The gate keeping function

- The auditors’ failure to perform their gate-keeping function is one of the culprits in the early decades’ recent debacles (Enron and WorldCom) and the most recent fraud in Satyam.
- Rating agencies failed to properly rate the “toxic” securities and contributed to the financial crisis.
- In the following, the proposal I offer for the auditing profession will also apply to the rating agencies with minor modifications.

Conflict of Interest

The reason for this gate keeping function failure is the inherent conflict of interest that exists because of the cozy relation between auditors (or rating agencies) and the managements of their clients who hire their services.

The inadequacy of Sarbanes Oxley

The Sarbanes Oxley Act of 2002 sought to offer a partial remedy by prohibiting some non-audit services. But an indefinite stream of future audit engagement is a potent temptation.

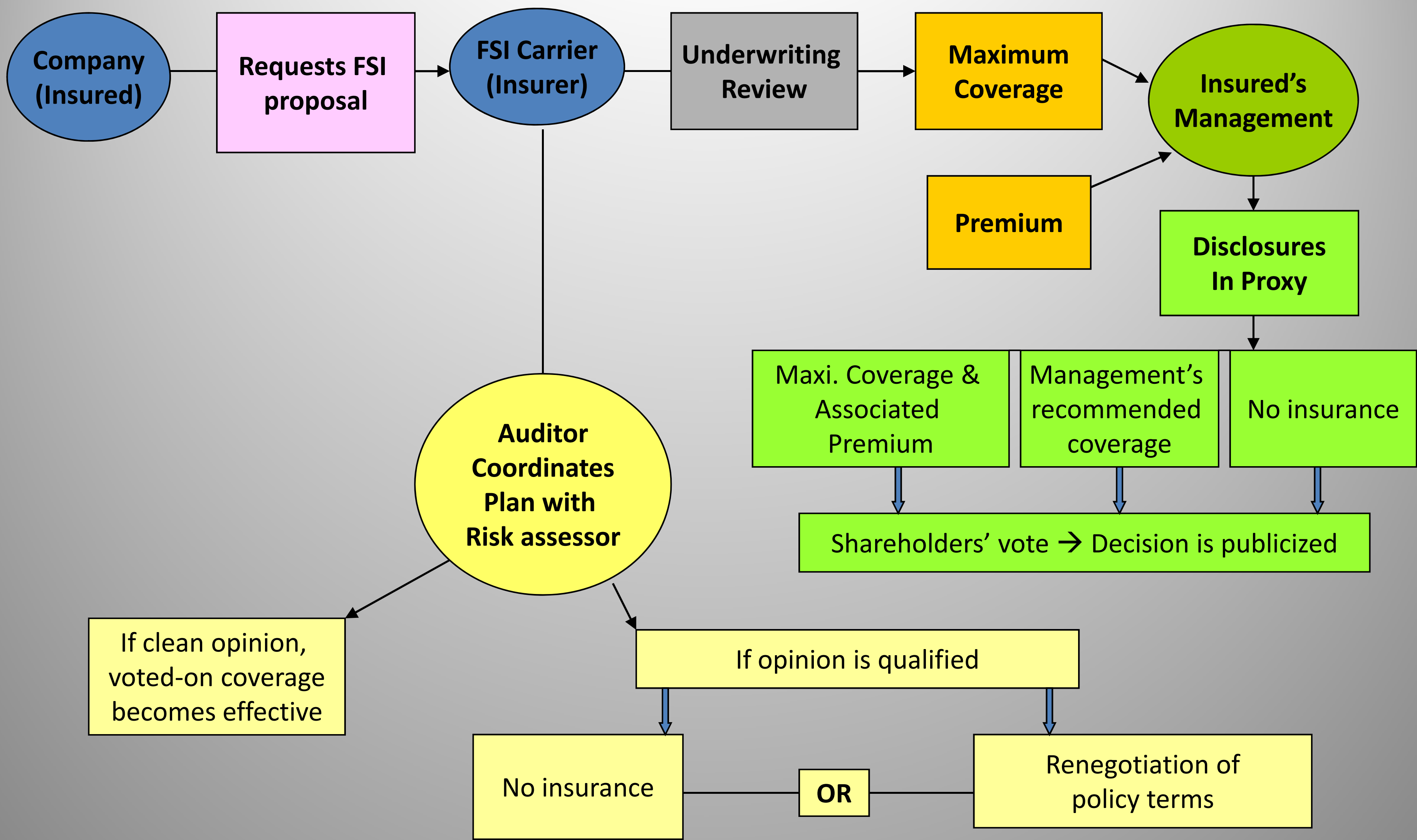
The auditor’s fee structure

The conflict of interest is endemic to the relation between Management (Principal) and auditor (agent). The Principal structures the contractual relation so that the agent does what the Principal wishes. The Principal’s (Management) interests are not aligned with those of the investors. Management wishes to maximize the value of its options and other compensation - derived wealth.

Proposal

Change the identity of the Principal from client's management to a Principal whose interests would be aligned with those of investors. A good candidate for such a role would be an insuring body. It could be an existing insurance corporation, the auditor himself, an investment banker, or a government corporation..

The FSI Process



Expeditious FSI Settlement Process

- Represent harmed investors.
- Assess claims before notifying the carrier.

Carrier and Insured select a fiduciary

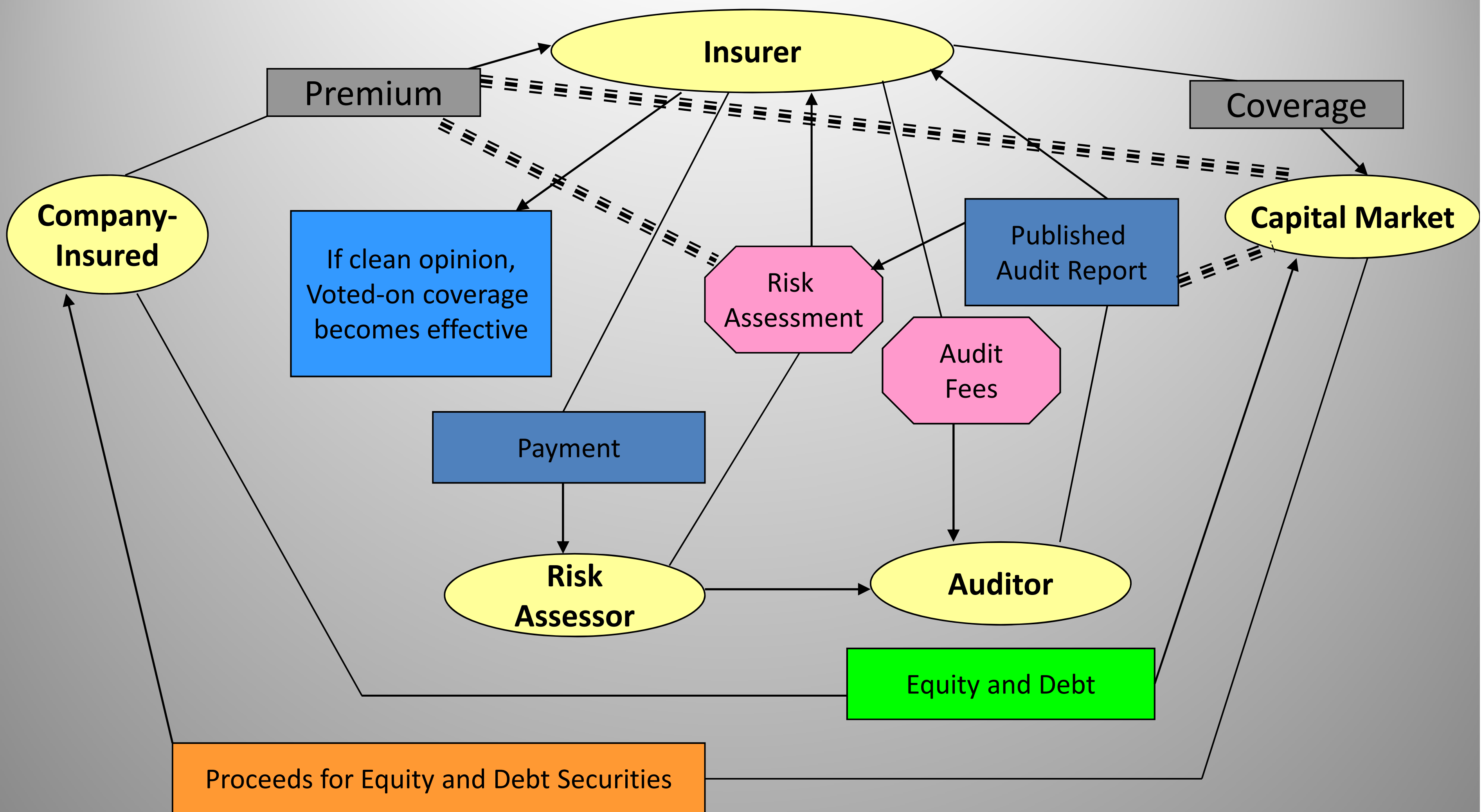
Fiduciary and carrier select independent expert

- Verify whether there was a misrepresentation.
- Determine quantum of losses.

- Up to the policy coverage limit.

Compensate the fiduciary for losses

Relationship Among the Parties



Legend: Solid lines indicate actual flows / Fuzzy lines indicate information flows

Formal Analysis - Main focus

1. To show that a public disclosure of the insurance premium charged on the financial statement increases the efficiency of capital allocation

2. To show that switching the audit employment contract to the insurer in addition to disclosing the premium increases both the quality of financial reporting and the efficiency of capital allocation.

Notation

N firms, where each firm is of type i, $i = 1, \ldots, L$ where a type i firm will earn return r_i with $r_1 < r_2 < \ldots < r_L$.

Each firm f is drawn randomly by nature at the start of the period and is independent of other firms

The managers of each firm f obtain a private signal, ω_f, about their firm's type where $\omega_f \in \{\omega_1, \omega_2, \ldots, \omega_L\}$ represents the set of L possible signals observable by the firm

$q \in [\underline{q}, \overline{q}]$ denotes internal quality.

$e \in [\underline{e}, \overline{e}]$ denotes audit effort.

$x = V(q, e)$ denotes overall quality.

$\theta = \{1, \ldots, L\}$ are the possible financial reports that a firm might issue.

$\vec{\nu} = \{\nu_1, \ldots, \nu_L\} = \{x_1, \ldots, x_L\}$ denotes beliefs about quality where x_i denotes the overall quality chosen by a firm with private signal ω_i.

The inferred rate-of-return

$$\hat{r}_j = E[r|\theta_f = j, \nu_f] = \sum_{i=1}^{L} r_i P(i|j, \nu_f).$$

We assume that there is a minimum threshold rate, r^*, such that funding firms with rates of return less than r^* results in a social loss. r^* is a random variable with a distribution $G(r^*)$ that represents the social cost of capital.

Funding occurs only if the inferred return exceeds this threshold.

Assumption 1 (A Formalization of Financial Statement Quality)

(1) For a given overall quality x, firms of higher type are more likely to issue high reports. That is, whenever $i \geq k$, the relative likelihood of being reported as type j, $\frac{P(j|i,x)}{P(j|k,x)}$ increases in j (i.e., for a fixed x, higher signals are "good news" in the sense of Milgrom [10]).

(2) For a given type i, the reported type increases (in the sense of First Degree Stochastic Dominance) as overall quality is lowered, that is, for $y \preceq x$, $P(\cdot|i,y)$ FDSD's $P(\cdot|i,x)$.

(3) For any two quality levels $y \preceq x$, there exists a column stochastic matrix Λ^{yx} with $\Lambda^{yx} \circ \mathcal{P}^x = \mathcal{P}^y$.[15]

Firm and auditor liability and Fees

$\mathcal{L}_f(x)$ denotes the firm's expected liability if quality x is set.

$\mathcal{L}_a(x, e) = \mathcal{L}_a(V(q, e), e)$ denotes the auditor's expected liability when internal quality is q and audit effort is e.

$C(e)$ denotes the cost of audit effort e.

$F(x, e) = \mathcal{L}_a(x, e) + C(e)$ denotes the total audit fee needed to break-even under overall quality x and audit effort e.

Funding and Managerial Benefits

All firms have an investment, I, absent any new capital, or the amount I + 1 if new capital is raised. Managers may appropriate a portion B of the new capital as direct benefits.

Expected firm value:

$$(1 + E(r|\omega_f))(I + FP_f(x|\omega_f, \vec{\nu})(1 - B)) - \mathcal{L}_f(x) - F(x, e)$$

Where

$FP_f(x|\omega_l, \vec{\nu})$ is the probability that the firm will be funded on receiving, private signal ω_l, choosing overall quality x when investors beliefs are represented by $\vec{\nu}$.

Managers payoff_ function is:

$$\alpha\left[(1 + E(r|\omega_f))\left(I + FP_f(x|\omega_f, \vec{\nu})(1 - B)\right) - \mathcal{L}_f(x) - F(x, e)\right] + B \times FP_f(x|\omega_f, \vec{\nu})$$

Assuming that the managers own α of the firm

If insurance is available with an associated premium π_f

$$\alpha[(1 + E(r|\omega_f))(I + FP_f(x|\omega_f, \vec{\nu})(1 - B)) - (\pi_f + F(\hat{x}, e))] + B \times FP_f(x|\omega_f, \vec{\nu})$$

Auditor Incentives and decisions

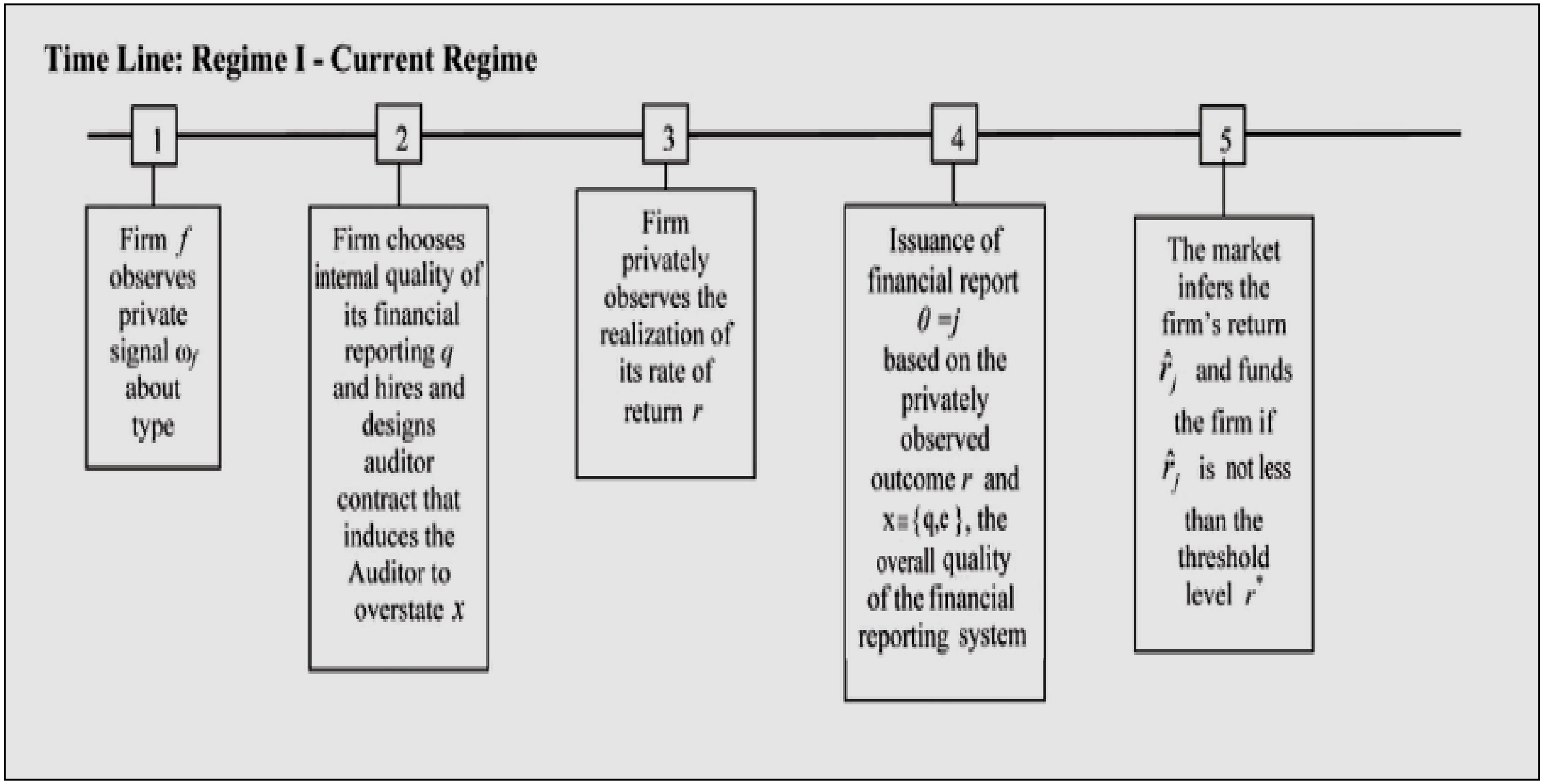
(auditor hired by the firm and the fee paid directly by the firm) :

$$F(\hat{x}, x, e) = F(x, e) = C(e) + \mathcal{L}_a(x, e)$$

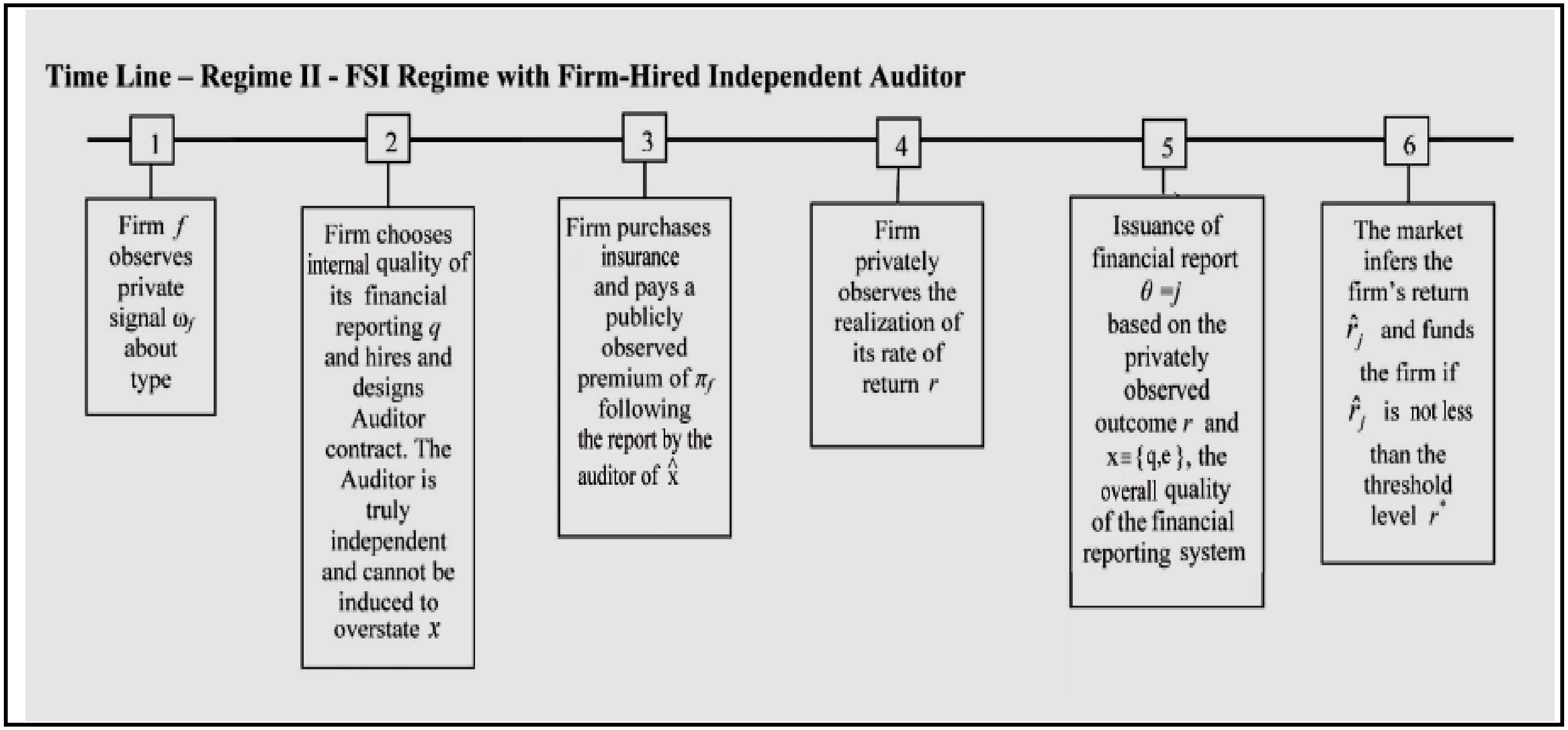
(FSI : auditor hired by insurer and the fee paid by the insurer but reimbursed by the firm

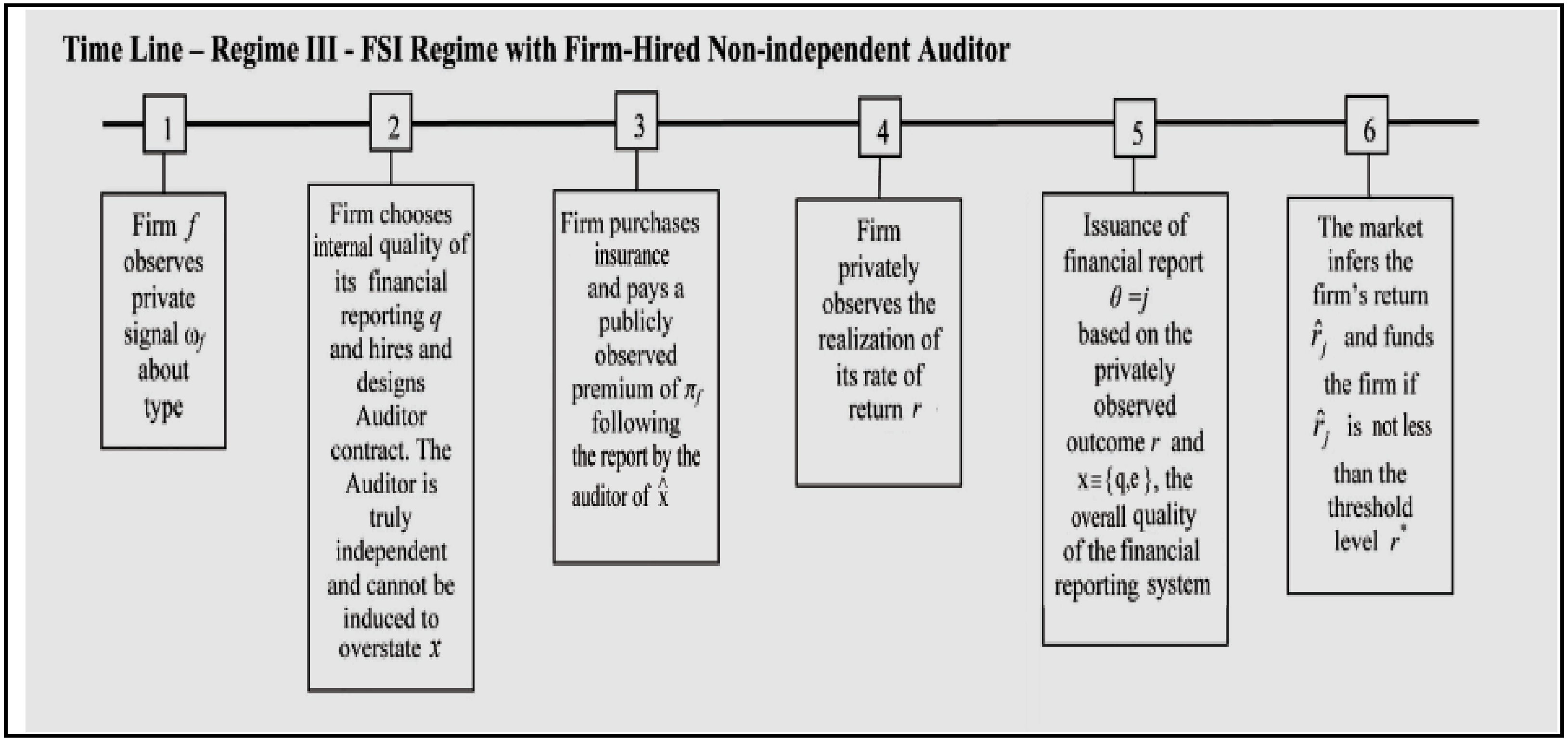
$$F(\hat{x}, x, e) = F(\hat{x}, e) = C(e) + \mathcal{L}_a(\hat{x}, e)$$

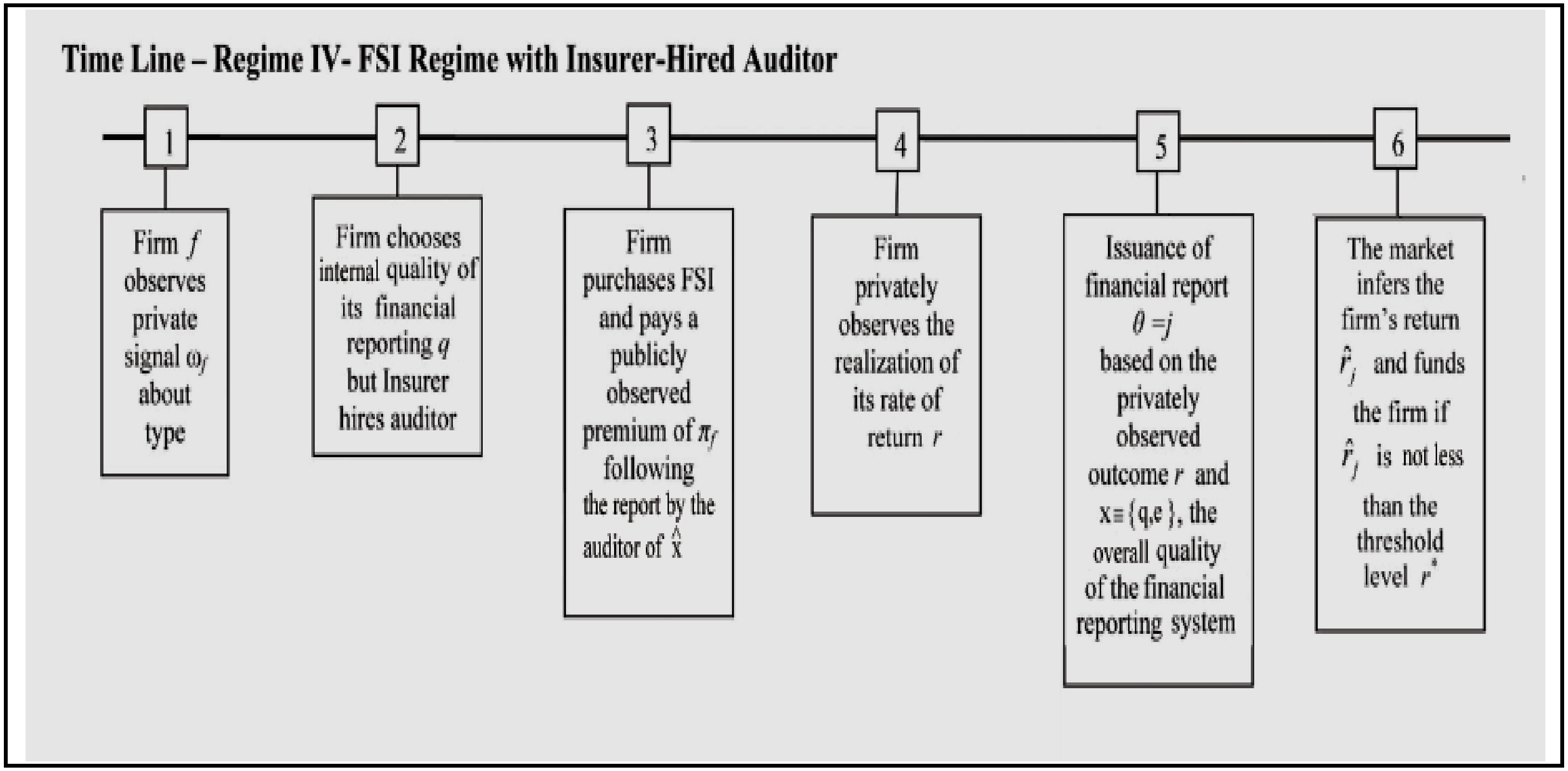
under FSI (where the insurer hires the auditor), the total payoff of the auditor $F(\hat{x}, e) - \sigma(\hat{x}, x)$, is net of the ex-post adjustment


Time Line: Regime I - Current Regime
1
2
3
4
5
Firm f observes private signal ωf about type
Firm chooses internal quality of its financial reporting q and hires and designs auditor contract that induces the Auditor to overstate x
Firm privately observes the realization of its rate of return r
Issuance of financial report θ =j based on the privately observed outcome r and x≡{q,e}, the overall quality of the financial reporting system
The market infers the firm's return r̂j and funds the firm if r̂j is not less than the threshold level r*

Time Lines


Time Line – Regime II - FSI Regime with Firm-Hired Independent Auditor
1
Firm f observes private signal ω_f about type
2
Firm chooses internal quality of its financial reporting q and hires and designs Auditor contract. The Auditor is truly independent and cannot be induced to overstate x
3
Firm purchases insurance and pays a publicly observed premium of π_f following the report by the auditor of $\hat{x}$
4
Firm privately observes the realization of its rate of return r
5
Issuance of financial report $\theta = j$ based on the privately observed outcome r and $x \equiv \{q,e\}$, the overall quality of the financial reporting system
6
The market infers the firm's return $\hat{r}_j$ and funds the firm if $\hat{r}_j$ is not less than the threshold level r^*


Time Line – Regime III - FSI Regime with Firm-Hired Non-independent Auditor
1
2
3
4
5
6
Firm f observes private signal ω_f about type
Firm chooses internal quality of its financial reporting q and hires and designs Auditor contract. The Auditor is truly independent and cannot be induced to overstate x
Firm purchases insurance and pays a publicly observed premium of π_f following the report by the auditor of $\hat{x}$
Firm privately observes the realization of its rate of return r
Issuance of financial report $\theta = j$ based on the privately observed outcome r and $x \equiv \{q,e\}$, the overall quality of the financial reporting system
The market infers the firm's return $\hat{r}_j$ and funds the firm if $\hat{r}_j$ is not less than the threshold level r^*


Time Line – Regime IV- FSI Regime with Insurer-Hired Auditor
1
Firm f observes private signal ωf about type
2
Firm chooses internal quality of its financial reporting q but Insurer hires auditor
3
Firm purchases FSI and pays a publicly observed premium of πf following the report by the auditor of x̂
4
Firm privately observes the realization of its rate of return r
5
Issuance of financial report θ = j based on the privately observed outcome r and x≡{q,e}, the overall quality of the financial reporting system
6
The market infers the firm's return r̂j and funds the firm if r̂j is not less than the threshold level r*

Program I: Current Regime

$$\max_{q,e,F} \quad B \times FP_f(x|\omega_f, \vec{\nu})$$
$$+\alpha \left[(1 + E(r|\omega_f))(I + FP_f(x|\omega_f, \vec{\nu})(1 - B)) - \mathcal{L}_f(x) - F(x, e)\right]$$

subject to

$$F(x, e) = C(e) + \mathcal{L}_a(x, e) \qquad \text{(AF)}$$

$$FP_f(x|\omega_f, \vec{\nu}) = Probability\{E[r|\omega_f, \vec{\nu}] \geq \hat{r}*\} \qquad \text{(FD)}$$

$$\nu_f = x^*(\omega_f) = (q^*(\omega_f), e^*(\omega_f)) \qquad \text{(RE)}$$

where (AF), (FD) and (RE) are respectively the Audit Fee, Funding probability and Rational Expectations constraints.

Proposition 1 (Equilibrium in Program I (current regime))

If the benefits from funding, B, are such that for every $y < x$:

$$B\left\{\frac{[FP_f(y|\omega_f,\vec{\nu}) - FP_f(x|\omega_f,\vec{\nu})]}{x-y}\right\} >$$
$$\left\{\frac{\alpha}{[1-\alpha(1+E(r|\omega_f))]}\right\}\left\{Max_q\left|\frac{\partial}{\partial q}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right| + Max_e\left|\frac{\partial}{\partial e}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right|\right\} \tag{12}$$

(i.e., B is large enough to ensure that the benefits from funding exceed the incremental cost from increasing overall quality for each private-signal type), then the equilibrium overall quality level chosen by the firm is $\underline{x} = \{\underline{q}, \underline{e}\}$, ie., the lowest possible level of overall quality. Consequently, as benefits to the manager from funding increases, capital is allocated to low rate-of-return firms with greater probability.

Program II: Premia Disclosed with independent auditor hired by the firm and reports $\hat{x} = x$

$$\max_{q,e,F} \quad B \times FP_f(x|\omega_f, \vec{\nu})$$
$$+\alpha\left[(1 + E(r|\omega_f))(I + FP_f(x|\omega_f, \vec{\nu})(1 - B)) - \pi_f - F(x, e)\right]$$

subject to

$$F(x, e) = C(e) + \mathcal{L}_a(x, e) \tag{AF}$$
$$FP_f(x|\omega_f, \vec{\nu}) = Probability\left\{E[r_f|\omega_f, \vec{\nu}] \geq \hat{r}*\right\} \tag{FD}$$
$$\pi_f = \mathcal{L}_f(x) \tag{BE}$$
$$\nu_f = x^*(\omega_f) = (q^*(\omega_f), e^*(\omega_f)) \tag{RE}$$

where (BE) is the insurer breakeven constraint.

Proposition 2 (Equilibrium with revelation of premia (Program II))

If the benefits from funding, B, are such that for every $y < x$:

$$B\left\{\frac{[FP_f(x|\omega_f,\vec{\nu}) - FP_f(y|\omega_f,\vec{\nu})]}{x-y}\right\} >$$
$$\left\{\frac{\alpha}{[1-\alpha(1+E(r|\omega_f))]}\right\}\left\{Max_q\left|\frac{\partial}{\partial q}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right| + Max_e\left|\frac{\partial}{\partial e}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right|\right\}$$

(i.e., B is large enough to ensure that the benefits from funding exceed the incremental cost from increasing overall quality for each private-signal type), then the equilibrium overall quality levels chosen by the firm is to set $\overline{x} = \{\overline{q},\overline{e}\}$, ie., the highest possible level of overall quality. The association between management benefits (perquisites) and misallocation of capital is negated through the provision of insurance premia that are publicly disclosed (note, however, that in this program, we assume that the auditor will not misreport x to the insurer).

Program III: Premia Disclosed with a (non-independent) auditor hired by client-firm.

$$\max_{\hat{x},q,e,F} \quad B \times FP_f(x|\omega_f, \vec{\nu})$$
$$+\alpha\left[(1+E(r|\omega_f))(I+FP_f(x|\omega_f,\vec{\nu})(1-B)) - (\pi_f + F(\hat{x},x,e)) - \sigma_f(\hat{x},x)\right]$$

subject to

$$F(\hat{x},x,e) = C(e) + \mathcal{L}_a(x,e) \qquad \text{(AF)}$$

$$FP_f(x|\omega_f,\vec{\nu}) = Probability\{E[r|\omega_f,\vec{\nu}] \geq \hat{r}*\} \qquad \text{(FD)}$$

$$\pi_f = \mathcal{L}_f(\hat{x}) \qquad \text{(IP)}$$

$$\pi_f \leq \mathcal{L}_f(x) \qquad \text{(CO)}$$

$$\sigma_f(\hat{x},x) = [\mathcal{L}_f(x) - \mathcal{L}_f(\hat{x})] \qquad \text{(BE)}$$

$$\nu_f = x^*(\omega_f) = (q^*(\omega_f), e^*(\omega_f)) \qquad \text{(RE)}$$

where (IP) and (CO) are respectively the insurance premium and competitive constraints.

Proposition 3 (Equilibrium with the Auditor as Firm's Agent)

Assume that the benefits from funding, B, are such that for every $y < x$:

$$B\left\{\frac{[FP_f(x|\omega_f,\vec{\nu}) - FP_f(y|\omega_f,\vec{\nu})]}{x-y}\right\} >$$

$$\left\{\frac{\alpha}{[1-\alpha(1+E(r|\omega_f))]}\right\}\left\{Max_q\left|\frac{\partial}{\partial q}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right| + Max_e\left|\frac{\partial}{\partial e}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right|\right\}$$

(i.e., B is large enough to ensure that the benefits from funding exceed the incremental cost from increasing overall quality for each private-signal type), and that the auditor is hired by the firm and may misrepresent the overall quality of the audit to the insurer. Then the equilibrium overall quality levels chosen by the firm is to set $\underline{\boldsymbol{x}} = \{\underline{q}, \underline{e}\}$, ie., the lowest possible level of overall quality.

Program IV : FSI

$$\max_{q,e,F} \quad B \times FP_f(x|\omega_f,\vec{\nu})$$
$$+\alpha\left[(1+E(r|\omega_f))(I+FP_f(x|\omega_f,\vec{\nu})(1-B))-(\pi_f+F(\hat{x},e))\right]$$

subject to

$$\hat{x} = \text{argmax}_{\hat{y}}(F(\hat{y},e)-\sigma(\hat{y},x)) \quad \text{(AF)}$$
$$FP_f(x|\omega_f,\vec{\nu}) = Probability\{E[r|\omega_f,\vec{\nu}] \geq \hat{r}*\} \quad \text{(FD)}$$
$$\min_{x,e} \mathcal{L}_f(x) \quad \text{(IP)}$$
$$\pi_f \leq \mathcal{L}_f(x) \quad \text{(CO)}$$
$$\sigma_a(\hat{x},x) = [\mathcal{L}_a(x,e)-\mathcal{L}_a(\hat{x},e)] \quad \text{(BE)}$$
$$\nu_f = x^*(\omega_f) = (q^*(\omega_f),e^*(\omega_f)) \quad \text{(RE)}$$

Proposition 4 (Equilibrium with the Auditor as the Insurer's Agent)

Assume that the benefits from funding, B, are such that for every $y < x$:

$$B\left\{\frac{[FP_f(x|\omega_f,\vec{\nu}) - FP_f(y|\omega_f,\vec{\nu})]}{x-y}\right\} >$$

$$\left\{\frac{\alpha}{[1-\alpha(1+E(r|\omega_f))]}\right\}\left\{Max_q\left|\frac{\partial}{\partial q}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right| + Max_e\left|\frac{\partial}{\partial e}\Big(F(q,e)+\mathcal{L}_f(q,e)\Big)\right|\right\}$$

(i.e., B is large enough to ensure that the benefits from funding exceed the incremental cost from increasing overall quality for each private-signal type). Under the FSI regime where the auditor is hired by the insurer (and premia are publicly disclosed), there is an equilibrium where all firms set $\overline{\boldsymbol{x}} = \{\overline{q}, \overline{e}\}$. In addition, if $L = 2$, this is the only equilibrium meeting the divinity criterion.

An Example

We assume that there are N firms each of which can have two possible rates of return, i.e., that there are two types (L=2). In addition, we assume that the internal quality choice $q = q$, is one-dimensional and lies in $[0, \overline{q}]$, where $\overline{q} < 1$. Next, we assume that the private information is perfect, and that $\omega_l = 1, 2$ reveals the expected rate of return as r_l. We set $V(q, e) = q$ (that is, $x = q$) and $P(i|i, q) = q$ for $i = 1, 2$. So with a quality level q, the probability that the firm's type is reported correctly is q, and, as there are only two types, the probability of the firm being misclassified is $1 - q$. Let the beliefs of investors be represented by ν_i; the firm that receives a private signal that it's rate of return is r_i is expected to set its q at ν_i.

Without insurance,

The total negative returns associated with the misallocation of capital may then be written as:

$$(N/2)\int_{r_1}^{r_2} \min\{r^* - r_1, r_2 - r^*\} g(r^*) dr^*$$

With insurance - Social Loss

$$(N/2)\int_{r_1}^{r_2} \min\{(1-\overline{q})(r^* - r_1), r_2 - r^*\} g(r^*) dr^*$$

Because $\min\{(1-\overline{q})(r^* - r_1), r_2 - r^*\} \leq \min\{r^* - r_1, r_2 - r^*\}$

social loss is reduced through the provision of FSI.