically take the contract as given and then examine incentives for reputation development. We have shown that discretion expands the potential for reputation development; thus, better agents have an incentive to choose discretionary contracts. Moreover, the discretionary contract provides a mechanism for the transmission of information necessary for reputation development. Thus, even though legally unenforceable, the discretionary contract is superior to having no explicit promise.

The empirical predictions of our theory are as follows. (i) The better the guarantor's reputation, the greater is its incentive to write discretionary contracts. The reason is that, with an exemplary reputation, the fees that a better (type-H) guarantor receives for discretionary contracts are only minimally affected by the negative externality imposed by the lesser (type-L) guarantor. (ii) Prices of discretionary guarantees will be lower than for otherwise similar enforceable guarantees written by the same guarantor. (iii) Since a discretionary guarantee of a highly reputed guarantor can be more valuable than an enforceable guarantee of a less-reputable guarantor, prices of discretionary guarantees need not be less than those for enforceable guarantees (across guarantors with different reputations). (iv) The better a guarantor's reputation, the higher will be the price of any guarantee.[11]

Our theory predicts a link between guarantor reputation and the prices of guarantees, and also predicts that the difference between prices for a *given* guarantee across intermediaries with disparate reputations is greater for a discretionary guarantee than for an enforceable one. Moreover, since the choice of contract depends on the nature of the transaction as well as the reputation of the guarantor, our theory has the distinctive feature of predicting diversity among contracts within a firm and across firms within a given industry.

[11] It should be possible to test some of these predicitions. For example, measures of underwriter reputation among investment bankers are available (see Samuel Hayes, 1971; Richard Carter and Steven Manaster, 1990).

Appendix

Derivation of Bayesian Beliefs

We do not include the termination state T in the specification of Bayesian beliefs. In the expressions below, $S_i = \{1-[1-\eta][1-p_i]\}$ is the "survival probability" of type i. Thus, we have

$$\psi_1^{\mathrm{D}}(\mathrm{H}|\mathrm{h}_1) = \psi_2^{\mathrm{D}}(\mathrm{H}|\mathrm{h}_1,\mathrm{n}_2) = \psi_2^{\mathrm{D}}(\mathrm{H}|\mathrm{h}_1,\mathrm{h}_2) = 1$$

$$\psi_1^{\mathrm{D}}(\mathrm{H}|\mathrm{n}_1) = \psi^{\mathrm{E}}(\mathrm{H}|\mathrm{n}_1) = \gamma S_{\mathrm{H}}[\gamma S_{\mathrm{H}} + (1-\gamma)S_{\mathrm{L}}]^{-1}$$

$$\psi_2^{\mathrm{D}}(\mathrm{H}|\mathrm{n}_1,\mathrm{n}_2) = \psi_1^{\mathrm{E}}(\mathrm{H}|\mathrm{n}_1,\mathrm{n}_2) = \gamma S_{\mathrm{H}}^2[\gamma S_{\mathrm{H}}^2 + (1-\gamma)S_{\mathrm{L}}^2]^{-1}$$

$$\psi_1^{\mathrm{D}}(\mathrm{H}|\mathrm{d}_1) = \gamma\eta(1-p_{\mathrm{H}})\{\gamma\eta(1-p_{\mathrm{H}}) + (1-\gamma)[p_{\mathrm{L}} + \eta(1-p_{\mathrm{L}})]\}^{-1}$$

$$\psi_2^{\mathrm{D}}(\mathrm{H}|\mathrm{d}_1,\mathrm{n}_2) = \gamma\eta(1-p_{\mathrm{H}})S_{\mathrm{H}}\{\gamma\eta(1-p_{\mathrm{H}})S_{\mathrm{H}} + (1-\gamma)[p_{\mathrm{L}} + \eta(1-p_{\mathrm{L}})]S_{\mathrm{L}}\}^{-1}$$

$$\psi_2^{\mathrm{D}}(\mathrm{H}|\mathrm{d}_1,\mathrm{h}_2)=\gamma\eta(1-p_{\mathrm{H}})[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]\{\gamma\eta(1-p_{\mathrm{H}})[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]$$
$$+(1-\gamma)[p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})][p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})]\}^{-1}$$

$$\psi_2^{\mathrm{D}}(\mathrm{H}|\mathrm{n}_1,\mathrm{h}_2)=\psi_2^{\mathrm{E}}(\mathrm{H}|\mathrm{n}_1,\mathrm{h}_2)=\gamma S_{\mathrm{H}}[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]$$
$$\times\{\gamma S_{\mathrm{H}}[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]+(1-\gamma)S_{\mathrm{L}}[p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})]\}^{-1}$$

$$\psi_1^{\mathrm{E}}(\mathrm{H}|\mathrm{h}_1)=\gamma[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]\{\gamma[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]+(1-\gamma)[p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})]\}^{-1}$$

$$\psi_2^{\mathrm{E}}(\mathrm{H}|\mathrm{h}_1,\mathrm{n}_2)=\gamma[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]S_{\mathrm{H}}\{\gamma[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]S_{\mathrm{H}}+(1-\gamma)[p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})]S_{\mathrm{L}}\}^{-1}$$

$$\psi_2^{\mathrm{E}}(\mathrm{H}|\mathrm{h}_1,\mathrm{h}_2)=\gamma[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]^2\{\gamma[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]^2+(1-\gamma)[p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})]^2\}^{-1}$$

PROOF OF LEMMA 1:

We will prove that this is a Nash equilibrium by first establishing that the bank's pricing policy is a best response to the borrower's project choice and that the borrower's project choice is a best response to the bank's pricing policy. The parametric condition stated is identical to

$$\xi_\ell[S_\ell-\underline{R}/\xi_\ell]>\xi_{\mathrm{h}}[S_{\mathrm{h}}-\underline{R}/\xi_\ell] \tag{A1}$$

$$\xi_\ell[S_\ell-\overline{R}/\xi_\ell]<\xi_{\mathrm{h}}[S_{\mathrm{h}}-\overline{R}/\xi_\ell]. \tag{A2}$$

Note that (A1) and (A2) imply that, *given* the bank's (equilibrium) pricing policy, the borrower will not deviate from its choice of ℓ if $\tilde{R}=\underline{R}$ and its choice of h if $\tilde{R}=\overline{R}$. The only out-of-equilibrium move for the borrower is to take no loan at all, but then it is strictly worse off than in the equilibrium. Thus, the borrower's project choice is a best response to the bank's pricing policy for each realization of the spot rate. Now, from (A1), we know that a bank that lends at $\underline{R}/\xi_\ell$, when $\tilde{R}=\underline{R}$, induces the borrower to choose project ℓ. Given this pricing policy, the (perfectly competitive) bank makes zero expected profit. If it were to choose a higher interest rate, it would lose the borrower to a competing bank (which gives the bank no greater profit than its equilibrium profit), and a lower interest rate would yield an expected loss. From (A2) it follows that if $\tilde{R}=\overline{R}$, the bank makes a loss by pricing the loan under the presumption that a borrower chooses project ℓ; the bank must assume a project choice h and price the loan at $\overline{R}/\xi_{\mathrm{h}}$ to earn zero expected profit. A higher interest rate would cause the borrower to go to a competing bank. Thus, the bank's (equilibrium) pricing policy is a best response to the borrower's project choice for each realization of the spot rate.

PROOF OF PROPOSITION 1:

We adopt the usual approach and solve the model backwards, starting with $t=2$ (the beginning of the third period). At $t=2$, agent X with reputation ψ_2^{D} can charge the following fee for the guarantee:

$$f_2^{\mathrm{E}}(\psi_2^{\mathrm{D}})=q\{\psi_2^{\mathrm{D}}[p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})]+(1-\psi_2^{\mathrm{D}})[p_{\mathrm{L}}+\eta(1-p_{\mathrm{L}})]\}M. \tag{A3}$$

A new intermediary with a reputation of $\psi_2^{\mathrm{D}}=\gamma$ charges a premium of

$$\phi_2^{\mathrm{E}}(\gamma)=q\{p_{\mathrm{H}}+\eta(1-p_{\mathrm{H}})\}M-f_2^{\mathrm{E}}(\gamma)+\overline{V} \tag{A4}$$

where $q\{p_H + \eta(1 - P_H)\}M$ is the expected liability on the guarantee for a type H, $f_2^E(\gamma)$ is the guarantee fee, and $\bar{V}$ is the information-production cost. The price (i.e., total compensation) $f_2^E(\gamma) + \phi_2^E(\gamma)$ is such that the participation constraint for a de novo intermediary is just satisfied. We let the price that X can charge be anchored by the amount required for a new intermediary to participate. An intermediary of type H with reputation ψ_2^D receives a premium of

$$\phi_2^E(\psi_2^D) = \phi_2^E(\gamma) + (\psi_2^D - \gamma)(p_H - p_L)(1 - \eta)qP. \tag{A5}$$

The total compensation, $f_2^E(\psi_2^D) + \phi_2^E(\psi_2^D)$, reflects three sources of rents. First, it receives a higher guarantee fee, $f_2^E(\psi_2^D)$ (if $\psi_2^D > \gamma$). Second, it can extract rents because the expected value of the social loss P faced by Y is strictly lower if Y contracts with an established guarantor (with $\psi_2^D > \gamma$) instead of a de novo X. This rent to the type-H guarantor is

$$(\psi_2^D - \gamma)(p_H - p_L)(1 - \eta)qP.$$

Third, X earns rents on information reusability. Define $F_i(\psi_t)$ as the net rent earned in the period following t by a type $i \in \{L, H\}$ with reputation ψ_t. If H enters the third period with a reputation of ψ_2^D, he earns a *net* rent of

$$F_H(\psi_2^D) = f_2^E(\psi_2^D) + \phi_2^E(\psi_2^D) - \tilde{V} - q\{p_H + \eta(1 - p_H)\}M \tag{A6}$$

with $\tilde{V}$ equal to $\underline{V}$ or V^*, depending on the prior state realization. Substituting (A5) in (A6), and taking into account (A3) and (A4), yields

$$F_H(\psi_2^D) = (\psi_2^D - \gamma)(p_H - p_L)(1 - \eta)q(M + P) + \bar{V} - \tilde{V}. \tag{A7}$$

Similarly, for L we have

$$F_L(\psi_2^D) = (\psi_2^D - \gamma)(p_H - p_L)(1 - \eta)q(M + P) + \bar{V} - \tilde{V} + q(p_H - p_L)(1 - \eta)M. \tag{A8}$$

We now analyze the second-period solution. Using steps similar to those for the third period, we can write

$$F_H(\psi_1^D) = (\psi_1^D - \gamma)(p_H - p_L)(1 - \eta)q(M + P) + \bar{V} - \underline{V} \tag{A9}$$

$$F_L(\psi_1^D) = (\psi_1^D - \gamma)(p_H - p_L)(1 - \eta)q(M + P) + \bar{V} - \underline{V} + q(p_H - p_L)(1 - \eta)M. \tag{A10}$$

(Note that the discretionary first-period contract preserves full benefits of information reusability.)

We now show that if state C_S is realized at the end of the first period, H will honor the discretionary first-period contract and L will not. H will honor the contract at $t = 1$ if the loss of financial capital from doing so, M, is less than the future gains of honoring, which is the excess of expected future rents from honoring over the expected future rents if it defaults. Thus, H honors the contract if

$$\begin{aligned} M < {} & F_H(\psi_1^D(\mathrm{H}|\mathrm{h}_1)) + qp_H F_H(\psi_2^D(H|\mathrm{h}_1, \mathrm{h}_2), \underline{V}) + \eta q(1 - p_H)F_H(\psi_2^D(\mathrm{H}|\mathrm{h}_1, \mathrm{h}_2), V^*) \\ & + (1 - q)[1 - (1 - \eta)(1 - p_H)]F_H(\psi_2^D(\mathrm{H}|\mathrm{h}_1, \mathrm{n}_2)) \\ & - F_H(\psi_1^D(\mathrm{H}|\mathrm{d}_1)) - qp_H F_H(\psi_2^D(\mathrm{H}|\mathrm{d}_1, \mathrm{h}_2), \underline{V}) - \eta q(1 - p_H)F_H(\psi_2^D(\mathrm{H}|\mathrm{d}_1, \mathrm{h}_2), V^*) \\ & - (1 - q)[1 - (1 - \eta)(1 - p_H)]F_H(\psi_2^D(\mathrm{H}|\mathrm{d}_1, \mathrm{n}_2)). \end{aligned} \tag{A11}$$

Similarly, L will choose to default in state C_S if

$$\text{(A12)}\quad M > F_L(\psi_1^D(H|h_1)) + qp_L F_L(\psi_2^D(H|h_1,h_2),\underline{V}) + \eta q(1-p_L)F_L(\psi_2^D(H|h_1,h_2),V^*)$$
$$+(1-q)[1-(1-\eta)(1-p_L)]F_L(\psi_2^D(H|h_1,n_2)) - F_L(\psi_1^D(H|d_1))$$
$$-qp_L F_L(\psi_2^D(H|d_1,h_2),\underline{V}) - \eta q(1-p_L)F_L(\psi_2^D(H|d_1,h_2),V^*)$$
$$-(1-q)[1-(1-\eta)(1-p_L)]F_L(\psi_2^D(H|d_1,n_2)).$$

Substituting (A7)–(A10) into (A11) and (A12) allows us to write the following expressions:

$$\text{(A13)}\quad M < (p_H - p_L)(1-\eta)q(M+D)$$
$$\times\{[\psi_1^D(H|h_1) - \psi_1^D(H|d_1)] + q[p_H + \eta(1-p_H)][\psi_2^D(H|h_1,h_2) - \psi_2^D(H|d_1,h_2)]$$
$$+[1-(1-\eta)(1-p_H)][\psi_2^D(H|h_1,n_2) - \psi_2^D(H|d_1,n_2)]\}$$

and

$$\text{(A14)}\quad M > (p_H - p_L)(1-\eta)q(M+D)$$
$$\times\{[\psi_1^D(H|h_1) - \psi_1^D(H|d_1)] + q[p_L + \eta(1-p_L)][\psi_2^D(H|h_1,h_2) - \psi_2^D(H|d_1,h_2)]$$
$$+[1-(1-\eta)(1-p_L)][\psi_2^D(H|h_1,n_2) - \psi_2^D(H|d_1,n_2)]\}.$$

The right-hand side (RHS) in (A13) exceeds the RHS in (A14). It follows immediately that for any set of parameters there exists a range of values of M for which both inequalities hold.

We also have to show that both H and L will choose to default in the state C_I at $t=1$. Recall that a decision to honor the discretionary contract in that state will lead to *partial* loss of information reusability in the next period. This enhances the benefit of not honoring by $V^* - \underline{V}$. To sustain the conjectured strategies, we now require that

$$\text{(A15)}\qquad M + V^* - \underline{V} > \text{RHS of (A13)}$$

and

$$\text{(A16)}\qquad M + V^* - \underline{V} > \text{RHS of (A14)}.$$

Obviously, given (A14), (A16) is satisfied. It is easy to see that (A15) is compatible with (A13), and that for all values of $V^* - \underline{V}$ there exist values of M that satisfy (A13)–(A15).

PROOF OF PROPOSITION 2:

First, we will verify the conjectured equilibrium strategies conditioned on a discretionary contract in the first period. Two actions are possible: honor or default. In the conjectured equilibrium, both are observed. Given that (A13) and (A14) hold, it is straightforward to verify that, depending on type, X will honor or default on the first-period contract in state C_S according to the conjectures in Table 2 (i.e., compute the Bayesian posteriors and compare the intertemporal payoff to X; see also the proof of Proposition 1). Given that (A15) holds, the same is true for X's strategies in state C_I. In state T, X's choice of strategy is fixed (i.e., X is terminated and thus defaults). X's choice of strategy in the second and third period is fixed as well (the contracts in those periods are enforceable).

We will now verify the choice of first-period contract. The choice between an enforceable and a discretionary contract is *strategic*. Given the conjectured equilibrium, a choice of an enforceable contract at $t=0$ is an out-of-equilibrium move. No other out-of-equilibrium moves exist. Define $\mu(\mathrm{H}|\mathrm{E})$ as the market's belief (i.e., the probability that the defector is type H given the out-of-equilibrium move E [choosing an enforceable contract]). It follows that for $\mu(\mathrm{H}|\mathrm{E})$ sufficiently small, neither type will defect. Take, for instance, $\mu(\mathrm{H}|\mathrm{E})=0$; then $\psi_1^{\mathrm{E}}(\text{defection})=\psi_2^{\mathrm{E}}(\text{defection})=0$, and contracting would produce negative rents. This proves that the conjectured equilibrium is a Bayesian perfect Nash equilibrium. The alternative equilibrium involves both L and H choosing an enforceable contract in the first period. The strategies for $t=2$ and $t=3$ are those specified in Table 2. Choosing a discretionary contract is now an out-of-equilibrium move; but with the belief $\mu(\mathrm{H}|\mathrm{D})=0$, this equilibrium can be sustained.

Recall that a benefit of a discretionary contract is that it preserves full reusability of information in state $\mathrm{C_I}$ (i.e., it preserves the rents $V^*-\underline{V}$ that would be lost with the enforceable contract). Thus, the Bayesian perfect Nash equilibrium stated in this proposition is preferred by H if these rents are sufficiently large (details available from the authors upon request).

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