Value Maximization and Earnings Management Via Accounting Techniques

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Comments welcome

1. Introduction

Consider the set of accounting techniques now used by some firm. Under what conditions should this set be modified in some way? Presumably a change in "generally accepted accounting principles" (GAAP) that makes some aspects of a firm's existing procedures "unacceptable" would warrant a modification. And some substantive economic changes may induce a firm to modify its accounting techniques, subject to the constraints of GAAP.* Are there additional reasons for which firms' managements might make accounting changes? Gordon (1964) suggested the additional reason that seems to have attracted the most attention, viz, "earnings management" or "income smoothing." Basically, Gordon depicted managers as pursuing value maximization, because of links between their total compensation and the values of their firms. Gordon also argued that security holders prefer firms with "smoother" (i.e., less variable) income numbers. Thus, Gordon concluded that managers will be motivated to "manage" their accounting techniques so as to report "smooth" income numbers -- even if that implies making changes in techniques that are not motivated by substantive economic factors. The hypothesis that managers behave as if they are doing these things has come to be known as the "income smoothing" or "earnings management" hypothesis.

Despite the extensive literature on this hypothesis,** few attempts have been made to reconcile Gordon's assertions with some basics of economic theory. Nor is it clear that all of the assumptions lurking behind Gordon's

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*For example, technological changes that affect the service characteristics of durable capital may motivate changes in depreciation techniques. Or changes in the probability of collecting on accounts receivables may induce a firm to switch its basis of revenue recognition from, say, delivery to collection.

**For a survey of this literature, see Ronen and Sadan [1981].

arguments have been identified. In the end, Gordon effectively asserted that managers pursue income smoothing and that this is consistent with maximizing the value of their firms. But the optimality of income smoothing, conditional on the objective of value maximization, was not proven. Indeed, even the feasibility of income smoothing has been questioned.*

Some other seemingly basic aspects of the conventional income smoothing scenario have also been given inadequate attention. Note, for example, that a characterization of the market for information is rarely included in that scenario. Do investors face the same information-production costs and opportunities as do managers? If so, then "earnings management" (to the extent not justified by substantive economic factors) will be successful if investors fail to incorporate the knowledge of earnings management into their pricing of firms securities -- i.e., if the capital market is not efficient. Yet, available empirical evidence renders capital market inefficiency a seemingly inadequate description. This brings us back to the implicit assumptions on the market for information.

Barnea, et al [1976], after considering the implications of capital market efficiency, tried to exploit an approach based on "signaling," which has received much attention in the information economics literature. They took capital market efficiency as a given and suggested that earnings management is motivated by managers' attempts to provide "signals" to those outside the firm. The motivation for this is partially due to an asymmetry in the market for information. In short, managers information-production costs and opportunities are, in some sense, superior to those of outside investors. "Signaling" is an attempt by managers to supply information to

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*See Ball and Watts [1972] and for some insights on the issues that are relevant to feasibility see Gonedes [1972].

outsiders, because it is in their interest to do so.* Of course, this requires that there be an unambiguous signal. And that seems to be the problem with the Barnea, et. al., story. Most smoothing mechanisms that have been suggested (including the one considered by Barnea, et. al.) do not seem to supply such numbers -- by, for example, reporting what income numbers would have been observed in the absence of earnings management. Indeed, it is really not clear that any manager openly admits that he is consciously "managing" earnings numbers. Thus, there may be no clearcut signal of the sort considered by, e.g., Spence [1974]. Moreover, we really have no theoretical model that rigorously demonstrates the optimality of signaling for managers behaving in the way contemplated by Gordon's smoothing hypothesis.

Another limitation of the existing smoothing literature is its treatment of GAAP. In general, GAAP constitutes one set of constraints on managerial decisions induced by earnings management objectives. But, with one possible exception, the implications of these constraints are never developed. The possible exception is Copeland [1968]. He recognizes that GAAP constrains earnings management actions. Yet, he does not pursue the implications of his observation.

This paper attempts to remedy some of the problems noted above by providing a formal analysis of "earnings management." Contrary to what is often claimed, we shall find that attempts to reduce earnings variability need not be optimal, conditional on a seemingly conventional scenario of "earnings management." In general, value maximizing by managers may lead to reported numbers that are either more or less variable than what would otherwise be reported.

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*Some of the self-serving properties of signalling are discussed by, eg, Spence [1974] and Ross [1977].

We begin with a discussion of some substantive assumptions. Technical details and formal results are provided and discussed in Section 3. Basic implications are considered in Section 4.

2. Remarks on Substantive Assumptions

We shall be dealing with a scenario wherein managements alter the reported values of accounting numbers for the purpose of altering investors' assessment about firms' values.* And we shall presume that managements induce such altered inferences even though they are not justified by substantive economic characteristics of their firms. This seems to capture the essence of what is conventionally meant by, e.g., "income smoothing" and "earnings management." In particular, it is consistent with the view that "income management" is not something that managements would want to disclose. If the altered inferences of investors were justified by firms' substantive economic attributes, there would be no obvious reason to maintain secrecy.

We shall assume that this secrecy can be maintained because of an extreme and lasting asymmetry of information insofar as managements and investors are concerned. A discussion of smoothing -- as conceived here -- seems to make little sense unless some kind of informational asymmetry is assumed. In any event, we shall assume that investors cannot distinguish between smoothing and nonsmoothing firms. Note that this does not mean that investors treat smoothing as something that occurs with probability zero. They may assign a nonzero probability to smoothing. But they can never determine, with probability one, whether any particular firm does or does not smooth. As far as inferred probability distributions are concerned, the best that investors

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*This can be accomplished via appropriate selections of accounting techniques or appropriate selection of the methods of applying such techniques. Either route may be used in pursuing "earnings management."

can do is to use the marginal distributions implied by their inferred distributions conditional on smoothing (nonsmoothing) and their prior probabilities of smoothing (nonsmoothing).*

Of course, if investors view observed accounting numbers as uninformative types of sample evidence, then altered values of accounting numbers would be irrelevant insofar as firms' values are concerned. Thus, we shall assume that investors treat observed values of accounting numbers as types of informative sample evidence.

Related to the above assumption is our assumption about what management knows about the effect of reported values of accounting numbers on firms' equilibrium values. We already assumed that managements' alterations of accounting numbers are for the purpose of altering investors' assessments of firms' values. Consistent with this, we shall assume that managements know how firms' values are affected by sample evidence on accounting numbers.

Without some restrictions on managements' latitude of choice, analyses of "smoothing" can lead to some ridiculous results. E.g., they can imply the reporting of values that are so extreme that they lack credibility. And, some such reported values will be "infeasible" because they can be produced only via violations of the limits implied by generally accepted accounting

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*Suppose, for example, that each investor entertains two possibilities: that each firm does or does not pursue "earnings management." And suppose that each investor assesses a distribution function of some firm's value at time $t + 1$, $\tilde{V}_{t+1}$, conditional on information available at time t, I_t, and on each of the possibilities: smoothing, S, and no smoothing, NS. Assume that the prior probabilities, at time t, of the latter possibilities are, respectively, P(S) and P(NS). Then the distribution function used to establish a period t equilibrium value of this firm is given by:

$$F(V_{t+1}|I_t) = F(V_{t+1}|I_t, S)P(S) + F(V_{t+1}|I_t, NS)P(NS) .$$

procedures (GAAP).* We shall capture some aspects of these restrictions -- particularly their exclusion of "extreme" values -- by imposing upper and lower bounds on the reported values of accounting numbers. These bounds need not be time invariant. Moreover, they need not be separable functions of restrictions implied by credibility issues and those implied by GAAP.

Many presentations of income smoothing stories seem to have a multiperiod optimization perspective -- at least at the outset. This perspective seems to get quickly lost insofar as empirical work (and even some theoretical work) is concerned. In any event, even if a multiperiod perspective is adopted, behavior that evolves as if it is based on single-period optimization cannot be ruled out. Some sufficient conditions for such a result are presented by Fama [1977]. These (and other) sufficient conditions play no critical role in our analysis. Thus, we shall assume directly that managements' and investors' decisions can be viewed as if they evolve according to the single-period (or myopic) framework specified below.

Additional assumptions will be identified below, as we specify our formal model.

3. Formalities

We assume that managements alter values of accounting numbers in order to maximize the values of their firms. Conditional on available information (which includes previously reported values of accounting numbers), a management's decision variables consist of the currently reported values of accounting numbers. Consistent with the bulk of the "smoothing" literature,

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*We are not claiming that GAAP are explicitly expressed in terms of lower and upper bounds. We are claiming that GAAP can be viewed as implying such bounds. In some cases, the lower and upper bounds for a given number may be equal.

we shall focus on one accounting number: income. Let the value of firm i at time t conditional on reported income for period t, $\tilde{Y}_t = Y_t$, be denoted by $V_{it}(Y_t)$.* Conditional on the Sharpe-Lintner version of the single-period two parameter asset pricing model, we have:

$$(1) \qquad V_{it}(Y_t) = (1 + R_f)^{-1}\left[E(\tilde{V}_{it+1}|Y_t) - \lambda_t \, Cov(\tilde{V}_{it+1}, \tilde{V}_{mt+1}|Y_t)\right]$$

where $\tilde{V}_{mt}$ is the value of the market portfolio at time t and λ_t is the market price per unit of risk at time t.

Since we are assuming that management knows how its firm's value is affected by the reported value of income, the values of $E(\tilde{V}_{it+1}|Y_t)$ and $Cov(\tilde{V}_{it+1}, \tilde{V}_{mt+1}|Y_t)$ are known to management.

Let $\tilde{X}_t$ denote the value of income that would be reported in the absence of "smoothing" and let the ultimately reported value be re-expressed as a function, $Y_t(\tilde{X}_t)$, of X_t. The restrictions on managements' latitude of choice impose bounds on the value of $Y_t(\tilde{X}_t) - \tilde{X}_t$. Conditional on information available as of time t, we shall assume that the bounds for period t's report are functions of $\tilde{X}_t$. Denote the lower and upper bounds on $Y_t(\tilde{X}_t) - \tilde{X}_t$ by, respectively, $L(\tilde{X}_t)$ and $U(\tilde{X}_t)$. Thus, for $\tilde{X}_t = X_t$, we require:

$$(2) \qquad Y_t(X_t) - X_t \in [L(X_t), U(X_t)] \ .$$

The influence of past information, upon which the bounds' values are also conditional, is not noted explicitly -- because past numbers are not decision variables as of time t.

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*For convenience, the subscript i on $\tilde{Y}_t$ is omitted. The same applies to $\tilde{X}_t$, introduced below.

Note that the above formulation allows for the possibility $L(X_t) = U(X_t) = \sqrt{Var(\tilde{X}_t | X_t, X_{t-1}, X_{t-2}, \ldots)}$. This specification of the bounds on $Y_t(X_t) - X_t$ seems consistent with a restriction due primarily to credibility issues, in the sense that reported values should not be "too extreme" relative to the variability of the underlying stochastic process (assessed conditionally on $\tilde{X}_t = X_t$ and previously reported values).

Expression (1) requires that we specify a relationship between the earnings number $\tilde{Y}_t$ and the end-of-period values $\tilde{V}_{it+1}$ and $\tilde{V}_{mt+1}$. We shall assume that the joint distribution function of $(\tilde{V}_{it+1}, \tilde{V}_{mt+1}, \tilde{Y}_t)$ is trivariate normal. This implies that

$$E(\tilde{V}_{it+1} | Y_t) = E(\tilde{V}_{it+1}) + \left[\frac{Cov(\tilde{Y}_t, \tilde{V}_{it+1})}{Var(\tilde{Y}_t)}\right][Y_t - E(\tilde{Y}_t)]$$

$$Var\begin{pmatrix} \tilde{V}_{it+1} \\ \tilde{V}_{mt+1} \end{pmatrix} \Bigg| Y_t = \begin{pmatrix} Var(\tilde{V}_{it+1}), & Cov(\tilde{V}_{it+1}, \tilde{V}_{mt+1}) \\ Cov(\tilde{V}_{it+1}, \tilde{V}_{mt+1}), & Var(\tilde{V}_{mt+1}) \end{pmatrix}$$

$$= \frac{1}{Var(Y_t)} \begin{pmatrix} Cov(\tilde{V}_{it+1}, \tilde{Y}_t) \\ Cov(\tilde{V}_{mt+1}, \tilde{Y}_t) \end{pmatrix} (Cov(\tilde{Y}_t, \tilde{V}_{it+1}), Cov(\tilde{Y}_t, \tilde{V}_{mt+1}))$$

$$= \begin{pmatrix} Var(\tilde{V}_{it+1} | Y_t) & Cov(\tilde{V}_{mt+1}, \tilde{V}_{it+1} | Y_t) \\ Cov(\tilde{V}_{mt+1}, \tilde{V}_{it+1} | Y_t) & Var(\tilde{V}_{mt+1} | Y_t) \end{pmatrix}$$

see, e.g., Anderson [1958; p. 28].

Let $\sigma_{iy} \equiv Cov(\tilde{V}_i, \tilde{Y})$ and $\sigma_{my} \equiv Cov(\tilde{V}_m, \tilde{Y})$, with similar notation for other variances and covariances regarding $\tilde{V}_i$, $\tilde{V}_m$, and $\tilde{Y}$, after dropping the time subscript (t). Then, from the mathematics of trivariate normality, one

gets:

$$\mathrm{Var}\begin{pmatrix}\tilde{V}_{it+1}\\ \tilde{V}_{mt+1}\end{pmatrix} \Big| Y_t\Big) = \begin{pmatrix}\sigma_{ii} - \frac{\sigma_{iy}^2}{\sigma_{yy}}, & \sigma_{im} - \frac{\sigma_{iy}\sigma_{ym}}{\sigma_{yy}}\\ \sigma_{mi} - \frac{\sigma_{my}\sigma_{yi}}{\sigma_{yy}}, & \sigma_{mm} - \frac{\sigma_{my}^2}{\sigma_{yy}}\end{pmatrix}$$

Note, from the preceding expression, that the variance/covariance matrix of $(\tilde{V}_{it+1}, \tilde{V}_{mt+1})$ conditional on $\tilde{Y}_t = Y_t$ is independent of Y_t, for each value of $\tilde{Y}_t$. This is an immediate implication of our assuming that the trivariate distribution of $(\tilde{V}_{it+1}, \tilde{V}_{mt+1}, \tilde{Y}_t)$ assessed as of time t -- before the realized value of $\tilde{Y}_t$ is announced -- is trivariate normal. After the realized value of $\tilde{Y}_t$ is announced, the bivariate distribution of $(\tilde{V}_{it+1}, \tilde{V}_{mt+1})$ is the conditional distribution implied by that trivariate distribution. This result plays an important role in our subsequent analysis.

Since we shall be interested in managements' selections of values of $\tilde{Y}_t$, conditional on its (private) information about the current value of $\tilde{X}_t$ (as well as the past values of $\tilde{X}_t$), the above conditional moments are the relevant parameters insofar as optimal "earnings management" is concerned.

Summing up, the task facing management is to select a value of Y_t so as to

$$\text{Max} \quad V_{it}(Y_t) = (1+R_f)\,[E(\tilde{V}_{it+1}|Y_t) - \lambda_t\, \mathrm{Cov}(\tilde{V}_{it+1}, \tilde{V}_{mt+1}|Y_t)]$$

Subject to

$$Y_t(X_t) - X_t \varepsilon [L(X_t),\ U(X_t)]$$

Conditional on our trivariate normality assumption, management's decisions do not alter $\mathrm{Cov}(\tilde{V}_{it+1}, \tilde{V}_{mt+1}|Y_t)$, $\mathrm{Cov}(V_{it+1}, Y_t)$, or $\mathrm{Var}(\tilde{Y}_t)$ -- where the latter values are for the parameters of <u>outsiders'</u> assessed distribution function of $(\tilde{V}_{it+1}, \tilde{V}_{mt+1})$ conditional on $\tilde{Y}_t = Y_t$. We

have, therefore,

$$\frac{\partial V_{it}}{\partial Y_t} = (1 + R_t)^{-1} \frac{\partial E(\tilde{V}_{it+1} | Y_t)}{\partial Y_t} = (1 + R_f)^{-1} (\sigma_{iy}/\sigma_{yy})$$

and therefore,

$$\text{sgn}\left(\frac{\partial V_{it}}{\partial Y_t}\right) = \text{sgn}(\sigma_{iy}).$$

This implies that the optimal value of $Y_t(X_t)$ is given by the corner solution

$$Y_t(X_t) - X_t = \begin{cases} L(X_t) \text{ if } \sigma_{iy} < 0 \\ U(X_t) \text{ if } \sigma_{iy} > 0 \end{cases}$$

This has an interesting implication for the characteristics of the process $\{\tilde{Y}_t\}$ relative to those of $\{\tilde{X}_t\}$. From the above, investors "see" the process given by,

$$\tilde{Y}_t = \tilde{X}_t + U(\tilde{X}_t)$$

for $\sigma_{iy} > 0$. For any given t, we have

$$\text{Var } (\tilde{Y}_t) = \text{Var } (\tilde{X}_t) + \text{Var } (U(\tilde{X}_t)) + 2\text{Cov}(\tilde{X}_t, U(\tilde{X}_t)).$$

And, therefore, Var $(\tilde{Y}_t)$ > Var $(\tilde{X}_t)$ if Var $(U(\tilde{X}_t))$ + $2\text{Cov}(\tilde{X}_t, U(\tilde{X}_t)) > 0$. The latter inequality is obviously satisfied when $\text{Cov}(\tilde{X}_t, U(\tilde{X}_t)) > 0$, which seems plausible in view of the considerations represented by the upper bound $U(\tilde{X}_t)$. It is also satisified when $\text{Cov}(\tilde{X}_t, U(\tilde{X}_t)) < 0$ so long as it is not smaller (more negative) than the quantity: - 1/2 Var $(U(\tilde{X}_t))$.

In any event, the basic point is that the allegedly "smoothed" number $\tilde{Y}_t$, has <u>more</u> variability than the "unsmoothed" number, $\tilde{X}_t$, under conditions that are consistent with the crux of most stories about "income smoothing" or "earnings management."

Note that the stationarity of σ_{iy} implies that each firm's reported income number will be characterized <u>either</u> by $\tilde{Y}_t = \tilde{X}_t + L(\tilde{X}_t)$ or by $\tilde{Y}_t = \tilde{X}_t + U(\tilde{X}_t)$, where, of course, we permit $L(\tilde{X}_t) < 0$. Therefore, the

variance for each firm's reported number will be given either by

$$\text{Var}\ (\tilde{Y}_t) = \text{Var}\ (\tilde{X}_t) + \text{Var}\ (U(\tilde{X}_t)) + 2\ \text{Cov}\ (\tilde{X}_t,\ U(\tilde{X}_t))$$

or by

$$\text{Var}\ (\tilde{Y}_t) = \text{Var}\ (\tilde{X}_t) + \text{Var}\ (L(\tilde{X}_t)) + 2\ \text{Cov}(\tilde{X}_t,\ L(\tilde{X}_t))$$

for all t.

If lower (higher) values of $\tilde{X}_t$ imply lower (higher) values of the lower bound, $L(\tilde{X}_t)$ -- just as one might expect lower (higher) values of $\tilde{X}_t$ to induce lower (higher) values of $U(\tilde{X}_t)$ -- then $\text{Cov}\ (\tilde{X}_t,\ L(\tilde{X}_t)) > 0$. In this case of positive correlation between each bound and $\tilde{X}_t$, we shall have $\text{Var}\ (\tilde{Y}_t) > \text{Var}\ (\tilde{X}_t)$ for both $\sigma_{iy} < 0$ and $\sigma_{iy} > 0$. Thus, in neither case does the conventional smoothing story accurately predict the relationship between $\text{Var}\ (\tilde{Y}_t)$ and $\text{Var}\ (\tilde{X}_t)$.

Of course, the conditions identified above may not hold. We could have, as examples, $\text{Cov}(\tilde{X}_t,\ U(\tilde{X}_t)) < -\frac{1}{2}\text{Var}(U(\tilde{X}_t))$ or $\text{Cov}(\tilde{X}_t,\ L(\tilde{X}_t)) < 0$. In these cases, value maximizing behavior by managers leads to the more common prediction of the "earnings management" story, viz., $\text{Var}(\tilde{Y}_t) < \text{Var}(\tilde{X}_t)$. But it is important to note that this is not the only thing implied by value maximizing behavior, as our previous remarks indicate.

4. Implications and Limitations

Some implications of our work can be highlighted by briefly comparing it to some recent papers on income smoothing. We chose two seemingly representative papers, at least insofar as basic underpinnings are concerned. They are: Beidleman [1973] and Barnea, Ronen, and Sadan [1976].

According to Beidleman, the pursuit of "income smoothing" with respect to external reports is consistent with value maximization (p. 654). And he seems

to have concluded that reported income numbers conditional on earnings management will be less variable than they would otherwise be (pp. 654 - 655). The exceptions that he recognizes are "unlikely" cases in which "smoothing may not be possible" because of nonstationarities (esp., trends of earnings numbers (p. 655)).

Our results -- which are based explicitly on value maximization -- point to a fundamental deficiency of Beidleman's work on "income management" (as well as other works). Our analysis indicates quite clearly that value maximization by management via adjustments of reported earnings numbers need not lead to reduced variability of reported numbers (relative to what would have prevailed in the absence of earnings management). Increased variability of reported numbers can also be consistent with value maximization. Indeed, Beidleman himself concluded that not all firms adopt actions that reduce the variability of reported earnings (p. 666). Given our results, this is not inconsistent with value maximization by management.

The Barnea, Ronen, and Sadan (BRS) paper attempts to provide a more general conceptual framework for earnings management. They too view earnings management as a form of "manipulatory time sequencing" (p.). But they raise the possibility of earnings managements' being a form of "signaling." (See, e.g., Spence [1974] for a formal conceptualization of "signaling.") And they imply that such signaling -- which is presumed to be in managements' self-interest -- will reduce the variability of reported earnings numbers, relative to what it would otherwise be.

Clearly, the introduction of "signaling" into the earnings management story does not, by itself, rescue the claim of reduced earnings variability. If earnings management is indeed a form of "manipulatory" reporting -- in particular, one that is not disclosed or observed -- then it cannot provide a

basis for "signaling." In a formal sense, outsiders do not have an identifiable signal in this scenario. Secondly, the BRS paper still has the same basic deficiency detected in the Beidleman paper: it does not demonstrate that optimal earnings management (whether or not motivated by "signaling" objectives) implies reduced variability of reported earnings numbers. It is clear from our analytical results that optimal reporting behavior by management may imply either increased or decreased variability.

The theoretical underpinnings of the "earnings management" literature appear to be quite meager. In this respect, the message of our paper is essentially the same as that of Gonedes [1972; p. 571]: "One characteristic of the available studies of the income-smoothing hypothesis is a lack of rigorously derived explicit statements about what one should expect if, in fact, income-smoothing is practiced." This lack is due primarily to a failure to determine what, if any, form of earnings management is consistent with optimal managerial behavior, conditional on the exogenous stochastic processes facing management.

Of course, our own treatment of earnings management has some limitations of its own. First, it relies heavily on value maximizing behavior by those who ultimately decide what values of accounting numbers will be reported by a firm. In this regard, we assume that these persons have rational expectations insofar as the behavior of their subordinates is concerned. I.e., we presume that subordinates' incentives and opportunities to "manage" earnings are taken into account when values of accounting numbers are received via internal reports. In short, departures from value maximization by subordinates do not, by themselves, imply that our framework is inadequate.

Nevertheless, some of the reasons for which subordinates depart from value maximizing behavior may apply to their superiors as well. And that

could spell trouble for our analysis. For example, the types of contracts considered by Healy [1983]--which appear to tie parts of managers' total compensation to values of accounting numbers--may motivate such departures. But one can easily think of countervailing forces that induce value maximization even in this setting. Threats of takeovers induced by attempted departures from value maximization constitute one such force. Monitoring of subordinates' behavior by forms of internal auditing are others.* In short, the extent to which value maximization--on an "as if" basis--is descriptively adequate, is an unsettled issue.

A second seemingly restrictive part of our analysis pertains to the effects of earnings management. We assumed that the substantive economic aspects of a firm--such as a firm's production-investment and financing decisions--are unaffected by earnings management. Only the equilibrium value of the firm is affected, because investors' inferences about the firm's future values are affected. Indeed, we defined earnings management as an alteration of accounting numbers' reported values that is supposed to induce changes in investors' (i.e., "outsiders'") inferences independently of the substantive characteristics of firms. This, in our view, seems to be consistent with the extant literature on "earnings management." But, of course, it is not the only one. And for some purposes--such as general equilibrium analyses--it may not be the most productive one.

For example, one might argue that an alteration of investors' inferences via earnings management may lead to changes in investors' risk assessments. This, in turn, may lead to changes in the terms of alternative financial

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*Healy assumes that information asymmetries are sufficiently strong to preclude detection of departures from value maximization by subordinates. See, e.g., Healy [1983; pp. 10-11].

arrangements faced by a firm, such as changes in explicit monetary costs and monitoring arrangements. And such changes in financing arrangements can, in a world of asymmetric information, induce changes in production-investment decisions. These types of changes are not recognized by our analysis.

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