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CORPORATE DISCLOSURE AND SHAREHOLDER WEALTH: THE CASE OF MANAGEMENT PERQUISITES

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Kathleen T. Mcgahran

The University of Michigan

CORPORATE DISCLOSURE AND SHAREHOLDER WEALTH:

THE CASE OF MANAGEMENT PERQUISITES*

KATHLEEN T. MCGAHRAN
ASSISTANT PROFESSOR
THE UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN 48109

ABSTRACT

The study analyzes the impact on shareholder and manager welfare due to corporate disclosure regulation. The analysis uses a simplified contracting relationship as a tool in evaluating the impact of regulation. Information provided for contracting purposes is assumed to "spill over" and be acted upon by a third party--the Internal Revenue Service. The case of management perquisite disclosure regulation coupled with tax enforcement policies is modeled.

The analysis demonstrates that without taxation, perquisite disclosure regulation results in an increase in shareholder's welfare and a corresponding decrease in the manager's welfare. However, with taxation, both the shareholder's and manager's utility levels decrease with the IRS receiving the net benefit.

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In this paper, a simplified agency model[1] is used to assess the joint impact of a Securities and Exchange Commission (SEC) disclosure regulation coupled with the Internal Revenue Service's (IRS) tax regulation on the welfare of the shareholders and managers of the corporation. The case of perquisite disclosure regulation promulgated by the SEC in 1978 is modeled. This ruling required companies to disclose the dollar value of perquisites consumed by the top five executive officers and, directors and officers as a group. It is presumed here that the average individual manager, prior to the disclosure requirement, did not report perquisites as income since, for all intents and purposes, the IRS was unable to enforce its regulations pertaining to perquisites as taxable income. Consequently, perquisites received by the manager, prior to the disclosure law, were deducted as a noncompensation business expense. With the advent of the SEC regulation requiring the company to separately report perquisite income, the screen of aggregation was reduced and the IRS's enforcement became practical. As a result of a lower after tax value of perquisites to the manager, the benefit to the manager of choosing perquisites over monetary compensation is reduced.

While shareholders are expected to benefit from perquisites disclosure due to the resulting reduction in information asymmetry, this benefit might be offset (or even eliminated) by the managers demanding a higher monetary compensation in recompense for the tax on the disclosed perquisites. An additional cost may be incurred if shareholders formerly used perquisites as a method of paying managers nontaxable income. It is expected that the corporation incurs additional expenses to cover additional wage requirements. The change in the shareholders' and managers' utilities is analyzed under the alternative reporting requirements. This change represents (in a partial equilibrium context) the value of changing from one information system to the other.

Regulatory bodies such as the SEC and IRS were created for the attainment of different social objectives. In this instance, it is shown that the combined regulatory impact results in an undesirable effect on both shareholders and managers.

Explicit solutions are obtained via the introduction of some strong assumptions. The characterizations made enable comparative static analyses which would otherwise be difficult to obtain. However, it should be clear that the economic intuition underlying the results is robust. The solutions presented show that disclosure, combined with taxation of non-pecuniary benefits, result in an overall decrease in utility for shareholders and a substantial increase in risk to managers.

BACKGROUND

The SEC's perquisite disclosure requirement was promulgated to provide shareholders with additional information. This additional information may provide a basis for assessing the manager's deviation from the principle of shareholders' wealth maximization. Due to the diffuse ownership of public corporations, the manager holds the position of decision-maker for the firm with large discretionary powers. The manager guided by self-interest will use his decision-making authority and power within the firm for the purpose of furthering his own interests via discretionary actions and expenditures. Consequently, the decisions and actions taken may not be congruent with the goal of shareholder wealth maximization. This conflict with shareholders' interest is exacerbated whenever the manager possesses information which the shareholders do not with respect to the firm and/or the manager's utility preferences.

Non-pecuniary benefits (NPB) are defined in this paper to be the residual or the deviation from the optimal funds produced from the production process--as if the agent actions and decisions were totally congruent with the shareholder's best interest (the first best solution)--and the actual funds from the production process before monetary compensation is paid to the manager-agent.[2] Thus, NPB can be viewed as the cost incurred by the shareholder on the activities and decisions which generated utility only to the managers without a commensurate benefit to the shareholder.[3] The SEC requires disclosure of only a subset of NPB--those NPB which can be more readily quantified in terms of monetary value, i.e., perquisites.[4]

The model formulated in this paper incorporates two types of information asymmetry between the shareholder and the manager. The first centers around the outcome of the production process where the actual outcome is known by the manager and the shareholder only knows the expected level. The second is the actual NPB the manager consumes while the shareholder only has an estimate. The first may be thought of as an adverse selection problem on reporting the firm's outcome while the second results from the moral hazard phenomenon around the NPB consumed.

In the model, the shareholder invests resources in monitoring to reduce or eliminate the information asymmetry. The information obtained from monitoring affects the compensation of the manager via the employment contract. Since monitoring is costly, the shareholder incorporates incentives in the manager's compensation contract which trade off the deviation from shareholder's wealth maximization and the monitoring costs.

There are some who hold that the competitive market processes exert sufficient pressure on the manager to reduce or even eliminate this consumption of NPB. These processes include incentives due to the manager's share of ownership (Jensen and Meckling (1976)), discipline by the labor market (Fama (1980)), and takeover threats. These competitive market solutions assume information symmetry and/or costless monitoring and/or costless information. Once these assumptions are dropped, the competitive market solutions proferred will not guarantee that the manager's consumption of NPB will be reduced or eliminated.[5] When information asymmetries exist, it becomes both difficult (due to moral hazard) and costly to obtain information on the manager's consumption of NPB.[6] The higher the costs of obtaining information, the greater will be the manager's freedom for discretionary actions and the less feasible will be the competitive market solutions.[7]

Voluntary disclosure was not observed prior to the release of disclosure laws.[8] This observation implies that the managers must have perceived that a competitive disadvantage existed surrounding disclosure where the costs exceeded the benefits. Here the costs may include possible (1) penalties from shareholders (2) unfriendly takeover bids and (3) income tax implications.

Disclosure laws represent a way of resolving the above issues by mandating more information and increasing the penalty of noncompliance in those instances where incentives for the manager to disclosure do not exist and other market mechanisms are not effective in inducing the managers to disclose.

The model introduced below will address the nature of the costs which result from the interaction of the tax and disclosure regulations while the empirical section will evaluate whether the shareholders, managers or both bore the cost of disclosure.

THE MODEL

A one period model is constructed which depicts a simplified agent/principal relationship. The shareholder and the manager are assumed to act so as to maximize their individual expected utilities. The shareholder's utility is assumed to depend only on wealth while the agent's utility is assumed to depend on wealth and NPB.

The shareholder (principal) chooses the optimal wage, bonus and penalty for the manager's (agent's) compensation scheme at the beginning of the period. This decision is a function of the expected outcome from the production process, monitoring costs and the manager's expected consumption of NPB. The manager chooses, after observing the actual realization from the production process, the optimal amount of NPB to consume and the optimal amount to disclose to the shareholder.

The basic model is formulated and solved for two scenarios. The first scenario represents the case where no taxation exists on NPB disclosed while the second scenario represents the case where taxation on disclosed NPB does exist. In both instances, the manager's choice of the optimal level of NPB to disclose is voluntary. The solutions are then compared to the situation where disclosure is determined by SEC regulation.

The Production and Monitoring Functions.

The manager reports X at the end of the period as the outcome of the production process. X is defined as:

$$X = T - H - C = T - \beta T - C = (1-\beta)T - C \qquad 0 < \beta < 1$$

where:

T represents the exogenous maximum achievable random outcome of the production process (assumed to be strictly positive).

H $= \beta T$ represents the monetary equivalent of NPB which is an expenditure (cost) from the maximum achievable production process's outcome.

C $= f(P)$ represents monitoring costs as a function of the disclosed amount of NPB, $P = \delta\beta T$ where $0 \leq \delta \leq 1$.

Thus, the realized outcome of the production process, T, is reduced by the monetary equivalent of the NPB consumed, H, and the amount of monitoring costs, C, incurred. (Note that the dollar equivalent of any action which the manager takes which does not maximize T is included in H.)

The disclosure of P provides the shareholder with information on the actual NPB consumed, H.[9] The manager has no incentive to disclose more NPB than actually consumed while, on the downward side, the manager has the option of disclosing NPB equal to zero. Consequently, the P reported by the manager is treated as a completely reliable signal to the shareholder.

The shareholder is induced to incur monitoring costs because of the ex post/ex ante nature of the decision choices. Shareholders do not observe the realization of the production process, T, they only know the expected value of T for their ex ante decision. Managers are making their decisions regarding the consumption of NPB, H, ex post-based upon the actual realization of T. Given an outcome T, the manager will choose the optimal level of NPB to consume H^* ($=\beta^*T$) and the optimal level of disclosure $P^*(=\delta^*\beta^*T)$. Without monitoring, the manager has incentive to understate the actual outcome of the firm. He can deceive the shareholder by reporting as if T realized was lower--consuming the difference in the form of NPB ($\beta'T$ where $\beta' > \beta^*$). Without monitoring, the shareholder cannot correctly ascertain the outcome of the production process. The shareholder depends on what is reported by the manager as well as monitoring activities intended to verify that the manager's reported outcome, X, is accurate. The purpose of monitoring is to force the manager to consume an optimal level of NPB thus minimizing the deviation from β^*T. Therefore, it is assumed that shareholders monitor routinely the manager's activity such that managers' consumption of H is limited to the optimal amount which is consistent with shareholder wealth maximization.

Thus, monitoring enables the shareholder to obtain information, beyond the amount P disclosed, on the total NPB, H, which are consumed by the manager. The combination of the NPB disclosed, P, and the monitoring costs incurred for the purpose of observing the remainder of the NPB actually consumed by the manager (H - P), enables the shareholder to correctly assess the NPB actually consumed by the manager ex post.

Note that with this formulation, the employment contract chosen is ex ante efficient but not necessarily ex post efficient. The shareholder ex post might be made better off by renegotiating the contract but the original agreement is legally enforceable so they are prohibited from renegotiating. Otherwise, the agent would take the renegotiation into consideration and his original decisions would no longer be optimal.

Since P is assumed to be a reliable signal for the shareholders, the larger the disclosed P, the lower the monitoring costs necessary to determine information on H. The monitoring cost function adopted in this paper is defined to be $C = K - k_1P$ and $\frac{\delta C}{\delta P} = -k_1 < 0$. Here K represents the maximum amount on the monitoring that shareholders are willing to expend when P = 0.

The total assessed NPB can be expressed as $Ho = P + \phi\ (H - P)$, $0 \leq \phi \leq 1$, where ϕ is determined by the level of monitoring costs. Specifically, the parameter $\phi = \frac{1}{K}(K - k_1P) = 1 - \frac{k_1}{K}P$. If the monitoring costs are equal to zero, ϕ will be equal to zero. If monitoring costs are equal to K, ϕ will be equal to one (see figure 1). Recall that H is the actual NPB consumed by the manager which can only be assessed by the shareholder via monitoring.

The parameters of the monitoring cost function (K and k_1) are assumed to be exogenously determined by the outside market for monitoring services. These parameters are known by both the manager and the shareholder ex ante and are considered to be fixed over the period. Note, however, that the actual C expended cannot be determined until the end of the period when the manager discloses P. Consequently, the actual ϕ is also determined at the end of the period.

The Compensation Scheme

A linear compensation scheme is formulated in this study based upon quantities observed by both the principal and the agent.[10] Since the agent is assumed to be risk averse, the compensation paid depends on both the outcome (Shavell, 1979) and the information on NPB consumed provided by the agent (Holmstrom, 1979). Thus, the form of the compensation scheme, M, which the shareholder is assumed to offer to the manager is a function of the reported outcome, X, and a penalty associated with the assessed consumption of NPB, H_o. The compensation scheme is represented as:

$$M(X, Ho) = w + a_1(X) - a_2\,(Ho)$$

where w is the fixed salary of the manager, a_1 is the share of the outcome the manager receives after monitoring costs (a bonus) and a_2 is an operator which determines the level of the penalty imposed on the manager. The assessed penalty may be viewed as an imposition by shareholders via the judicial process or actions taken by the SEC in protection of shareholders. This may involve a decrease in the market's wage for managers if shareholders perceive βT as being too high. An alternative interpretation of this penalty is a bonding cost in the spirit of the Jensen and Meckling (1976) analysis.

This form of the compensation scheme is such that it encourages the manager to reduce the consumption of NPB. Since the manager receives a share of X (reduced by NPB, H), the monetary compensation is increased when lower amounts of NPB are consumed. However, a tradeoff exists since the manager has positive utility for NPB. The manager's compensation scheme also involves a tradeoff between the benefits and costs of disclosing the NPB consumed. The manager receives a benefit from disclosure of NPB in two forms. First, monitoring costs are reduced by $k_1 P$ which affects X and increases his compensation via $a_1 X$. Second, by reducing the monitoring costs, the value of $\phi = \frac{C}{K}$ becomes smaller reducing a_2 (Ho). However, higher amounts of disclosure imply higher penalties from disclosure. Since ϕ is a number between 0 and 1, the deviation H-P is not penalized as highly as P. If H_o = P, the penalty imposed is $a_2 \cdot P$. If the actual disclosure is different than the actual H, (H - P), the penalty imposed is higher, $a_2 \cdot H_o$.

The net monetary compensation which the manager receives after personal taxes is:

$$M_\tau \ (X,\ Ho) \equiv [w + a_1(X) - a_2\ (Ho)]\ [1 - \tau]$$

where τ represents the personal tax rate of the manager.

The shareholder receives the reported outcome after monitoring costs less the compensation to the manager regardless of the personal taxation of the manager or:

$$S = X - M(X,\ Ho)$$

where S represents the shareholder's expected payoff

The next two sections contain the solutions for the two scenarios. The first depicts the situation without taxation of disclosed NPB and the second depicts the situation when disclosed NPB are taxed.

SCENARIO I

The Manager's Problem Without Taxation of Disclosed NPB

Given the monitoring function and the employment contract chosen by the shareholder, the manager chooses the optimal amount of NPB to consume and the optimal amount of NPB to disclose to the shareholder. The manager's objective is to maximize his additive utility from NPB and monetary compensation.

It is assumed that the manager's additive utility function, A, can be represented as utility from NPB, V(H), and a utility from after tax monetary compensation, $U(M_\tau)$. These utility functions are assumed to be of the same form and are assumed to be continuously differentiable up to at least the second order. It is also assumed that $V' > 0$ and $U' > 0$, the manager receives increasing satisfaction, and $V'' < 0$ and $U'' < 0$, at a decreasing rate. For any given T, the manager's decision is to:

(1) $$\underset{\{\delta,\beta\}}{\text{Maximize}}\ A(H, M_\tau) = V[H] + U[M_\tau(X,Ho)].$$

The optimal δ^*, β^* is that which satisfies the following first order conditions:

(2) $$\frac{\partial A}{\partial \delta} = U' \cdot \left[\frac{\partial M\tau}{\partial X} \cdot \frac{\partial X}{\partial \delta} + \frac{\partial M\tau}{\partial Ho} \cdot \frac{\partial Ho}{\partial \delta}\right] = 0$$

$$= U' \cdot \left[a_1(1-\tau)k_1\beta T - a_2(1-\tau)\left(+\frac{2k_1\delta\beta^2T^2}{K} - \frac{k_1\beta^2T^2}{K}\right)\right] = 0$$

(3) $$\frac{\partial A}{\partial \beta} = V'(T) = U' \cdot \left[\frac{\partial M\tau}{\partial X} \cdot \frac{\partial X}{\partial \beta} + \frac{\partial M\tau}{\partial Ho} \cdot \frac{\partial Ho}{\partial \beta}\right] = 0$$

$$= V'(T) + U' \cdot \left[a_1(1-\tau)(-T + k_1\delta T) - a_2(1-\tau)\left(T - \frac{2k_1\delta\beta T^2}{K} + \frac{2k_1\beta\delta^2T^2}{K}\right)\right] = 0$$

Given U' is strictly positive, the condition (2) is satisfied if the expression inside the brackets is equal to zero, i.e.,

$$(4) \qquad [a_1(1 - \tau)k_1\beta T - a_2(1 - \tau)(+ \frac{2k_1\delta\beta^2T^2}{K} - \frac{k_1\beta^2T^2}{K})] = 0$$

Solving equation (4) for δ results in,

$$(5) \qquad \delta = \frac{a_2\beta T + a_1K}{2a_2\beta T} = \frac{1}{2} + \frac{a_1K}{2a_2\beta T} .$$

As a result of the tradeoffs (discussed above) in the compensation scheme (via $a_2 \cdot Ho$), increasing either a_2 or $\beta T(=H)$ (ceteris paribus) results in less disclosure. While increasing a_1 or K results in more disclosure (via $a_1 \cdot X$ and C).

Substituting δ from equation (5) into equation (3) and rearranging results in:

$$(6) \qquad -\frac{V'}{U'} = (1 - \tau)[a_2(\frac{k_1\beta T}{2K} - 1) + a_1(\frac{k_1}{2} - 1)]$$

Equation (6) represents the marginal rate of substitution between the manager's two goods, NPB and money.[11]

The last part of the equation (6), $a_1(\frac{k_1}{2} - 1)$, shows the effect on the monetary compensation of the manager for taking NPB. The share of the firm's outcome to the manager is reduced whenever the manager consumes NPB. The higher the a_1, the more the manager bears the cost of NPB via the reported oucome. The higher the k_1, the less the monetary cost imposed on the manager for consuming NPB, thus, leaving the manager in a better monetary position via the bonus.

The section of equation (6) which refers to the penalty, $a_2(\frac{k_1\beta T}{2K} - 1)$, represents the cost of taking NPB, $H = \beta T$. Since monitoring costs are positive, $k_1\beta T$ must always be less than or equal to K and $\frac{k_1\beta T}{2K}$ must be a fraction less than one. The smaller the fraction the larger will be the negative number multiplying a_2. Thus, the cost of taking NPB is reduced by a high k_1 and increased by a higher K. The higher the a_2, the larger the penalty for consuming NPB.

The Shareholder's Problem

The shareholder's ex ante decision problem consists of finding the optimal parameters of the compensation scheme. Let S represent the shareholder's expected utility defined over wealth represented by the share of the outcome where $S' > 0$ and $S'' = 0$. $S'' = 0$ implies that any risk imposed on the manager by the incentive scheme is for the purpose of motivation and/or reducing the NPB consumed and not for risk sharing purposes. The shareholder is aware of the manager's utility function and knows the desired δ^* and β^* chosen by the manager for every level of T. The shareholder may control the actual δ^* and β^* by changing the compensation scheme so as to encourage the manager to disclose at a particular level.

The shareholder's problem may be represented as:

(7) $$\max_{\{a_1,a_2,w\}} E(S) = E(X - M\ (X,Ho))$$

s.t.

(7a) (1) $EA = \overline{A}$

(7b) (2) $\beta^*, \delta^* \ \underset{\{\beta,\delta\}}{\text{argmax}}\ V(H) + U[M_\tau(X,H_0)]$

Equation (7a) is a market constraint which states that the expected compensation package received by the manager is equal to an exogenous compensation package determined by outside managerial market opportunities or a negotiation process.

In equation (7b) the notation "argmax" denotes the set of arguments that maximize the objective function which follows. The set of arguments which maximizes the manager's objective function is represented by the first order conditions (equations (4) and (6)). The addition of these constraints changes the shareholder's problem to that of a "second best" nature.

The equations for Scenario I are presented in Table 3. The equations are shown after all simplifications have been made.[12]

The model presented above will be used to examine the characteristics of compensation schemes that elicit the proper incentives for disclosure of perquisites and the incentives created to minimize the consumption of NPB by the manager in an environment without taxation of the NPB disclosed.

SCENARIO II

The Manager's Problem Constructed with Taxation of Disclosed NPB as Income

When NPB disclosed are taxed as income, the manager's net monetary compensation can be described as:

$$M_p = M_\tau(X, Ho) - \tau\delta\beta T$$

$$= (w + a_1(X) - a_2(Ho))(1 - \tau) - \tau\delta\beta T.$$

For any given T, the manager's decision is to maximize the utility level, A', over NPB, H, and over net monetary compensation, M_p. Or,

(8) $$\text{Maximize } A'(H,M_p) = V(H) + U[(M_\tau(X, Ho)) - \tau\delta\beta T]$$

The optimal $\delta^{*\prime}$, $\beta^{*\prime}$ is that which satisfies the following first order conditions,

(9) $$\frac{\partial A'}{\partial \delta} = U' \cdot [(\frac{\partial M_\tau}{\partial X} \cdot \frac{\partial X}{\partial \delta} + \frac{\partial M_\tau}{\partial Ho} \cdot \frac{\partial Ho}{\partial \delta}) - \tau\beta T] = 0$$

$$= U' \cdot [a_1(1 - \tau)k_1\beta T - a_2(1 - \tau)(\frac{2k_1\delta\beta^2T^2}{K} - \frac{k_1\beta^2T^2}{K}) - \tau\beta T] = 0$$

(10) $$\frac{\partial A'}{\partial \beta} = V'(T) + U' \cdot [(\frac{\partial M\tau}{\partial X} \cdot \frac{\partial X}{\partial \beta} + \frac{\partial M\tau}{\partial Ho} \cdot \frac{\partial Ho}{\partial \beta}) - \tau\delta T] = 0$$

$$= V'(T) + U' \cdot [(a_1(1 - \tau)(-T + k_1\delta T) - a_2(1 - \tau)(T - \frac{2k_1\delta\beta T^2}{K} + \frac{2k_1\beta\delta^2 T^2}{K}) - \tau\delta T] = 0$$

Rearranging equation (9) and solving for δ results in,

(11) $$\delta^{*\prime} = \frac{(\tau - 1)(a_2k_1\beta T + a_1k_1K) + \tau K}{2a_2k_1\beta T(\tau - 1)} = \frac{1}{2} + \frac{a_1k_1K(\tau - 1) + \tau K}{2a_2k_1\beta T(\tau - 1)}$$

Comparing equation (11) to equation (5), it can be seen that in the case without taxation of disclosed NPB the tax rate did not influence disclosure. However, with taxation of disclosed NPB, the tax rate is an important factor. The difference between $\delta^{*\prime}$ and δ^* is $\frac{K\tau}{2a_2k_1\beta T(\tau - 1)}$. The sign of this difference is negative ($\tau < 1$). This represents the reduced disclosure level desired by the manager when NPB are taxed as income.

The marginal rate of substitution is obtained from rearranging equation (10) and dividing by T.

(12) $$\frac{-V'}{U'} = a_1(1 - \tau)(-1 + k_1\delta) + a_2(1 - \tau)(-1 + \frac{2k_1\delta\beta T}{K} - \frac{2k_1\beta\delta^2 T}{K} - \tau\delta)$$

Notice this is the same equation (6) without the last term, $\tau\delta$. This additional term, $\tau\delta$, increases the cost of taking NPB ($H = \beta T$) by the tax rate times the percentage disclosed. Thus, the marginal rate of substitution between NPB and monetary compensation is affected by the bonus, a_1, the penalty parameter, a_2, the monitoring cost parameters and the tax rate times the percentage of disclosure.

Comparing equation (6) with (12), we would expect less consumption of NPB (with taxes on disclosed NPB) than previously in exchange for higher monetary compensation. The price of NPB has increased with respect to the price of monetary compensation.

The Shareholder's Problem Constructed with Taxation of Disclosed NPB

The shareholder's problem may be represented as:

(13) $$\underset{\{a_1', a_2', w'\}}{\text{Max}} E(S) = E(X - M\ (X,\ Ho))$$

(13a) s.t. (1) $EA = \overline{A}$

(13b) (2) $\beta^*, \delta^* \underset{\{\beta,\delta\}}{\text{argmax}}\ V(H) + U[M_\tau(X,\ Ho) - \tau\delta\beta\overline{T}]$

Again, constraint (13a) represents the minimum level acceptable to the manager for the total compensation package as determined by outside forces. And, constraint (13b) is represented by the first order conditions which maximize the manager's objective function. The addition of constraint 13b results in the shareholder's problem being one of a "second best" nature.

Note, the shareholders' expected utility function, E(S), in equation (13), is the same as in Scenario I, equation (7). The shareholder pays the manager before the manager pays personal taxes.

The equations for Scenario II are presented in Table 4. The equations are shown after all simplifications have been made.

The next section provides numerical examples of and implications for the optimal solutions of both the shareholder's and manager's problems. In order to obtain explicit solutions for the decision variables (a_1, a_2, w, β, δ) a natural log (ln) utility function for the manager was assumed. This ln function has the properties of decreasing absolute risk aversion and constant relative risk aversion. The ln utility function is consistent with the behavioral assumption of a risk averse manager who prefers more to less and whose percentage invested in risky assets remains constant as wealth increases.

The explicit equations which yield an optimal solution to the shareholder's problem under scenarios I and II are presented in Appendix A and B, respectively.

When δ is defined as one, the manager discloses all NPB consumed. Assuming a natural log utility function, the manager's solution for the optimal β to consume reduces to:

$$\beta^* = - \frac{w + a_1 (T-K)}{+2a_1(k_1T-T) - 2a_2T} \qquad \text{(Scenario I)}$$

and,

$$\beta^{*\prime} = - \frac{(\tau-1)w + a_1(T-K)(\tau-1)}{(\tau-1)(2a_1(k_1T-T)) + (\tau-1)(-2a_2T) + 2\tau T}. \qquad \text{(Scenario II)}$$

Notice that $\beta^{*\prime}$ will be less than β^* due to the additional term of $2\tau T$ in the denominator. Thus, mandatory disclosure combined with taxation of the disclosed NPB will result in a decrease in the NPB consumed. This is a potential benefit to shareholders however, as shown via examples in the next section, the decrease in NPB is offset by an increase in monetary compensation.

Examples and Discussion

This section provides numerical examples and implications to the optimal solutions to both the shareholder's and the manager's problems. Solutions to the shareholder's optimization problem are presented in Table 5 for Scenario I (obtained from equations in Appendix A) and Table 6 for Scenario II (obtained from equations in Appendix B). The values assigned to the exogenous variables are presented in the first column of the tables and the shareholder's optimal solutions are presented in the second column. The examples presented utilize small dollar amounts to facilitate both the computation and the presentation of the results.[13]

The shareholder uses the expected value of T ($\overline{T}$) to obtain his optimal parameters (w, a_1, a_2) set for the manager's compensation scheme. A realization of T different from $\overline{T}$ results in a value for δ and β which differs from the δ* and β* used by the shareholder to set the compensation scheme. Consequently, T ≠ $\overline{T}$ results in changes in: the monitoring costs, C; the reported outcome, X; the amount of NPB actually consumed, H = βT; the actual monetary compensation of the manager, M; the after tax monetary payoff to the manager, M_τ; the after tax monetary payoff to the manager when disclosed NPB are taxed, M_p; and the shareholder's payoff, S. The effect of T realized not equal to $\overline{T}$ via the manager's solutions are discussed below.

<u>Scenario I</u>

Table 5 shows the shareholder's optimal solutions using $\overline{T}$ = \$1000 (Case 1) and the solutions when T realized is equal to \$950 (Case 2) and \$1050 (Case 3) when T realized is equal to or lower than $\overline{T}$, full disclosure (δ = 1) is induced by the compensation scheme. With a lower T realized, the manager's utility, A, money, M, and NPB, βT, is reduced as is the shareholder's utility, S.

When T realized is higher (T = 1050) than $\overline{T}$, both the shareholder and the manager obtain a higher utility level. Both the manager's consumption of NPB and monetary compensation increase, however, less is disclosed voluntarily.

When disclosure laws are in effect and full disclosure ($\delta \equiv 1$) is required <u>and</u> complied with by the manager the outcome changes to the benefit of the shareholder (Case 4 versus Case 3). The manager consumes less NPB but receives a larger monetary compensation (M). The net effect for the manager is a lower utility level. The shareholder's payoff increases from 607.32 to 613.20. This results from a lower monitoring cost and a lower NPB consumption.

Hence, it would appear that the disclosure laws are of a net benefit to the shareholder when there is no taxation of NPB disclosed and the manager complies with the disclosure laws.

Scenario II

With taxation of the disclosed portion of NPB, the shareholder sets the compensation scheme to induce the manager to minimize consumption of NPB and to maximize disclosure. In this scenario, the manager has incentives to disclose less then the amount of NPB actually consumed since the amount disclosed is taxed. Thus, the shareholder loses information. The shareholder is always better off when the manager is required to pay a rent (negative wage to the manager). These points are more clearly shown by analyzing the numerical examples presented in Table 6.

Case 5 represents the optimal solution. Note that the manager receives a large share of the output from production ($a_1 = .74$) while paying the shareholder a "rent" for resources contributed ($w = -350$). With taxes on NPB, the manager has a greater incentive not to disclose NPB (and shirk). As a consequence, the shareholder's utility is maximized by receiving rent and a smaller share in the firm. The payment to the shareholder is increased by a_2 times $\delta\beta T$. The manager receives a larger share of the outcome from the production process and thus, absorbs the majority of the risk associated with this outcome. Here, the risk neutral shareholder absorbs only a small portion of the uncertain outcome, T. With the monitoring system assumed here, the shareholder is better off in maximizing his outcome by designing the optimal compensation parameters in such a way that a rent is paid. This contract avoids much of the "shirking" problem for the shareholder. However, this contract is suboptimal from the manager's viewpoint. He is risk averse but, the majority of the risk associated with the uncertain outcome is borne by him.

Contrasting Case 5 to Case 1 in Scenario I, we see that the shareholder's utility decreases--the shareholder takes less risk and receives a lower return--while the reported outcome, X, increases. The manager's utility remains constant (by definition $\overline{A}$ = 1808 in both cases) however, the mix between NPB and monetary compensation changes as expected. The consumption of NPB and the after tax monetary equivalents to the manager decreases ($184 in Case 1 versus $91.81 in case 5). Both the shareholder and the manager incur dollar losses while the government via tax revenue receives the difference.

The realized solutions presented in Cases 6 and 7 show the changes in δ, β and other selected variables when the realized outcome of the production process is different from the expected outcome which the shareholder used to solve for the optimal compensation parameters. Two examples are provided T = 950 and T = 1050. Notice, analogous to Case 1 in Scenario I, when T realized is less than or equal to $\overline{T}$, δ is equal to 1 and β, βT, and the monetary compensation of the manager are lower. When T realized is greater than $\overline{T}$, δ is less than one. Note, however, the shareholder's payoff is higher when T realized is lower (T = 950) than $\overline{T}$ and lower when T realized (T = 1050) is higher than $\overline{T}$. Here, the manager absorbs the majority of the monetary loss when T is below $\overline{T}$, since the ownership share is high, and receives a larger payoff when T is greater than $\overline{T}$. In all instances, the shareholder receives a lower payoff in Scenario II than in Scenario I.

In Case 7, the manager consumes more NPB (βT = 87.843) and discloses less (δ = .8568) voluntarily. δ (disclosure) decreases by 11% [from Case 3 to Case 7] when disclosed NPB are taxed.

As shown in case 8, when disclosure laws are in effect and full disclosure ($\delta \equiv 1$) is required and complied with by the manager, the outcome again changes to the benefit of the shareholder (Case 8 versus Case 7). These are the same results obtained via the comparison of Case 4 and Case 3 in Scenario I.

Case 9 represents the solutions when the manager's A is allowed to vary such that the shareholder does not absorb the entire loss due to the change in regulations. These results are shown in Table 7. Here again, the shareholder's payoff is not as high as in Scenario I (Case 1) and a rent is paid. The manager has incentive to shirk ($\delta < 1$) and still receives larger monetary compensation both before and after taxes. Given taxation of disclosed NPB and a lower level in the manager's expected utility level, $\bar{A}$, a disclosure requirement would be beneficial to the shareholder.

Results

In summary, the theoretical results and examples from both scenarios indicate that there is a reduction in the manager's consumption of NPB, a corresponding increase in monetary compensation, and a significant increase in the risk assumed by the manager when disclosed NPB are taxed. In addition, the shareholder's utility level is reduced even in case 9 where the manager's utility is exogenously decreased and the reported outcome, X, is higher. Assuming the monitoring cost parameters remain constant, monitoring costs increase since the manager has a greater incentive not to disclosed in Scenario II.

When comparing cases within each scenario (case 4 versus case 3 and case 8 versus case 7), if the realized outcome is less than or equal to the expected, the manager discloses all NPB consumed voluntarily. Thus, when outcome is lower than expected, no "slack" exists beyond what is disclosed to the shareholder. However, when the realized outcome is greater than the expected, the manager takes more in NPB and discloses less voluntarily. When full disclosure is required and complied with, the shareholder does benefit from the disclosure requirement whenever the realized outcome is greater than the expected. However, across scenarios, ceteris parabus, the shareholder's utility level is decreased.

The results obtained from the model are consistent with the results obtained in the risk sharing and incentive contracting literature. By incurring monitoring costs, the shareholder is able to obtain perfect information ex post thus enabling the compensation scheme parameters to be set (ex ante) at levels which mitigate the moral hazard problem. In the instance where no taxes are paid on disclosed NPB, the monitoring costs incurred are sufficient to induce full disclosure combined with an optimal mixed contract for both the shareholder and manager. In the instance where taxes are paid on the disclosed NPB, the manager has an incentive not to disclose. Here, the incurrence of monitoring costs is not sufficient to control the moral hazard problem and a "rent" is paid by the manager to the shareholder.

The results of this paper support the hypothesis that the joint effect of disclosure regulation and taxation of perquisites was costly to both the shareholder and the manager. It was shown in general that once taxation of disclosed NPB exists, the manager consumes a lower amount of NPB and receives a higher before and after tax level of monetary compensation. Assuming the welfare of the manager remains constant, it would appear that the shareholder bears the dollar cost of this additional taxation. (The manager bears a cost in terms of the additional risk that is assumed. This is indicated via the induced increase in the manager's ownership share--the shift of the optimal a_1 from the levels shown in Scenario I to the larger levels shown in Scenario II.)

Since the minimum level necessary to employ the manager, $\bar{A}$, is exogenous to the model, the theoretical analysis is limited in its ability to show whether the shareholder, manager or both bore the dollar cost of the disclosure/taxation requirements. To further examine the question of who bore this cost, empirical results are provided in the next section.

EMPIRICAL ANALYSIS

The results of the previous theoretical analysis suggest that a shift from the manager's consumption of NPB to monetary compensation is expected due to the perquisite disclosure requirement and taxation of the disclosed portion of NPB. This substitution effect is tested empirically in this section. The empirical model formulated tests for a shift in the before tax compensation of the manager between the pre and post disclosure period. The results obtained in this section enable us to explore further the question of who bears the monetary cost of the taxation of disclosed NPB.

Specifically, the hypothesis to be tested is:

H_0: There is no significant difference between monetary compensation prior to disclosure requirements and change in taxation policy and post disclosure requirements and change in taxation policy.

H_a: H_0 is not true. There is a significant change in monetary compensation.

The Data

Three hundred firms, picked randomly from the Fortune 1,000 companies, were asked to supply proxy statements and annual reports. Of the 250 companies which responded, 170 firms met with the criterion of: 1) no change in the chief executive officer during the period of 1976 through 1980 and 2) available on both CRSP (1980) and Compustat (1980) tapes.

Compensation is defined to include salary, bonus and director's fees for each year during the years 1976-1980 inclusive. In order to adjust for an upward pattern found in the compensation data[15] a symmetrical time period was utilized in the analysis. This study covers two years before and two years after the disclosure requirement and change in tax policy went into effect (the requirement mandating perquisite income disclosure was passed in August of 1978 to be effective with filings after December 25, 1978). Adjustments to the disclosure requirement most likely were not made during the year 1978 since contracts in effect in 1978 could not have been changed until 1979. An analysis of the Spring 1979 proxy statements for perquisite compensation information for 1978 revealed that few firms disclosed perquisite information. Those firms which did disclose did so in a footnote to the compensation table and did not show any dollar amounts. Thus, 1978 is considered the neutral year in this study while 1976 and 1977 are considered as the pre-disclosure years. (There were no prequisite disclosures for the sample companies in these 2 years.) The years 1979 and 1980 are considered as the post-disclosure period. Both 1979 and 1980 were evaluated as the years of change based upon the proxy reports issued in the Spring of 1980 and the Spring of 1981. Actual perquisite dollar amounts were only distinguishable in the years 1979 and 1980. In 1979 a column in the compensation table included joint disclosure of exercised stock options and perquisite amounts but footnotes to the compensation table enabled the assessment of the amount, or range of, perquisites involved (See Table 8 for company coding based on perquisite disclosure).

Exercised stock options do not, in general, reflect the compensation of the executive for the year in which they are exercised.[16] The actual option may have been issued years earlier and, in fact, most stock option plans require that the exercise of the option may only take place after a specific number of years have passed from the date of the granting of the option. Therefore, to include an exercised option amount in any one year as compensation may be totatlly misleading and produce erroneous results. Consequently, the amount of the exercised stock options was <u>not</u> included in the executive's compensation as defined in this study.

Several empirical studies have concentrated on analyzing the major determinants of compensation. Notably, Masson (1971) and Lewellen and Huntsman (1970) evaluated executive compensation related to sales, earnings and market equity values. They found that reported profit and equity market values were more important in determining compensation than sales numbers. Both McLaughlin's (1975) and Crystal's (1978) study on management compensation contracts indicated that bonus contracts for key officers were tied to a measurement of firm performance where the net income number was one of the most frequently used determinants. In the present study both reported net income and return to common equity holders will be employed.

Although there is some duplication in including both net income and return to common stockholders as explanatory variables, many compensation contracts for the chief executive officer include one or the other and sometimes both determinants. Rather than misspecifying the model, both were included in the study. Since the interest in this study is not to explain compensation but rather to search for a change in compensation, the inclusion of both variables does not detract from the total model but rather adds to the model's explanatory power. The coefficients for income and return to common stockholders derived from the regressions may not be a true indication of their individual explanatory power, because of multicollinearity, and must be discounted in drawing any conclusions towards that end.

The American Management Association in their Top Management Report, by the Financial Executive Institute in Executive Compensation, and Williamson (1963) have demonstrated that both the size of the firm and the firm's industry are important determinants of executive compensation. The first two of these studies consisted of bivariate, cross sectional regressions with coefficients of correlation in the range of 60%. The Williamson study was of a multiplicative form where "highly significant" coefficients were obtained. The size of a corporation would be expected to impact on the compensation of the chief executive since the larger the organization the greater the responsibility and effort demanded to coordinate the activities of the organization. In this study, the ratio of sales to industry sales was computed as a surrogate for the size of the company in the sample. This ratio is analogous to a market share parameter. In addition, within different industry categories one would expect to find similar accounting techniques utilized and the co-adaption of efficient methods of production. Likewise competition is such that one would expect compensation (salary, bonus and director's fees) within similar industries to be compatible while among different industries there is no a priori reason to expect compatibility. As a consequence, it is expected that the type of industry in which a firm operates may influence the form and the level of the compensation of the chief executive. Therefore, industry dummy variables have been utilized in this study with the intent of capturing some of the explanatory power of the industry category's impact on compensation. Companies were sorted into five major industry groupings; manufacturing, retail, financial, industrial manufacturing and natural resources. Four dummy variables were used to represent these industries grouped in five categories. Table 9 provides the detailed analysis of the industry classifications.

The manufacturing group includes all manufacturers and wholesalers of consumer related products. The manufacturing group is distinguished from industrial manufacturing where the principal form of business is the manufacture of heavy industrial equipment. The retail group includes those companies which concentrate on the sale of consumer products and services. The natural resources group consisted mostly of forest products and oil and gas firms. The financial category consisted of banks, both commercial and savings banks.

An additional independent variable to be utilized in this study is a risk factor, beta. Beta is defined to be the responsiveness of the return for each company's security when there is a one unit change in the return on the market portfolio. The actual risk category which the firm is associated with is strongly influenced by the investing, financing and production decisions of the chief executive officer and his staff. The fluctuation of a company's return may affect the compensation of the chief executive indirectly through his bonus or deferred compensation and is thus included in this study. We can expect this variable, beta, to be related to the return on common stock. However, since the predicted relationship is not perfect, we include it here in an attempt to increase the explanatory power of the model.

The CRSP (1980) tape was employed to calculate the beta, risk factor, for all firms. Since it is hypothesized that the chief executive officer is compensated based upon the risk level of the firm, among other determinants, the beta regressed in each year for each company was calculated based upon a 5 year moving average. For example, beta for company i in 1976 was calculated by using company i's monthly returns over the period 1971 through 1975 inclusive. Company i's beta in 1977 was calculated by using company i's monthly returns over the period 1972 through 1976. The New York Stock Exchange value weighted index was used to compute all the betas.

In an attempt to capture any outside effects on compensation caused by independent variables not included in the study, two dummy variables were utilized. The purpose of including these two dummy variables is to increase the explanatory power of the regression. D_1 is a dummy variable representing the companies which gave perquisites (Code 1 in Table 8). D_1 takes the value of 1 if the company is in this group and 0 otherwise. D_2 is a dummy variable representing the companies which did not give perquisites (Code 2 in Table 8). D_2 takes the value of 1 if the company is in this group and 0 otherwise. Those companies which did not meet the criteria for inclusion in D_1 or D_2 have been included in the intercept term.

In order to utilize both the pre and post disclosure periods and the two distinct groups (Codes 1 and 2), two conditional dummy variables were established. D_3 represents a dummy variable for those companies classified under Code 1 (perquisites greater than $0) where the value assigned is -1 for years 1976 and 1977 and +1 for years 1979 and 1980 and a 0 for all other codes (companies not represented by Code 1) and year 1978. D_4 represents a dummy variable for those companies classified under Code 2 ($0 perquisites) where the value assigned is -1 for years 1976 and 1977 and +1 for years 1979 and 1980 and a 0 for all other codes (companies not represented by Code 2) and year 1978. The intercept term absorbs all the firms which do not meet the requirements for inclusion in D_3 and D_4.

These dummy variables (D_3 and D_4) perform two functions:

1. Any downward compensation bias in the period before disclosure is adjusted by the assignment of a negative one to that period and,
2. two separate effects can be tested for the impact on the compensation data. D_3 for companies reporting perquisites and D_4 for companies $0 in perquisites. Thus, D_4 is used as a control variable for the study.

If both the coefficients of D_3 and D_4 are significant, then the influence on compensation may not have been a result of perquisite disclosure. Or, if both are significant and significantly different from one another where the coefficient for D_3 is a higher level than D_4, we can conclude that the results support the proposition that compensation did increase due to perquisite disclosures and change in tax policy. If D_3 is significant and positive and D_4 is not, the results support the proposition that compensation did increase due to perquisite disclosure. Thus, the coefficients of these variables represent the difference in this group versus the other group in the study.

The Regression Model

This study utilized pooled, cross-sectional time-series regressions. A problem with pooling cross-sectionaly, time-series data is the possibility that each cross-sectional unit and each time period are characterized by their own special characteristics and that homogeneity of the regression coefficients and intercept terms may not exist. To test this proposition, a Chow test[17] was performed with the complete data set regression (pooled cross-sectional, time-series) designated as the restricted residual sum-of-squares (RRSS) and three separate sub-groups (alphabetically ordered by company name) were used to estimate the unrestricted residual sum-of-squares (URSS). An F test was computed which resulted in rejecting the hypothesis that the three sub-groups came from the same model as generated from the RRSS. Thus, we reject the hypothesis that the relationship of the coefficients over cross-sectional units and time periods is stable.

The above result implies that a generalized least squares regression is not the appropriate model to use. Although the results produce unbiased estimates of the coefficients, the variance of these coefficients is not asymtotically efficient. To alleviate this problem, an appropriate estimation procedure has been suggested by Fuller and Battese (1974). Their method decomposes the components of the error term to estimate the coefficients and their standard errors. Fuller and Battese (1974) proved that their model produced unbiased estimates of the coefficients which have the same normal distribution as the generalized least-squares estimators. Thus, the parameter estimates obtained are equivalent to those obtained by computing an estimated generalized least-squares estimate and correcting for each cross-sectional unit and time period.[18]

The model formulated is used to test for a change in real compensation income of the executive. Measures of executive compensation, net income and return to common stockholders were deflated by the consumer price index at the end of year t in order to evaluate the real changes in executive compensation and its determinants.

The regression was run over five years from 1976 to 1980 inclusive for 170 companies. The regression model is:

$$\frac{C_{i,t}}{CPI_t} = B_0 + B_1 \frac{Inc_{i,t}}{CPI_t} + B_2 \, Size_{i,t} + B_3 \frac{RC_{i,t}}{CPI_t} + B_4 \, Beta_{i,t}$$

$$+ B_5 \text{ Manuf} + B_6 \text{ Retail} + B_7 \text{ Finl} + B_8 \text{ Ind. M.}$$

$$+ B_9 D_1 + B_{10} D_2 + B_{11} D_3 + B_{12} D_4 + U_{i,t} \qquad i = (1,170)$$

$$t = (1976, 1980)$$

Where:

$C_{i,t}$ = compensation for the chief executive for company i over year t.

$Inc_{i,t}$ = net income (excluding extraordinary items) of company i in year t.

$Size_{i,t}$ = a surrogate for size measured by the sales of firm i divided by total industry sales in year t (where industry is defined as those companies having the identical standard industry classification code).

$RC_{i,t}$ = return to common stockholders for company i in year t defined as:

$$\frac{\text{dividends}_t + (\text{price}_t - \text{price}_{t-1})}{\text{price}_{t-1}}$$

where: price_t = price per common share at the end of year t

and,

price_{t-1} = price per common share at the end of year t-1.

$Beta_{i,t}$ = a measure of risk for company i computed from a five year running average from t-1 to t-5. (The responsiveness of the return on firm i's security when there is a one unit change in the return on the market portfolio.)

Manuf. = a dummy variable = 1 for those firms classified in the manufacturing group, and 0 otherwise.

Retail = a dummy variable = 1 for those firms classified in the retail group, and = 0 otherwise.

Finl. = a dummy variable = 1 for those firms classified in the financial group, and = 0 otherwise.

Ind. M. = a dummy variable = 1 for those firms classified in the industrial manufacturing group, and = 0 otherwise.

D_1 = a dummy variable = 1 for companies which declared perquisites greater than $0, and = 0 otherwise.

D_2 = a dummy variable = 1 for companies which declared $0 prequisites and = 0 otherwise.

D_3	= a dummy variable	= -1 if year 1976 or 1977 = +1 if year 1979 or 1980 = 0 otherwise	Conditional on the company belonging to Code 1 (Perquisites > $0)
D_4	= a dummy variable	= -1 if year 1976 or 1977 = +1 if year 1979 or 1980 = 0 otherwise	Conditional on the company belonging to Code 2 (Perquisites > $0)

$U_{i,t}$ = the disturbance term for the regression of company i in the year t.

CPI_t = the consumer price index at the end of year t.

The Compustat tape (1980) was used to obtain net income, sales, industry sales (industry defined as all companies with the same standard industrial classification code), and return to common stockholders. The return to common stock ratio was computed by data on year end prices and dividends per share taken from the Compustat tape.

We would expect the coefficients of the income, size measure and return on common stock to be positive. That is, as these measure increase so should compensation. The coefficient of beta is expected to be positive since we would expect, in general, the compensation of the chief executive officer to increase the higher the risk he is willing to accept. This relationship between compensation and risk depends on the risk aversion of the manager and on the risk aversion of the stockholder group as perceived by the compensation committee of the company's board of directors. The actual risk class of the company results from the chief executive's decisions and thus, may influence his compensation.

The coefficients of the industry dummy variables represent the various effects on compensation of the different industries where some industries will pay less than the average compensation and other industries will pay greater than the average compensation.

The Empirical Results

The results of the regression Model are shown in Table 10. The results are presented with the coefficients, standard errors (std. error), and both two-tailed and one-tailed significance levels (sign. level) resulting from the standard t-test. That is:

H_0: $B_i = 0$ $\qquad i = 0, \ldots, 12$

H_a: $B_i \neq 0$.

The two sided significance level is useful for evaluating the dummy-variables since we expected the coefficients to be either positive or negative. One-sided significance levels are presented for all the independent variables which have significance levels of less than 10%. None of the coefficients for the industry dummy variables resulted in significance at the 10% level using the two-tailed t-test. The results show significance for only the financial industry dummy variable under the one-sided test. It appears that financial companies tend to have a lower level of compensation that non-financial companies indicated by the negative coefficient (-31.714) which is significant at the 5.81% level. Except for the financial industry then, there appears to be no significant impact on compensation due to the particular industry in which the company operates. As a consequence, for the other regression results presented, the industry dummy variables were deleted from the regression.

The coefficient for the independent variable, size was significant at the 6.3% level. This result may have been caused by the correlation which existed between income and size. With the Fuller and Battese estimates the correlation coefficient is -.23. Thus, multicollinearity seems to exist between these two variables. This multicollinearity which exists is not disturbing since we are not attempting in this study to isolate the impact of these variables on compensation but rather we are attempting to isolate the effect of the coefficients B_{11} and B_{12}. Table 11 shows the correlation coefficients without the Fuller-Battese adjustments for the standard errors while Table 12 displays the correlation coefficients for the Fuller-Battese parameter estimates.

Notice that the coefficient for D_1 (the dummy variable representing those companies which reported perquisites greater than \$0) is not significant in either regression. D_2 (the dummy variable representing those companies which reported perquisites equal to \$0), on the other hand, is significant at the .47% and 25% level and has a negative coefficient. Compensation for this group tends to be lower than that of the group which provides perquisites.

The main hypothesis of concern is whether or not the coefficients of D_3 (B_{11}) (representing those companies with perquisites greater than \$0 adjusted by -1 for pre-disclosure period and +1 for the post-disclosure period) and D_4 (B_{12}) (representing those companies with perquisites equal to \$0 adjusted by -1 for the pre-disclosure period and +1 for the post-disclosure period) are significant. As shown in Table 10, the t-test results in significance for D_3 with a positive coefficient and no significance for D_4 with a negative coefficient. These results support the hypothesis that an increase in compensation did result after the disclosure law was passed. These results are significant even with the correction for an upward trend in the pre-disclosure to post-disclosure period. The coefficient for D_4 (B_{12}) acted as a control for "other events" which may have influenced compensation. The result of insignificant coefficient for D_4 implies that events not accounted for in the model did not influence the coefficient of D_3.

The deflated value Model was rerun without the industry dummy variables and without the size surrogate. Table 13A displays the results. Although the coefficients are slightly modified, the level of significance for D_3 and D_4, remains unchanged. The different coefficients can be attributed to multi-collinearity which existed between the variables in the regression and the variables removed from the regression. The adjusted $\overline{R}^2$ improved slightly.

Table 13B displays the regression results with the variable D_1 removed from the model. With this run both the R^2 and adjusted $\overline{R}^2$ decreased slightly but the same results ensue.

To verify the impact of the dummy variable D_2 on the dummy variable D_4, the regression was rerun without either D_1 or D_2. The results are displayed in Table 13C. D_4 is still not significant at the 10% level. And $\overline{R}^2$ has not only improved but is higher than any of the previous regression runs.

Since the error-components model adjusts for errors associated with the time-series and errors associated with cross-sectional deviations, the error remaining on the transformed regression is one of the random-error components of the regression run. The R^2 and $\overline{R}^2$ statistic is higher than that which is associated with the generalized least-square regression.

The overall empirical results support the alternative hypothesis that compensation has increased due to the joint affects of disclosure and shift in IRS taxation policy. The significant shift in compensation from before to after the perquisites disclosure requirement went into effect demonstrates that a higher level of monetary compensation existed after the disclosure law for the sample firms used and for the period studied. This result is consistent with the statement that the management perquisite disclosure requirement resulted in a higher level of management compensation expense paid by the shareholders of the corporation.

CONCLUSIONS

The SEC in its Release #6003 based the promulgation of its rule requiring the disclosure of personal benefits (perquisites) received for the five most highly compensated executive officers or directors and the officers and directors as a group on a social welfare argument. The alledged purpose: to "promote the protection of investors...and as a means of promoting better investor understanding...the expansion of (information disclosure) is a basic element in providing security holders with information with which to assess the performance of management".[19]

This study has shown that a major portion of the related costs from the disclosure of this information was borne by existing shareholders. The costs go beyond the mere compilation and printing of the information. They include the additional compensation that the executives demand to counteract the diminution of their overall utility. The ancillary benefits to the executives were always subjected to taxation under Section 61 of the Internal Revenue Code even though the IRS had a great deal of difficulty in enforcing their rule. Therefore, for all practical purposes, perquisites were non-taxable compensation prior to the SEC regulation. As a by-product of the SEC rule the enforcement of the IRS Code was shifted to the company, its officers and directors, and outside auditors. This is so because the SEC rule was made part of regulation S-K which carries with it fraud penalties. It could be conjectured that the SEC did not anticipate the effect of its rule. Or, if it did, it must have believed that the social benefit outweighted the private cost. In either case, the issuance of the SEC rule provided the opportunity to study the impact of two related government regulations.

The results of this study support the hypothesis that the joint effect of disclosure regulation and taxation of perquisites was costly to both the individual shareholders and managers. The manager consumes a lower amount of NPB and receives a higher before and after tax level of monetary compensation along with a higher risk level. Assuming that the utility of the manager remains constant, the shareholder bears the dollar cost of this additional taxation.

FIGURE 1. The Parameter ϕ.

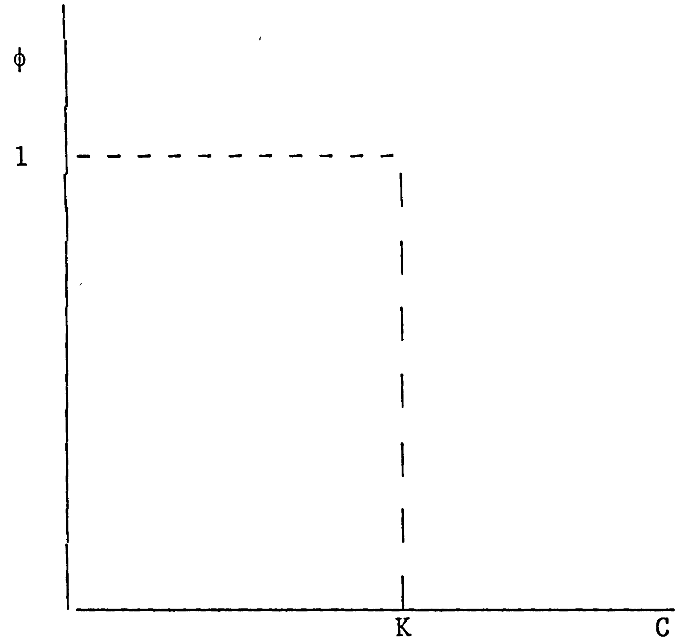

TABLE 1

Variable Definitions

A	represents the manager's utility over non-pecuniary benefits and monetary wealth.
M	represents the manager's compensation scheme where the parameters of the scheme are a decision variable for the shareholder
$H \equiv \beta T$	is the amount from the outcome of the production process which is consumed by the manager (NPB), where $0 \leq \beta < 1$.
V	represents the manager's utility from non-pecuniary benefits.
U	represents the manager's utility from monetary wealth.
T	is the outcome of the production process.
X	is the outcome reported to the shareholders.
C	represents the monitoring costs which are required to be expended by the shareholders.
K	is the fixed dollar amount of monitoring costs, determined exogenously.
k_1	is the multiplier used to reduce monitoring costs; determined exogenously.
$P \equiv \delta\beta T$	is the amount of NPB which is reported by the manager where $0 \leq \delta \leq 1$.
Ho	the level of NPB which is assessed by the shareholder via monitoring costs and disclosed NPB.
ϕ	is an operator which is determined by the level of monitoring costs.
τ	is the personal tax rate of the manager.
S	represents the shareholder's utility.

TABLE 2

TABLE OF EQUATIONS

Monitoring Cost	$C = K - k_1\delta\beta T$
Reported Outcome	$X = T - \beta T - K + k_1\delta\beta T$
Penalty Operator	$\phi = \frac{1}{K}(K - k_1\delta\beta T)$
Assessed NPB	$Ho = \delta\beta T + \frac{1}{K}(K - k_1\delta\beta T)(\beta T - \delta\beta T)$
Compensation to Manager	$M = w + a_1(T - \beta T - K + k_1\delta\beta T) - a_2(\delta\beta T + \frac{1}{K}(K - k_1\delta\beta T)(\beta T - \delta\beta T)$
After Tax Monetary Payoff to Manager	$M\tau = [w + a_1(T - \beta T - K + k_1\delta\beta T) - a_2(\delta\beta T + \frac{1}{K}(K - k_1\delta\beta T)(\beta T - \delta\beta T)](1 - \tau)$
Shareholder's Payoff	$S = T - \beta T - K + k_1\delta\beta T - [w + a_1(T - \beta T - K + k_1\delta\beta T) - a_2(\delta\beta T + \frac{1}{K}(K - k_1\delta\beta T)(\beta T - \delta\beta T))]$
After Tax Monetary Payoff to Manager when disclosed NPB are taxed	$M_p = [w + a_1(T - \beta T - K + k_1\delta\beta T) - a_2(\delta\beta T + \frac{1}{K}(K - k_1\delta\beta T)(\beta T - \delta\beta T)](1 - \tau) - \tau\delta\beta T$

TABLE 3

SCENARIO I: NO TAXATION OF NPB

Manager's Problem:

$$\underset{\{\delta,\beta\}}{\text{Max } A} = \text{Ln}(\beta T) + \text{Ln}[(w + a_1(T - \beta T - K + k_1\ \delta\beta T) - a_2(\delta\beta T + (\frac{K - k_1\delta\beta T}{K})$$
$$(\beta T - \delta\beta T)))(1 - \tau)]$$

$$\frac{\partial A}{\partial \delta} = 2a_2k_1\delta\beta T(\tau-1) + a_2k_1\beta T(1-\tau) + a_1k_1K(1-\tau) = 0$$

$$\frac{\partial A}{\partial \beta} = 2a_2k_1\ \beta T\delta^2(\tau-1) + 2a_2k_1\delta\beta T(1-\tau) + a_1k_1K\delta(1-\tau) + a_2K(\tau-1) +$$
$$a_1K(\tau-1) = 0$$

Solutions to the Manager's Problem:

$$\delta^* = \frac{1}{2} + \frac{a_1K}{2a_2\beta T}$$

$$\beta^* = -\frac{+ Z + a_1K(2k_1 - 4) - 4a_2K}{3a_2k_1T}$$

Where,

$$Z = \text{SQRT}\ (-12a_2Kk_1w + a_1a_2(K^2(32-4k_1)-12Kk_1T) +$$
$$a_1^2K^2(k_1^2 - 16k_1 + 16) + 16a_2^2K^2)$$

Shareholder's Problem:

$$\underset{\{a_1,a_2,w\}}{\text{Max } E(S)} = \overline{T} - \beta\overline{T} - K + k_1\delta\beta\overline{T} - (w+a_1(\overline{T}-\beta\overline{T}-K+k_1\delta\beta\overline{T}) - a_2(\delta\beta\overline{T}+(\frac{K-k_1\delta\beta\overline{T}}{K})(\beta\overline{T}-\delta\beta\overline{T})))$$

s.t.

(1) $\text{Ln}(\beta\overline{T}) + \text{Ln}[(w+a_1(\overline{T}-\beta\overline{T}-K+k_1\delta\beta\overline{T}-a_2(\delta\beta\overline{T}+(\frac{K-k_1\delta\beta\overline{T}}{K})(\beta\overline{T}-\delta\beta\overline{T})))(1-\tau)] = \overline{A}$

(2) $\delta^* - \frac{1}{2} - \frac{a_1K}{2a_2\beta\overline{T}} = 0$

(3) $\beta^* + (\frac{+\ E(Z) + a_1K(2k_1-4)-4a_2K}{3a_2k_1\overline{T}}) = 0$

TABLE 4

Scenario II: Taxation of NPB as Income

Manager's Problem:

$$\max_{\{\delta,\beta\}} A' = \mathrm{Ln}(\beta T) + \mathrm{Ln}[(w + a_1(T - \beta T - K + k_1 \delta\beta T) - a_2(\delta\beta T + (\frac{K - k_1\delta\beta T}{K})(\beta T - \delta\beta T)))(1 - \tau) - \tau\delta\beta T]$$

$$\frac{\partial A'}{\partial \delta} = - \delta(2a_2k_1\beta T(\tau-1)) + (a_2k_1\beta T(\tau-1) + a_1Kk_1(\tau-1) + K\tau) = 0$$

$$\frac{\partial A'}{\partial \beta} = (K\tau-K)w + ((3a_2\delta\beta^2-3a_2\delta^2\beta^2)k_1T^2 + (2a_1Kk_1\delta\beta + (2\delta\beta + (-2a_2-2a_1)\beta + a_1)K)T-a_1K^2)\tau$$
$$+ (3a_2\delta^2\beta^2-3a_2\beta^2\delta)K_1T^2 + (((2a_2+2a_1)\beta-a_1)K-2a_1Kk_1\delta\beta)T + a_1K^2 = 0$$

Solutions to the Manager's Problem:

$$\delta^{*\prime} = \frac{1}{2} + (\frac{a_1k_1K(\tau-1)+K\tau}{2a_2k_1\beta T(\tau-1)})$$

$$\beta^{*\prime} = - (\frac{+Z_1+2a_1Kk_1(1-\tau)-4a_1K(1-\tau)-4a_2K(1-\tau)-2K\tau}{3a_2k_1T(1-\tau)})$$

where,

$$Z_1 = \mathrm{SQRT}\ (a_2(Kk_1(-12\tau^2w + 24\tau w - 12w) + K^2(16\tau - 16\tau^2))$$
$$+ a_1\ (a_2(K^2(32\tau^2 + k_1(-4\tau^2 + 8\tau - 4) - 64\tau + 32) + Kk_1T\ (-12\tau^2+ 24\tau - 12))$$
$$+ K^2(k_1(2\tau^2-2\tau) - 16\tau^2 + 16\tau)) + a_1^2K^2(k_1^2(\tau^2-2\tau + 1) + 16\tau^2 + k_1$$
$$(-16\tau^2 + 32\tau - 16) - 32\tau + 16) + a_2^2K^2(16\tau^2 - 32\tau + 16) + K^2\tau^2)$$

Shareholder's Problem:

$$\max_{\{a_1,a_2,w\}} S = \overline{T} - \beta\overline{T} - K + k_1\delta\beta\overline{T} - (w+a_1(\overline{T}-\beta\overline{T}-K+k_1\delta\beta\overline{T})-a_2(\delta\beta\overline{T}+(\frac{K-k_1\delta\beta\overline{T}}{K})(\beta\overline{T}-\delta\beta\overline{T})))$$

s.t.

(1) $$\mathrm{Ln}(\beta\overline{T}) + \mathrm{Ln}[(w+a_1(\overline{T}-\beta\overline{T}-K+k_1\delta\beta\overline{T})-a_2(\delta\beta\overline{T}+(\frac{K-k_1\delta\beta\overline{T}}{K})(\beta\overline{T}-\delta\beta\overline{T})))(1-\tau)-\delta\beta\overline{T}\tau] = \overline{A}'$$

(2) $$\delta^{*\prime} - \frac{1}{2} - (\frac{a_1Kk_1(\tau-1) + K\tau}{2a_2k_1\beta\overline{T}(\tau-1)}) = 0$$

(3) $$\beta^{*\prime} + (\frac{+ E(Z_1) + 2a_1Kk_1(1-\tau) - 4a_1K(1-\tau) - 4a_2K(1-\tau)-2K\tau}{3a_2k_1\ \overline{T}\ (1-\tau)}) = 0$$

TABLE 5

EXAMPLES: SCENARIO I

EXOGENOUS VARIABLES	SHAREHOLDER'S OPTIMAL SOLUTIONS	SELECTED VARIABLE VALUES
	Case 1	
$\overline{T} = 1000$	$a_1 = .041592475$	$\beta\overline{T} = 173.59$
$\overline{A} = e^{7.5} = 1808$	$a_2 = .095840962$	$M = 17.3589$
$K = 400$	$w = 9.7624624$	$M_\tau = 10.415369$
$k_1 = .9$	$\lambda = .0096011922$	$S = 565.2821$
$\tau = .4$	$\lambda_2 = -176.50856$	$C = 243.7694$
	$Z = 145.02705$	$X = 582.64$
	$\beta = .17358938$	
	$\delta = 1$	

REALIZED SOLUTIONS

Case 2	Case 3	Case 4
$T = 950$	$T = 1050$	$T = 1050$ $\delta \equiv 1$
$A = e^{7.38} = 1604$	$A = e^{7.66} = 2115$	$A = e^{7.62} = 2031$
$Z = 147.965845$	$Z = 142.027546$	$Z = 143.659$
$\beta = .171780296$	$\beta = .176362738$	$\beta = .1752261$
$\delta = 1$	$\delta = .96870269$	$\delta \equiv 1$
$\beta T = 163.19119$	$\beta T = 185.18084$	$\beta T = 183.987$
$M = 16.32$	$M = 17.523699$	$M = 18.398756$
$M_\tau = 9.792$	$M_\tau = 10.514219$	$M_\tau = 11.039254$
$S = 523$	$S = 607.3166$	$S = 613.2025$
$C = 253$	$C = 238.55$	$C = 234.41$
$X = 533.80881$	$X = 644.2$	$X = 631.6$

TABLE 6

EXAMPLES: SCENARIO II

EXOGENOUS VARIABLES	SHAREHOLDER'S OPTIMAL SOLUTIONS	SELECTED VARIABLE VALUES
	Case 5	
$\bar{T} = 1000$	$a_1 = .74285374$	$\beta T = 63.201908$
$\bar{A} = e^{7.5} = 1808$	$a_2 = .01348166$	$M = 89.645711$
$K = 400$	$w = -350.349625$	$M_\tau = 53.78743$
$k_1 = .9$	$\lambda = .026584497$	$M_p = 28.60858$
$\tau = .4$	$\lambda_2 = -16.0818632$	$S = 503.798885$
	$Z_1 = 723.788826$	$C = 343.1183$
	$\beta = .063201908$	$X = 593.67981$
	$\delta = 1$	

REALIZED SOLUTIONS

Case 6	Case 7	Case 8
$T = 950$	$T = 1050$	$T = 1050$, $\delta \equiv 1$
$A = e^{6.5} = 674$	$A = e^{8.16} = 3491.1$	$A = e^{8.16} = 3490.9$
$Z_1 = 724.3266$	$Z_1 = 723.25065$	$Z_1 = 723.25$
$\beta = .040609397$	$\beta = .08366$	$\beta = .08363593$
$\delta = 1$	$\delta = .85684157$	$\delta \equiv 1$
$\beta T = 38.5788$	$\beta T = 87.843$	$\beta T = 87.8177$
$M = 54.834$	$M = 116.417$	$M = 124.7978$
$M_\tau = 32.9004$	$M_\tau = 69.85$	$M_\tau = 74.879$
$M_p = 17.4688$	$M_p = 39.743$	$M_p = 39.752$
$S = 491.308$	$S = 513.199$	$S = 516.42$
$C = 365.279$	$C = 332.26$	$C = 320.964$
$X = 546.142$	$X = 629.898$	$X = 641.218$

TABLE 7

EXAMPLES: SCENARIO II

EXOGENOUS VARIABLES	SHAREHOLDER'S OPTIMAL SOLUTIONS	SELECTED VARIABLE VALUES
	Case 9	
$\overline{T} = 1000$	$a_1 = .7407409$	$\beta\overline{T} = 33.974149$
$\overline{A} = e^{6.215} = 500$	$a_2 = 2.01866$ E-6	$M = 46.69511$
$K = 400$	$w = -394.7467$	$M_\tau = 28.017066$
$k_1 = .9$	$\lambda = .0505525$	$M_p = 14.7190316$
$\tau = .4$	$Z_1 = 711.113$	$S = 549.25132$
	$\beta = .033974$	$C = 370.079$
	$\delta = .97854$	$X = 595.946$

TABLE 8

CODES FOR PERQUISITE AMOUNTS DISCLOSED

Code	No. of Firms	Interpretation
1	34	Perquisites reported in years 1980, 1979 and 1978 were greater than $0.
2	54	Perquisites reported in years 1980, 1979 and 1978 were equal to $0.
3	22	Perquisites reported in 1980 were greater than $0 and equal to $0 in years 1979 and 1978.
4	56	Perquisites reported in 1980 and 1979 were greater than $0 and the amount for 1978 was not determinable.
5	4	Perquisites were greater than $0 in 1979 and equal to $0 in 1980 and in 1978 the amount was not determinable.
	170	TOTAL

TABLE 9

INDUSTRY CLASSIFICATIONS

Number of Companies	Group	Major General Industry Classifications	Standard Industrial Classified Code
48	Manufacturing	Food, Packaged Food Processors Tobacco Textile Drugs Durable Goods	2000 - 2300 2801 - 2899 3713 - 3721 5140 - 5199 7370, 9997
44	Industrial Manufacturing	Metal & Glass Containers Blast Furnaces Building Material Engines & Turbines Machinery Railroad Equipment Mechanical Measurement and Control Instruments	2950, 3000, 3221, 3270, 3310, 3334 - 3430, 3511, 3573, 3600, 3610, 3811, 3822, 4011, 4511, 5093
39	Retail	Hotels - Tourist Courts Shoes Cosmetics Household Appliances Radio - TV Auto, Parts & Accessories Retail Stores	2711, 2844, 3141, 3630 - 3652, 3714, 3816, 4811, 5311 - 5411, 5813, 5913, 6400, 7011
22	Financial	Banking Security Brokers	6021 - 6200
17	Natural Resources	Copper Ores Coal Oil and Gas Forest Products	1021, 1211, 1311, 2400, 2600, 2912, 4924
170	TOTAL		

TABLE 10

MODEL 2 (DEFLATED VALUES)

Variable	Coefficient	Std. Error	Two-Tail Sign. Level	One-Tail Sign. Level
Intercept	137.535	18.853	.0001	.0001
Income	.224	.032	.0001	.0001
Size	3.853	2.518	NS*	.063
Beta	15.315	7.230	.035	.0175
R.C.	21.297	7.574	.005	.0025
Manuf.	20.631	17.622	NS*	NS*
Finl.	-31.714	20.169	NS*	.0581
Ind. M.	14.867	17.750	NS*	NS*
Retail	20.967	18.313	NS*	NS*
D_1	10.158	12.846	NS*	NS*
D_2	-33.899	11.188	.0025	.00125
D_3	5.182	3.112	.096	.048
D_4	-.090	2.612	NS*	NS*

R^2 = .8440 N of observations = 850

$\bar{R}^2$ = .8420

*Not significant at the 10% level.

TABLE 11

DEFLATED VALUES

Unadjusted Correlation Coefficients

	INCOME	SIZE	R.C.	MANUF	RETAIL	FINL	IND.M.	BETA	D_1	D_2	D_3	D_4
INCOME	1.0000											
SIZE	.2739	1.0000										
R.C.	-.0525	-.0842	1.0000									
MANUF	-.0134	-.1336	-.0080	1.0000								
RETAIL	-.0675	.1645	-.0390	-.3407	1.0000							
FINL	-.0923	.0033	.0263	-.2415	-.2105	1.0000						
IND.M.	.1076	.0603	.0030	-.3703	-.3228	-.2288	1.0000					
BETA	-.0597	.0543	.1408	-.1583	.1242	.0310	.0632	1.0000				
D_1	-.0591	-.0760	.0527	.0812	.0546	-.1440	-.0159	.0615	1.0000			
D_2	-.1418	-.0596	-.0026	-.2021	.0190	.1879	-.0007	-.0385	-.3339	1.0000		
D_3	.0215	.0118	.0142	-.0096	.0032	.0023	.0035	-.0076	-.0123	.0041	1.0000	
D_4	.0103	-.0008	-.0172	.0000	.0000	.0000	.0000	.0307	.0000	.0000	.0000	1.0000

TABLE 12

DEFLATED VALUES

Correlation Matrix for Fuller and Battese Parameter Estimates

	INCOME	SIZE	BETA	R.C.	MANUF.	FINL	IND.M.	RETAIL	D_1	D_2	D_3	D_4
INCOME	1.0000											
SIZE	-.2325	1.0000										
BETA	-.0175	.0306	1.0000									
R.C.	-.0536	.0214	.0194	1.0000								
MANUF	.0737	-.0438	.0147	.0046	1.0000							
FINL	.1079	-.1049	-.0454	-.0067	.6262	1.0000						
IND.M.	.0353	-.1170	-.0480	.0029	.7256	.6345	1.0000					
RETAIL	.1137	-.1840	-.0666	.0044	.0793	.6271	.7128	1.0000				
D_1	.0819	.0754	-.0265	-.0209	-.0023	.0613	.0073	-.0277	1.0000			
D_2	.1247	.0673	.0277	-.0083	.1420	-.0425	.0483	.0314	.3246	1.0000		
D_3	-.0107	-.0510	.0512	.0179	.0017	.0011	.0035	.0047	-.0079	-.0054	1.0000	
D_4	.0261	-.0259	-.0414	.0539	.0022	.0062	.0053	.0094	.0003	-.0000	.2853	1.0000

Table 13A

Variables	Coefficient	Std. Error	Sig. Level
Intercept	157.031	11.799	.0001
Income	.243	.032	.0001
Beta	14.755	7.248	.0421
R.C.	20.531	7.553	.0067
D_1	13.161	13.294	NS*
D_2	-41.205	11.358	.0003
D_3	5.418	3.096	.0805
D_4	.039	2.601	NS*

$R^2 = .8440$

$\bar{R}^2 = .84289$

Table 13B

Variables	Coefficient	Std. Error	Sig. Level
Intercept	160.785	11.172	.0001
Income	.239	.032	.0001
Beta	14.950	7.245	.0394
R.C.	20.689	7.552	.0063
D_2	-45.075	10.656	.0001
D_3	5.431	3.097	.0799
D_4	.032	2.602	NS*

$R^2 = .84380$

$\bar{R}^2 = .84288$

Table 13C

Variables	Coefficient	Std. Error	Sig. Level
Intercept	144.563	10.733	.0001
Income	.261	.033	.0001
Beta	15.432	7.340	.0358
R.C.	20.421	7.550	.0070
D3	5.394	3.094	.0816
D4	.060	2.599	NS*

R2 = .8440

$\bar{R}2$ = .84327

* Not significant at the 10% level.

Appendix A
Scenario I: No Taxation of NPB Disclosed

Solution to the Manager's Problem

Using the assumption of a ln utility function, equations (5) and (6) are solved respectively for $\delta*$ and $\beta*$:

$$\text{(A1)} \quad \delta* = \frac{1}{2} + \frac{a_1 K}{2a_2\beta T}$$

$$\text{(A2)} \quad \beta* = -\frac{+ Z + a_1K(2k_1 - 4) - 4a_2K}{3a_2k_1T}$$

where,

$$Z = \text{SQRT}\ (-12a_2Kk_1w + a_1a_2(K^2(32-4k_1)-12Kk_1T) + a_1^2K^2(k_1^2 - 16k_1 + 16) + 16a_2^2K^2)$$

Solution to the Shareholder's Problem

The optimal solution for the shareholder's problem is found via the Lagrangian multiplier method. To solve the shareholder's problem, both the optimal δ and the optimal β are substituted into the shareholder's objective function and into the two constraints ($EA = \overline{A}$) and $(\frac{1}{2} + \frac{a_1K}{2a_2\beta\overline{T}} - 1 \leq 0)$.

The Lagrangian may be represented as:

$$\text{(A3)} \quad \underset{\{a_1,a_2,w\}}{\text{Max}} \quad SL = A + \lambda(EA-\overline{A}) + \lambda_2(\frac{1}{2} + \frac{a_1K}{2a_2\beta\overline{T}} - 1);$$

where SL is the constrained objective function for the shareholder and where λ is the Lagrangian multiplier of the constraint associated with the manager's expected utility level and λ_2 is the Lagrangian multiplier associated with $\delta^* \leq 1$. At optimality λ takes a positive value. It represents the marginal decrease in the shareholder's wealth for each unit increase in the manager's expected utility level. If the second constraint is binding (δ=1), λ_2 takes a negative value at optimality.

The procedure used in solving for a_1, a_2, δ, λ, and λ_2 was to obtain first order conditions (FOC) and set them equal to zero.[1] The equations which yield an optimal solution to the shareholder's problem without taxation of NPB:[2]

(A4) $$a_1^* = \frac{Z^*}{4K^2\lambda(1-\tau) - 5K\,k_1 + 4K}$$

(A5) $$a_2^* = \frac{\lambda Z^*(1-\tau)}{4K\lambda(1-\tau) - 5k_1 + 4}$$

(A6) $$w^* = -[(\lambda T(1-\tau) - 2K\lambda(1-\tau) + k_1-1)Z^* + (\lambda^2(5Kk_1(1-\tau) - 4K(1-\tau)) - 4K^2\lambda^3(1-\tau)^2)R] / [\lambda(4K(1-\tau) - 5Kk_1(1-\tau)) + 4K^2\lambda^2(1-\tau)^2]$$

(A7) $$\lambda_2^* = -[(\lambda(10Kk_1(1-\tau) - 8K(1-\tau)) - 10k_1^2 + 8k_1)\,Z^* + [\lambda^2(20\,Kk_1^2(1-\tau) - 56\,Kk_1(1-\tau) + 32K(1-\tau)) + \lambda^3(32K^2(1-\tau)^2 - 16K^2k_1(1-\tau)^2)]R$$

---

[1]The full FOC for scenarios I and II may be obtained from the author upon request.

[2]Notice that Z, the constant associated with the solution to β^* still remains on the RHS of the solutions for the variables a_1, a_2, w, λ, λ_2. To explicitly obtain the optimal solution for the desired variables the method of relaxation must be employed. The method of relaxation involves a series of iterations. The first step is to substitute a value for Z into the equations obtained for a_1, a_2, w, λ, and λ_2. The new values obtained are then substituted back into Z. The new value for Z is then substituted back into the original equations for a_1, a_2, w, λ, and λ_2. The process is continued until the value of Z coincides exactly with the value of Z obtained from substituting a_1, a_2, w, λ and λ_2 into Z (denoted as Z*).

$$+\lambda(4K^2k_1^{\,2}(1-\tau) + 32K^2k_1(1-\tau) - 32K^2(1-\tau)) -$$

$$5Kk_1^{\,3} - 36Kk_1^{\,2} + 72Kk_1 - 3K]/$$

$$[\lambda(-25Kk_1^{\,2}(1-\tau) + 40Kk_1(1-\tau) - 16K(1-\tau))$$

$$+\lambda^2(20K^2k_1(1-\tau)^2 - 16K^2(1-\tau)^2)]$$

(30) $$\lambda^* = +\left(\frac{1-k_1}{(1-\tau)R}\right)^{1/2}$$

where R is equal to $\overline{A}$.

Appendix B
Scenario II: NPB Disclosed--Taxed as Income

Solution to the Manager's Problem

The solution for the optimal δ and β (equations (16) and (17)) in Scenario II, with taxation of NPB as income, can be shown as:

$$(22) \qquad \delta^{*\prime} = \frac{1}{2} + \left(\frac{a_1 k_1 K(\tau-1) + K\tau}{2a_2 k_1 \beta T(\tau-1)}\right)$$

$$(23) \qquad \beta^{*\prime} = -\left(\frac{+ Z_1 + 2a_1 Kk_1(1-\tau) - 4a_1 K(1-\tau) - 4a_2 K(1-\tau) + 2K\tau}{3a_2 k_1 T(1-\tau)}\right)$$

where,

$$Z_1 = \text{SQRT } (a_2(Kk_1(-12\tau^2 w + 24\tau w - 12w) + K^2(16\tau - 16\tau^2))$$
$$+ a_1 \; (a_2(K^2(32\tau^2 + k_1(-4\tau^2 + 8\tau - 4) - 64\tau + 32) + Kk_1 T \; (-12\tau^2 + 24\tau - 12))$$
$$+ K^2(k_1(2\tau^2 - 2\tau) - 16\tau^2 + 16\tau)) + a_1^2 K^2(k_1^2(\tau^2 - 2\tau + 1) + 16\tau^2 + k_1$$
$$(-16\tau^2 + 32\tau - 16) - 32\tau + 16) + a_2^2 K^2(16\tau^2 - 32\tau + 16) + K^2\tau^2)$$

Solution to the Shareholder's Problem

The Lagrangian multiplier method is used to establish the first order conditions necessary to achieve an optimal solution to the shareholder's problem. To solve the shareholder's problem the optimal δ and the optimal β are substituted into the shareholder's objective function and into the two constraints ($EA = \overline{A}$) and $\left(\frac{1}{2} + \frac{a_1(1-\tau)Kk_1 + (1-\tau)K}{2a_2 \beta \overline{T} \, k_1(1-\tau)} \leq 1\right)$.

The Lagrangian may be represented as:

$$(31) \qquad \text{Max} \quad SL' = S + \lambda(EA' - \overline{A}) + \lambda_2\left(\frac{1}{2} + \frac{a_1(\tau-1)Kk_1 + K\tau}{2a_2 \beta \overline{T} \, k_1(\tau-1)} - 1\right)$$

where SL' is the shareholder's objective function for the scenario with taxation of disclosed NPB as income and where λ is the Lagrangian multiplier of the constraint associated with the manager's expected utility level and λ_2 is the Lagrangian multiplier associated with $\delta^{*'} \leq 1$. At optimality λ takes a positive value and represents the marginal decrease in the shareholder's wealth for each unit increase in the manager's expected utility level. If the second constraint is not binding ($\delta^{*'} < 1$), λ_2 takes a negative value at optimality.

The Kuhn-Tucker necessary conditions for optimality are met. These conditions are also sufficient for a unique maximum since the shareholder has a linear utility function, the manager's utility is convex and $\delta^{*'} - 1$ is linear.

The procedure used in solving the shareholder's problem in Scenario II is the same as that for Scenario I. The first order conditions (FOC) are set equal to zero and used to solve for a_1, a_2, w, λ, and λ_2. Equations which yield an optimal solution to the shareholder's problem with taxation of NPB included are:[1]

$$(33) \quad a_1^{*'} = \frac{k_1 Z_1^* + 4\lambda K^2(1-\tau)\tau - 5Kk_1\tau}{4K^2k_1\lambda(1-\tau)^2 - 5Kk_1{}^2(1-\tau) + 4Kk_1(1-\tau)}$$

$$(34) \quad a_2^{*'} = -\frac{K_1\lambda\ Z_1^* - 4K\lambda\tau}{4Kk_1\lambda\tau - 4Kk_1\lambda + 5K_1{}^2 - 4k_1}$$

$$\begin{aligned}(35) \quad w^{*'} = -\ &[((1-\tau)k_1\lambda\overline{T} - 2Kk_1\lambda(1-\tau) + k_1{}^2 - k_1)Z_1{}^* \\ &+ ((5Kk_1{}^2 - 4Kk_1)(\lambda^2(1-\tau^2)) - 4K^2k_1\lambda^3(1-\tau)^3)R \\ &+ (4K^2\lambda^2(1-\tau)^2\tau - 5(1-\tau)Kk_1\lambda\tau)\overline{T} - 4k^3\lambda^2(1-\tau)^2\tau \\ &+ 5K^2k_1\lambda\ (1-\tau)\tau + \tau Kk_1]/(4K^2k_1\lambda^2(1-\tau)^3 + K\lambda(1-\tau)^2(4k_1 - 5k_1{}^2))\end{aligned}$$

---

[1]Analogous to the previous scenario, Z_1 is a constant associated with the solution to $\beta^{*'}$.

The method of relaxation was again used to solve for the optimal values of $a^{*'}$, $a^{*'}$, $w^{*'}$, $\lambda^{*'}$ and $\lambda^{*'}$.

$$(36) \quad \lambda_2{}^{*\prime} = -\ [((1-\tau)\lambda Kk_1(10k_1-8) - 10k_1{}^3 + 8k_1{}^2)\ Z_1$$

$$+ (\lambda^3K^2k_1(1-\tau)^3(32-16k_1) + \lambda^2Kk_1(1-\tau)^2(20k_1{}^2-56k_1+32))R$$

$$+ (4(1-\tau)^2K^2k_1{}^3 + (36(1-\tau)^2 - 4(1-\tau)K^2k_1{}^2 + (24(1-\tau)^2 - 56(1-\tau)K^2k_1$$

$$+ (32(1-\tau) - 32(1-\tau)^2)K^2)\lambda$$

$$- 5Kk_1{}^4(1-\tau) + (5-41(1-\tau)Kk_1{}^3 + (72-16\tau)Kk_1{}^2$$

$$+ (-32-16)Kk_1]/(\lambda^2(1-\tau)^3K^2k_1(20k_1-16) + \lambda(1-\tau)^2Kk_1(-25k_1{}^2 + 40k_1-16))$$

$$(37) \quad \lambda^{*\prime} = \frac{-\left(\frac{k_1\tau-k_1+1}{R}\right)^{1/2}}{(\tau-1)}$$

where $R = \overline{A}'$.

FOOTNOTES

[1]See Baiman (1982) for a summary of the agency literature.

[2]Note that included in the cost of non-pecuniary benefits will be all the inefficiency cost of these activities and factors. This results from including all the marginal costs which are greater than the marginal benefits. These additional costs could be considered as internal "agency costs" where the top manager (principal) diffuses his authority to lower management (agents).

[3]This is the classic definition of an externality where the manager, acting in self-interest, infringes upon the welfare of the shareholder without incurring a commensurate cost. See for instance, Baumol (1977 p. 517) or Foster (1980).

[4]The perquisites which the manager is required to report include such things as the private use of the company's airplane, vacation lodges, apartments and automobiles. These are now taxable. Taxation of other "fringe benefits" has been postponed until December, 1983.

[5]See Ronen (1979) and McGahran (1982) for an elaboration of these points.

[6]If information symmetry exists, the moral hazard problem disappears. Where the employer can monitor all available information or there is no ex post uncertainty about the relationship between the agent's actions and the payoff, the optimal payoff scheme is a fixed wage which is a Pareto-efficient solution.

[7]Here, under an imperfectly enforceable agency relationship, the moral hazard cost may be considered as an opportunity cost to the principal when he delegates full managerial responsibility to the agent. NPB can be interpreted as the outcome of an action (expenditure), a, taken by the agent (manager), (second best solution) which deviates from the optimal action (expenditure), a^*, which the shareholder would prefer (first best solution). In the present study, NPB may be thought of as the difference in the realization resulting from the optimal action, a^*, versus the actual action, a. In other words, the action a^* will result in NPB = 0 while an action $a \neq a^*$ will results in NPB $\neq 0$.

[8]An examination of the proxy statements released by 170 sample companies for a period of 8 years prior to the disclosure regulations revealed that no firms in the sample voluntarily reported perquisites.

[9]Any information which reduces the ex post noise regarding the agent's consumption of NPB has positive value. This result is an adaptation from Shavell (1979) Holmstrom (1978), and Gonedes and Dopuch (1974, p. 59).

[10]A linear contract is assumed for tractability. Although this is not an optimal contract, it is one which is observed and consequently is descriptive of many top officer's compensation packages.

[11] If the manager's compensation depended only upon the manager's share in the firm, the marginal rate of substitution, $\frac{-V'}{U'}$, reduces to the Jensen and Mecklin (1976, p. 321) condition $\frac{-V'}{U'} = a_1$. The results derived here differ since the model explicitly allows for disclosure and monitoring.

[12] These equations and the examples presented in a later section were solved with the aid of MACSYMA, a program for symbolic manipulation developed by the Mathlab Group of the MIT Laboratory for Computer Science (Project MAC).

[13] When proportionately larger dollar amounts are utilized the results are the same.

[14] By increasing the incentive for manager's to disclose via k_1 the shareholder will share a larger percentage of the output of the firm. These changes in the monitoring cost parameters may be needed to offset the manager's incentive not to disclose due to taxes. This may be the situation since, in a more realistic case, the SEC disclosure requirement would most likely shift the monitoring cost parameters. In this instance, the magnitudes will change but not the overall results.

[15] An analysis of the chief executive's compensation, contained in the proxy statements, over the period 1970 through 1980 indicated that a pattern existed which was in favor of accepting the alternative hypothesis (a significant change in compensation from the pre-disclosure period to the post disclosure period exists). This pattern seemed to be the result of two properties of management contracts. First, in the early seventies, the comensation contract period extended for two or three years without adjustments for inflation. That is, a constant dollar amount was found to exist over a three year period for 42 out of the 179 firms or approximately 25% of the sample. Second, the percentage of companies paying bonuses has increased over this period. Studies by Mruk and Giardina titled Executive Compensation, published by the Financial Executives Institute, show that for the companies included in their study, 57% paid bonuses to the chief financial officer in their 1971-1972 report while this number increased to 69% in their 1975-1976 report and to 75% in their 1979 report. Bonus-paying companies showed consistently higher compensation for the chief executive officer than non-bonus paying companies. And, since compensation as defined in this study includes bonuses, an upward bias exists over time. In addition, the contractual period itself may influence the results of any study on compensation. However, with 179 companies in the sample it is not likely to have the majority of companies renegotiating contracts during the same period of time or over the same length of time.

[16] APB Opinion No. 25 does not consider the granting of qualified stock options (market price of the stock equals the option (exercise) price at the date of the grant are equal) as compensation expense. However, nonqualified stock options may result in a deferred compensation expense which is amortized over the length of the executive's service (e.g., benefit period for the company).

[17]Madala, G. S., Econometrics, McGraw-Hill Book Company, 1977, pp. 198-201.

[18]To utilize the dummy variable method 175 dummy variables would have to be constructed for this study which was computationally unmanageable by standard regression packages.

[19]Securities Act Release No. 6003, December 4, 1978, Commerce Clearing House, p. 2212.

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