

THEORIES OF EARNINGS-ANNOUNCEMENT TIMING

Brett TRUEEMAN*

University of California, Berkeley, CA 94720, USA

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Recent empirical research has found that when a firm releases its earnings report earlier than expected, its stock price rises, on average, while if the report is late, its stock price declines. The analysis here focuses on two alternative explanations for these findings, each based on the premise that some firms with unfavorable earnings increase their reported income through earnings management. In one case earnings management necessitates a reporting delay, while in the other a delay is caused by the manager's desire to first observe other firms' earnings. Both cases lead to market reactions consistent with the empirical findings.

1. Introduction

Recent research by Chambers and Penman (1984) and Kross and Schroeder (1984), among others, find that if a firm releases its earnings report earlier than expected, its stock price rises, on average, while if the report is late, its stock price declines.¹ Additionally, Kross and Schroeder presented evidence on the extent to which this result is driven by good news being released before bad. They controlled for the news content of the announcements by dividing their sample into two groups of firms – one for which earnings were categorized as ‘moderately’ higher than expected (where the expectation was calculated using a time-series model based on past earnings) and another for which they were ‘moderately’ lower. For each subgroup they again found that early announcements were associated with higher market returns than were late announcements. This result suggests that, holding constant the unex-

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¹Chambers and Penman assume the expected announcement date for any quarter is equal to the actual announcement date of the same quarter in the previous fiscal year. Kross and Schroeder calculate the expected announcement date using a time-series model based on the actual announcement dates of the previous quarter and of the same quarter in the previous fiscal year.

pected earnings, the earlier the announcement is made, the more positive the market reaction.

Two theories directed at explaining the timing of earnings announcements and the associated market reactions can be found in the literature. The first is that management tends to delay the release of bad news. Among possible reasons for such a delay is to give management time to complete a planned sale of securities before the bad news is announced. Consistent with the empirical findings, this behavior implies that the average market response to an early (late) earnings announcement should be positive (negative), since, on average, good news is expected to be released before bad. However, there are several problems with this behavior as being a fully satisfactory explanation for the timing of earnings announcements. First, since firms' earnings reports are almost always disclosed within a few days of the expected release date (for quarterly announcements) or within a few weeks of it (for annual announcements), intentionally delaying the release of bad news could have, at most, only very short-lived effects on market prices and so, in many cases, be of little value to managers. Second, the existence of prohibitions on insider trading is likely to deter managers from delaying the announcement of bad news if the reason for doing so is to sell shares in the interim. Third, this behavior, by itself, does not imply that for a given level of unexpected earnings, early announcements are accompanied by more positive market reactions than are late announcements, contrary to the finding of Kross and Schroeder.

Another theory often proposed to account for the timing of earnings announcements is that a longer period of time is required to audit earnings reports reflecting bad news, delaying their disclosure relative to those containing good news.² The presence of such a delay implies that good news is, on average, released before bad, and so is consistent with the empirical finding that the average market response to an early (late) earnings announcement is positive (negative). By itself, however, it too does not lead to the prediction that, holding fixed the unexpected earnings, early announcements are received more favorably by the market than are late ones.

Two avenues of research have the potential of resolving the disparity between the documented empirical findings and the existing theories of earnings-announcement timing. One is a repetition of the tests of Kross and Schroeder using a more accurate measure of earnings expectations, such as analysts' forecasts, and a more precise control for the news content of the earnings announcements. Another is an exploration of other explanations for the existing empirical findings. There are two objectives of this paper: (a) to present two alternative theories of earnings announcement timing and, in

²While quarterly reports do not undergo an external audit, unlike annual reports, they are still subject to an internal audit.

particular, to determine the extent to which each is consistent with the empirical findings, and (b) to stimulate additional empirical and theoretical research in this area.

One proposed explanation is that managers of firms with unfavorable earnings news attempt to shift the recognition of income across periods, so as to increase the current period's reported income, but this action takes time and causes a delay in the earnings announcement. Among reasons for a manager to engage in such earnings management is to increase the post-announcement market price of the firm's shares and so increase the proceeds from a planned sale of shares. A second potential explanation for earnings-announcement timing, also based on a desire to manage income but not requiring that such action, by itself, cause a delay in the earnings announcement, is that a manager contemplating earnings management intentionally delays the report under certain circumstances. As shown below, he would do so if there are costs to managing earnings and if there exists the possibility that information will be announced around the time of the firm's earnings report which could affect the manager's assessment of whether income management is profitable. Such an announcement is one that gives investors in the marketplace information which is correlated with the firm's underlying economic earnings and so enables them to better judge whether its manager has engaged in income management. An example of such an announcement is the release of earnings by others in the firm's industry. If the manager reports the firm's earnings before this announcement, then he must decide whether to manage earnings, and incur the associated costs, without full knowledge of the information to be released. However, if the manager waits, then he can use this information in deciding whether the expected gain from income management is worth the cost.

Each of these proposed explanations has the attribute of generating predictions consistent with the empirical findings. Each also provides independent empirical predictions which have the potential of testing its validity. It must be noted, however, that the results derived are sensitive to the assumptions made about the goal of the manager in deciding whether to manage earnings; under some alternative assumptions they would not be expected to hold. For those cases, then, the model developed here would not lead to predictions consistent with the empirical findings. This point is discussed further in section 5.

The plan of this paper is as follows. In the next section the economic setting is described. The equilibrium that arises in the case where income management necessitates a delay in the announcement of earnings is described in section 3. Empirical implications are also derived. In section 4 is a similar analysis for the case where income management does not, by itself, cause a delay in the earnings report. In section 5 is a discussion of limitations and extensions of these analyses. A summary section concludes the paper. All

formal proofs are omitted; they are however available, upon request, from the author.

2. Economic setting

The economy analyzed here spans two periods and is composed of many firms and risk-neutral investors. Without loss of generality, the one-period rate of interest is set equal to zero. Further, in order to abstract from potential owner–manager conflicts, all firms are assumed to be initially solely owned by their managers.³ However, as discussed in more detail in section 2.3 below, this ownership structure changes during the second period, as it is assumed that each manager sells shares in his firm to investors before the end of that period.

2.1. Firms' economic earnings

Each firm j generates economic earnings per share, c_{jt} , of either zero or A_t during each period t , $t = 1, 2$. Per-share economic earnings are assumed to have the property that, at any given time, investors' expectation for them summed over the two periods is equal to the price they are willing to pay for each of the firms' shares. The probability distribution of the firm's period t economic earnings is a function of two parameters, ε_{jt} and w_j . The parameter ε_{jt} captures the period t effect on the firm of common factors, which are not under the control of the firm's manager, such as certain industry (or economywide) conditions. The parameter w_j represents a firm-specific factor, such as the manager's ability or the productivity of the firm's assets, and is assumed constant across the two periods. The specific form of the probability distribution is

$$\text{prob}(c_{jt} = A_t) = w_j, \quad (1)$$

$$\text{prob}(c_{jt} = 0) = 1 - w_j, \quad (2)$$

if $\varepsilon_{jt} = 1$, and

$$\text{prob}(c_{jt} = A_t) = 0, \quad (3)$$

$$\text{prob}(c_{jt} = 0) = 1, \quad (4)$$

if $\varepsilon_{jt} = 0$. This probability distribution is common knowledge. At the end of each period the manager of the firm observes the firm's economic earnings

³Implications of relaxing this assumption are discussed in section 5.

for that period. However, investors only obtain incomplete information about them through the firm's publicly released earnings report (as described below).

To capture the notion that ε_{jt} embodies the effect of common factors, it is assumed to be positively correlated with a measure of the strength of firm j 's industry in period t , denoted by I_t . Without loss of generality, let I_t equal one when the industry condition is strong and zero when it is weak, where each value occurs with probability $\frac{1}{2}$. The positive correlation between ε_{jt} and I_t is reflected in the condition that $\text{prob}(\varepsilon_{jt} = 1 | I_t = 1) = \text{prob}(\varepsilon_{jt} = 0 | I_t = 0) = \rho_j$, where $\frac{1}{2} < \rho_j \leq 1$. Given this relation, when the condition of the industry is strong (weak), there is a greater (lesser) likelihood that the firm generates positive economic earnings. The value of ρ_j is assumed to be common knowledge at the beginning of the first period. The exact time at which investors and the managers of the firms learn the value of I_t , however, varies with the economic setting under consideration, as described below. In neither setting, though, is the precise value of ε_{jt} directly observed by either the firm's manager or investors.

The firm-specific factor, w_j , takes on a value between zero and one. The greater is w_j , the greater is the firm's ability to generate economic earnings of A_t in each period t . The precise value of w_j is unknown to both the manager of firm j and investors. Their prior is that it comes from a beta distribution with parameters α and β , where β is set equal to α and the value of α is common knowledge. The beta distribution is a continuous distribution with support $[0, 1]$. Setting β equal to α results in a symmetric distribution centered around the mean of $\frac{1}{2}$. Further, with β equal to α , the variance of the distribution decreases with α . Assuming that the prior is represented by a beta distribution simplifies the analysis because, combined with the assumption that the firm's economic earnings can take on only one of two possible values, it implies that investors' posterior, conditional on reported earnings, also has a beta distribution.

Fig. 1 clarifies the relations among I_t , ε_{jt} , and c_{jt} . Alongside each branch of this diagram is the probability of reaching that branch's ending point from its beginning point. The first set of branches gives the probability of the industry condition taking on any specified value. The second set reflects the probability of any particular realization of the firm's common factor, ε_{jt} , conditional on the strength of the industry. Finally, the third set of branches reflects the probability of any given realization for the firm's economic earnings, conditional on the strength of the industry and the value of ε_{jt} .

2.2. Firms' accounting earnings

Since each firm will be selling shares publicly, its manager is required to issue a report of the firm's first-period earnings at the beginning of the

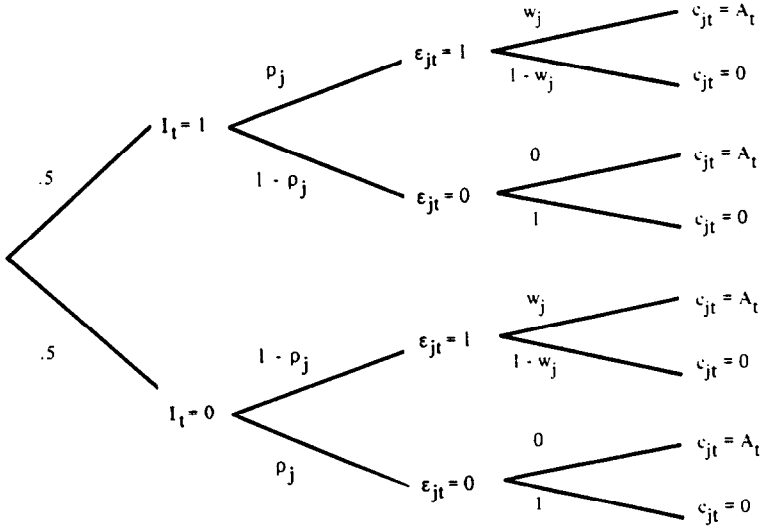


Fig. 1. The relations among I_t , ϵ_{jt} , and c_{jt} .

second period. (There is no need to issue a report after observing the firm's second-period economic earnings since the firm is liquidated at that time.) In preparing the report, the manager has the flexibility to shift the recognition of economic earnings as accounting income from the second period to the first.⁴ Specifically, earnings management allows the manager to report first-period accounting earnings of A_1 when the actual economic earnings for the period are zero.^{5,6} If the manager chooses not to manage income, then he reports accounting income equal to the firm's economic earnings.

If the manager engages in earnings management, he incurs a cost of K . This cost reflects any additional work required of the manager to prepare documents supporting his claim that the managed earnings conform to generally accepted accounting principles. It also includes the manager's expectation of the penalty to be imposed on him as a result of shareholder

⁴The results of this paper continue to hold even if the probability that the manager can engage in income management is strictly less than one, and investors do not know which managers have the ability to manage income.

⁵The manager of the firm could also have the flexibility to shift the recognition of economic earnings as income from the first period to the second so as to report first-period earnings of zero when the firm's economic earnings are A_1 . However, reducing reported income would cause a decrease in the post-announcement market value of the firm and could not be an optimal strategy for the manager in this setting. See section 2.3 for a further discussion.

⁶Without affecting the analysis, this assumption can be relaxed to allow the manager to shift any amount of income less than or equal to A_1 from the second period to the first. See section 5 for further elaboration on this point.

lawsuits initiated by investors who purchase shares after the earnings announcement and subsequently discover the earnings management.⁷ For simplicity, it is assumed that the entire cost of income management is borne personally by the manager and does not affect the market value of the firm. Allowing for it to also partly impact firm value would make the comparison of market value with and without earnings management somewhat more involved, but would not have a substantive effect on the results of the analysis.

The manager is allowed to release the firm's first-period earnings report at either one of two dates, denoted by 0 and 1, during the second period. There is some probability, however, that the manager is unable to report at the earlier of the two dates, date 0. This eventuality arises for reasons exogenous to the model, such as the existence of procedural problems which impede the preparation of the financial statements. While the manager knows whether such a problem exists in his firm, investors do not. Their prior is that with probability $\frac{1}{2}$ the manager does have the flexibility to report at date 0. Given that there are two possible reporting dates, a report released at date 0 will be referred to in the analysis below as an early announcement, while a report released at date 1 will be referred to as a late announcement.

2.3. *The manager's goal in deciding whether to manage earnings*

The extent to which the empirical findings discussed in the Introduction will be generated in this economy is critically dependent on the factors which the manager considers when deciding whether to manage earnings. The analysis here focuses on a setting in which the manager's decision is based on an intention to sell off partial ownership in his firm at some point during the second period, after the firm's earnings announcement is made. This action could arise either from a desire on the manager's part to sell some of his own shares in the market or to issue additional shares in the firm to finance its operations. The management of earnings then impacts the manager's wealth by affecting investors' expectation of the economic earnings of the firm and, consequently, the firm's post-announcement market value and the price received for the shares that are sold. Denoting by Δh the decrease in the manager's fractional shareholding position during the second period (from an initial level of 1) and by ΔV the increase in the post-announcement market value of the firm as a result of managing the first-period reported income, the manager will decide to engage in earnings management as long as the increase in his proceeds from the sale of shares, $\Delta h \Delta V$, is greater than K , the cost incurred in managing income. Equivalently, he will manage the firm's first-period earnings as long as the increase in firm value, ΔV , is greater than the adjusted cost of earnings management, K' , where $K' = K/\Delta h$.

⁷See section 2.3 for a detailed discussion of the nature and size of this expected penalty.

This discussion makes clear the role of K in the manager's decision whether to engage in earnings management. As stated in section 2.2, the size of K (and K') depends, at least partly, on the manager's expectation of the penalty to be incurred as a result of shareholder lawsuits. The expected penalty is a function of both the probability that shareholders bring a suit and win and the magnitude of the penalty to be imposed conditional on a successful suit. In cases where the earnings management falls within generally accepted accounting principles and where a significant amount of time passes between the earnings announcement and the manager's sale of shares during the second period, the probability of a successful suit is low. Under these circumstances the likelihood is relatively high that the manager will find it profitable to engage in earnings management. However, if the earnings management falls outside of generally accepted accounting principles and if the sales of share occurs shortly after the earnings announcement, the probability of shareholders winning a suit is high. The cost of income management is made even higher in this case by the significant possibility that the Securities and Exchange Commission will interpret the manager's actions as being in violation of the prohibition against insider trading. Under these circumstances it is unlikely that the manager will find it profitable to engage in earnings management. The results presented in this paper are not intended to be descriptive in such cases.

Before proceeding with the analysis, it is important to recognize that there are other reasonable settings in which the manager's goal in deciding whether to manage income is different from that assumed here. These include situations where the manager desires to increase (rather than decrease) his shareholding percentage during the second period and settings in which the manager's goal is to maximize his compensation, which is tied in a nonlinear fashion to reported earnings. In these instances, the analysis and results presented here do not hold. Section 5 further elaborates on this point.

3. Equilibrium in the case where income management necessitates a delay in the announcement of earnings

There are two important features of the present setting that distinguish it from that of the next section. First, it is assumed here that both the manager and investors can observe the first-period industry strength, I_1 , by the end of the first period. The manager can, therefore, use this information in deciding whether to manage earnings. Second, it is assumed that the management of earnings takes time, necessitating a delay in the announcement of earnings. Specifically, a manager who has the flexibility of reporting at date 0, as long as he does not engage in earnings management, must delay his report until date 1 if he decides to manage earnings. Note that in the case where the manager is unable to report at date 0 for other reasons (as discussed above),

he is precluded from managing the firm's earnings. This is because the additional delay required would extend the announcement date beyond the latest allowable reporting time, date 1.⁸

As the following proposition states, there is a set of investor conjectures about the manager's behavior in this setting which are fulfilled by his actions in equilibrium. (Where it does not cause confusion the subscript j will be dropped from the subsequent analysis.)

*Proposition 1. An equilibrium exists in which the following investors' conjectures are fulfilled by the manager's actions:*⁹

- (a) *If the manager has the flexibility of reporting early in the second period and:*
- i. *if he observes economic earnings of A_1 , then he reports earnings of A_1 early in period 2.*
 - ii. *if he observes economic earnings of zero and the first-period condition of the industry is strong (weak), then he reports earnings of zero early in period 2 with probability $1 - p_{d1} (1 - p_{d0})$ and earnings of A_1 late with probability $p_{d1} (p_{d0})$.*¹⁰
- (b) *If the manager does not have the flexibility of reporting early in the second period, then he reports earnings equal to the firm's first-period economic earnings.*

Given that he has the flexibility to do so, the manager in this equilibrium reports early if either the firm's economic earnings are equal to A_1 or if they are equal to zero and the manager chooses not to manage them. He reports late if either he is unable to report at date 0 or if he has observed economic earnings of zero and engages in income management.

In this setting there are two opposing forces which interact to determine whether a manager observing economic earnings of zero manages reported earnings. On the positive side, if the manager manages earnings and delays the earnings report, then he increases investors' assessment of the probability that the firm's actual economic earnings are equal to A_1 . This is because,

⁸The model becomes only slightly more complicated if the manager is still able to report at date 1, even if he manages the firm's earnings. The results of the analysis, however, do not change.

⁹There is an alternative equilibrium in this setting, one in which investors conjecture that, regardless of the reported earnings, a manager who announces early must have observed economic earnings of zero. Given this conjecture, the manager of a firm with first-period economic earnings of A_1 would, indeed, report only at date 1 of the second period. While this equilibrium does not seem reasonable, a formal assessment of its reasonableness would involve the application of one or more equilibrium refinement criteria. [See Banks and Sobel (1987) for examples of these criteria.] Such an analysis is beyond the scope of this paper.

¹⁰That is, $p_{d1} (p_{d0})$ is the equilibrium probability of delay when the industry condition is strong (weak).

from investors' perspective, there is a positive probability that the delayed report came from a firm with economic earnings of A_1 but which was unable to report at date 0. This action, therefore, increases the firm's market price. This positive effect decreases, of course, the greater is investors' conjecture of the probability that a manager observing zero economic earnings engages in income management. On the negative side, if the manager does manage earnings, he incurs the cost, K . Depending on the values of the parameters in the economy, the equilibrium probability of earnings management could then be zero, one, or some value strictly between zero and one. In the latter case, the manager randomizes between a strategy of managing income and one of reporting earnings of zero.

It is straightforward to show that the gain to the manager from earnings management in this setting is greater when the industry condition is strong. To understand why this is so, note that if the manager reports earnings of zero and the industry condition is strong rather than weak, investors believe that the low earnings are more likely due to a small value of the firm-specific component of earnings, w , and less likely due to a zero value for the firm's industry factor, ε_1 . Consequently, investors also believe that future economic earnings are more likely to be low. By similar reasoning, if the manager reports earnings of A_1 and the industry condition is strong, then, from investors' perspective, it is more likely that w is high and that the firm actually generated economic earnings of A_1 rather than that the manager engaged in income management. (Alternatively stated, a report of high earnings is less credible to investors when the industry condition is known to be weak, since it is less likely that the firm could actually have generated economic earnings of A_1 .) Furthermore, investors believe that future earnings are also more likely to be high. These two effects, together, result in a greater gain to the manager from engaging in income management and announcing earnings of A_1 when the condition of the industry is known to be strong.

This discussion implies that the equilibrium probability of delay for the firm is at least as great when the industry condition is strong as when it is weak. It is unaffected by the strength of the industry only if K is so low (high) that the manager engages in income management with probability one (zero) regardless of the condition of the industry.

Consider the market effects of early and late announcements in this equilibrium. Since the manager deliberately delays the earnings announcement only if the firm generates low economic earnings, the average economic earnings and average market value of a firm whose report is early must be greater than they are for a firm whose report is late, as long as the probability of delay is positive. This means that if investors observe an early announcement, the firm's price must rise, on average. If investors do not observe such an announcement, the price must fall. This differential price reaction be-

tween early and late reports is consistent with both the evidence of Chambers and Penman and that of Kross and Schroeder. It is straightforward to extend this argument to show that the differential price reaction between early and late reports is an increasing function of the probability of delay. This observation will be useful below in generating additional empirical predictions.

It can further be shown that, holding reported earnings constant, the market reaction must be (weakly) more positive if the earnings are reported early rather than late, consistent with the empirical finding of Kross and Schroeder. This result is driven by the fact that if the manager reports earnings of A_1 early, then investors are certain that the firm's economic earnings are also equal to A_1 , while if he reports earnings of A_1 late, then there is a possibility that the actual economic earnings of the firm are equal to zero. Consequently, investors in the market partially discount good news that is reported late. The market reaction to reported earnings of zero, however, is the same whether they are released early or late since they imply zero economic earnings with certainty.

In order to generate additional empirical predictions which have the potential of testing the model, consider, first, the following observation:

Observation 1. An increase in the correlation, ρ , between the firm's industry factor, ε_1 , and the condition of the industry, I_1 , increases (decreases) the gain to managing income when the industry condition is strong (weak).

To understand the forces behind this result consider, first, the case where the condition of the industry is known to be strong. Given this, the greater is ρ , the greater is investors' assessment of the probability that ε_1 is equal to one. Consequently, if the manager reports earnings of zero, investors believe there to be a greater probability that the firm-specific factor, w , is low and that future economic earnings will also be low. Further, if the manager instead reports earnings of A_1 , then investors believe there to be a greater probability that economic earnings actually equalled A_1 and that the value of w is high. Together these effects provide the manager with a greater incentive for managing earnings, given a strong industry condition, the higher is ρ . Consider, now, what happens when the industry condition is known to be weak. In this case, the greater is ρ , the greater is investors' assessment of the probability that ε_1 is equal to zero. Consequently, if the manager reports earnings of zero, investors believe there to be a lesser probability that the firm-specific factor is low. Further, investors believe that a report of A_1 is more likely due to income management. These effects provide the manager with a greater incentive not to manage earnings, given a weak industry condition, the higher is ρ .

Using Observation 1 and the fact that the differential price reaction between early and late earnings reports increases with the probability of delay, the following set of empirical predictions results:

Proposition 2. An increase in the correlation between the firm's economic earnings and the strength of the industry (weakly) increases the probability of delay when the industry condition is strong. The opposite is true when the industry condition is weak. As a result, the differential price reaction between early and late earnings reports (weakly) increases (decreases) with this correlation when the industry condition is strong (weak).

A further empirical prediction involves the parameter α of the density function for w . Recall that an increase in α decreases the *ex ante* variance of w . Given this, the following is apparent:

Observation 2. As α increases, the gain to earnings management decreases.

This observation follows from the fact that the lower is investors' *ex ante* uncertainty about w , the less does the observation of any period's reported earnings affect investors' expectation of it. Consequently, the gain to income management decreases. This leads to the following set of empirical predictions:

Proposition 3. As investors' ex ante uncertainty over the value of w decreases, the probability of delay (weakly) decreases. As a result, the differential price reaction between early and late earnings reports also (weakly) decreases.

4. Equilibrium in the case where income management does not require a delay in the announcement of earnings

An alternative explanation for why a manager deliberately delays the announcement of earnings, explored in this section, is that by doing so he obtains more information about the first-period industry strength, which is useful in deciding whether to manage income. Conditioning on this information is potentially of value because, as discussed in the previous section, the gain from earnings management is smaller if the industry condition is weak rather than strong. In order to focus on this potential explanation it is assumed in this section that earnings management can be accomplished without delaying the announcement of earnings. This assumption is reasonable if a manager anticipating low economic earnings in the first period is able to decide in advance of the end of the period how to manage income and so preclude a delayed report. It is also assumed here, in contrast to the previous section, that neither the manager nor investors learn the first-period

industry strength during the period. Instead, they can only discover it from an examination of the earnings reports of the firms in the industry, announced after the period ends. To capture this feature in a simple setting, it is assumed that the earnings announcement of an industry leader perfectly reveals the first-period industry condition. Further, the firm-specific factor of this firm is assumed to be known to investors so that there is no reason for it to either delay or manage its earnings. It reports its earnings at date 0. Consequently, if the manager of firm j wants to condition his earnings management decision on the strength of the industry in the first period, he must delay the earnings report until after the earnings of the industry leader are released at date 0. As a result, he will be forced to release his earnings late, at date 1.¹¹

There are two principal differences between the strategies available to the manager in this setting and those available in the previous one. First, the manager now has the option of reporting early *and* managing earnings. Further, in deciding whether to report early (and whether to manage earnings if he reports early) the manager does not know the first-period industry condition. Despite this, the nature of the equilibrium in this setting is similar in many ways to that described in the preceding section. However, differences do exist which allow for empirical tests to be designed to distinguish between them.

As the following proposition states, there is a set of investor conjectures about the manager's behavior in this setting which are fulfilled by his actions in equilibrium:

Proposition 4. An equilibrium exists in which the following investor conjectures are fulfilled by the manager's actions:

- (a) *If the manager has the flexibility of reporting early in the second period and:*
- i. *if he observes economic earnings of A_1 , then he reports earnings of A_1 early in period 2.*
 - ii. *if he observes economic earnings of zero, then he reports early with probability $1 - p_d$ and late with probability p_d ; if he reports early, then he reports earnings of A_1 with probability m_e ; if he reports late and the first-period industry condition is strong (weak), then he reports earnings of A_1 with probability m_{11} (m_{10}).*

¹¹Clearly, the concept and role of an industry leader is an extreme simplification designed to capture the notion that the manager of firm j has an incentive to delay reporting his firm's earnings until after he has observed the earnings of other firms in the industry (and what they imply about the prior period's industry condition). Introducing an industry leader allows for the analysis to abstract from the technical difficulties arising in a setting where there are several firms, each of which provides some information about the condition of the industry, and each of which must decide when to release its earnings, taking into account its conjectures about the actions of the other firms in the marketplace.

(b) *If the manager does not have the flexibility of reporting early in the second period and:*

- i. *if he observes economic earnings of A_1 , then he reports earnings of A_1 late;*
- ii. *if he observes economic earnings of zero, then he reports earnings of A_1 with probability m_{11} (m_{10}) if the first-period industry condition is strong (weak).*

It should be clear that in this equilibrium, just as in the previous one, an early earnings announcement is, on average, accompanied by a price increase and the lack of such an announcement by a price decrease. Further, holding the reported earnings constant, the market reaction is (weakly) more positive if the earnings are reported early rather than late.

Where this equilibrium differs from that studied in the previous section are in the additional predictions derived with respect to the correlation, ρ , between the strength of the industry and the firm's industry factor, ε_1 , as stated in the following proposition:

Proposition 5. (a) If there is a unique equilibrium value for the probability of delay, p_d , then an increase in the correlation between the firm's economic earnings and the strength of the industry causes that value to (weakly) increase. If, instead, there is a range of possible equilibrium values of p_d , an increase in this correlation causes a (weak) increase in both the lower and upper endpoints of that range.

(b) As a result, as the correlation between the firm's economic earnings and the strength of the industry increases, the differential price reaction between early and late earnings reports (weakly) increases.

The first part of Proposition 5 is a consequence of the fact that an increase in ρ negatively affects the gain to the manager from reporting early, while it positively affects his gain from reporting late. To understand why this is so, consider the strategy of reporting earnings of A_1 early as compared to the strategy of reporting earnings of A_1 (zero) late when the industry condition is strong (weak). (Other possible strategies need not be considered because they are either unaffected by ρ or cannot be equilibrium strategies for positive value of p_d .) The most significant difference between the firm's market values under these two strategies occurs when the industry condition is weak. In this case, the market value given an early release decreases with ρ , while the market value given a late release increases. These opposite effects occur because, conditional on the industry being weak, an increase in ρ makes it more likely that ε_1 equals zero and that the economic earnings of the firm are actually zero. Consequently, investors assign a lower (higher) value to a firm with reported earnings of A_1 (zero).

This discussion implies that the flexibility to condition reported earnings on the announcement of the industry's condition becomes more valuable as the correlation between the firm's economic earnings and the strength of the industry increases. Consequently, the likelihood that any firm's earnings announcement is delayed is a (weakly) increasing function of this correlation. This result contrasts with that of the previous section, where the probability of delay was shown to be a (weakly) increasing function of ρ only if the industry condition is strong.

As stated in the last part of the proposition, since ρ and p_d are positively related regardless of the condition of the industry, an increase in ρ increases the differential price reaction between early and late earnings reports. This result is also in contrast to that of the previous setting, where a positive relation was predicted only in the case where the condition of the industry is strong.

Finally, this setting provides an empirical prediction with respect to the parameter α similar to that of the previous section. Specifically, as investors' *ex ante* uncertainty over the value of w decreases, the probability of a delay in the announcement of earnings (weakly) decreases as does the differential price reaction between early and late earnings reports.

5. Limitations and extensions of the analysis

As mentioned in section 2.3, the analysis and results of this paper depend critically on the assumption that the manager's objective is to maximize the proceeds from the sale of shares (or, equivalently, to maximize the firm's post-announcement market value) net of the costs of earnings management. However, there are cases in which this is not his objective. One is where the manager intends to purchase shares on personal account (or repurchase shares for the firm) during the second period, after the firm's earnings announcement, and so wants to minimize the firm's second-period market price. Under this objective the manager would have an incentive to manage the first period's earnings downward rather than upward. This behavior would produce results opposite to those derived here and so would be inconsistent with the documented empirical findings. An alternative model of earnings announcement timing would be necessary in such a setting. Another reasonable objective for the manager would be to maximize the present value of his bonuses from the firm. As discussed in Healy (1985), managerial bonuses are often structured so that they remain flat both below a certain low level of income and above another, higher, level of income. Under this structure there would be instances in which a manager would prefer to shift income from the current to a future period. He would have an incentive to do so, for example, if current income is either so high or so low that postponing the recognition of income would not affect the manager's current-period

bonus, but might increase a future bonus. In this case it is not clear whether investors would interpret a delayed earnings announcement as bad news or as good news and, consequently, it is not obvious what the market reaction would be to it. The analysis of the previous sections does not apply to this case; a new analysis would be required in order to investigate the conditions under which the results obtained here would continue to hold in this setting and the conditions under which they would not.

Another limitation of this paper's analysis is that it abstracts from the manager's choice of how much to manage income. The manager either increases the first-period reported earnings by an amount A_1 or does not engage in earnings management at all. It is possible to limit his choice to these two possibilities in this setting, without loss of generality, because of the assumption that the firm's first-period economic earnings can take on only two possible values, 0 or A_1 . If the manager in a firm with zero economic earnings were to increase reported income by an amount less than A_1 , it would immediately reveal to investors that he engaged in earnings management and that the firm's economic earnings were equal to zero. Therefore, the manager would not find it optimal to take such an action. However, in a more realistic setting, where the firm's economic earnings take on a continuum of values, and where the cost of earnings management varies with the extent to which the manager raises the firm's reported income, the issue of the optimal amount of earnings management becomes important. In such a setting it is not obvious what the relation would be between the firm's underlying economic earnings and the extent of earnings management, making it uncertain whether the results obtained in the previous sections would continue to hold. Investigating this question would be a useful extension of the present work.

Another extension of this analysis would be to drop the assumption that the manager initially owns all of the firm's shares, by allowing for the existence of other shareholders in the firm at the beginning of the first period. This would introduce a conflict, between the manager and any other initial shareholders who also plan to sell shares during the second period, over the appropriate criterion for deciding whether to manage earnings. Since these other shareholders do not bear any of the costs, they would prefer that the manager engage in earnings management whenever it would increase the post-announcement market value of the firm, regardless of the cost of income management.¹² Consequently, they would prefer that the manager engage in earnings management more often than he would like. A question for future research is whether the existence of these divergent

¹²The conflict would be even more severe between the manager and any of the initial shareholders who plan to increase their shareholding position during the second period, since they would prefer that income management be used to decrease (rather than increase) the first period's reported earnings.

preferences would affect the frequency with which the manager engages in income management and the probability that he delays the firm's earnings announcement.

6. Summary of results and empirical implications

Empirical studies have found a positive (negative) market reaction to an early (late) release of earnings. Further, holding constant the earnings surprise, the market reaction has been shown to be more positive the earlier the announcement is made. Two explanations for these results have been proposed which yield implications consistent with the findings. Further analysis of these proposed explanations has provided independent empirical predictions. The first set involves the effect of an increase in the correlation between any firm's profitability and that of its industry on (a) the probability that the firm announces its earnings later than expected and on (b) the market reaction to an early release of earnings. In the case where earnings management requires a delay in the release of earnings, it is predicted that both the probability of a late release of earnings and the market reaction to an early announcement increase (decrease) with this correlation, as long as the industry's profitability is high (low). In the case where earnings management does not require a delay in the release of earnings, it is predicted that both the probability of a late release of earnings and the market reaction to an early announcement increase with this correlation, regardless of the industry's profitability. The second set of implications involves the effect of a decrease in investors' uncertainty about the firm's underlying value. It is predicted that such a decrease reduces both the probability of a late earnings report and the market reaction to an early announcement. Since some of these predictions differ between the two proposed explanations for earnings announcement timing, the potential exists for designing tests to distinguish between them.

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