Prospect Theory and the Timeliness of the Earnings Announcements: Empirical Evidence from Listed Chinese Firms

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Abstracts:

Many empirical researches on timeliness of earnings announcements present the evidence for “good news early, bad news late”. This paper goes further to divide an individual firm’s news contents into two aspects: unexpected earnings related to the prior year (news *A*) and unexpected earnings related to the industry-wide medium earnings (news *B*), and prove in theory that they play different roles in determining the announcement dates under the assumptions that shareholders are reference dependent, loss averse, and with diminishing sensitivity, as the prospect theory describes, and managers attempt to maximize shareholders’ evaluation on the firm’s value. We find that similar to pervious literatures, news *A* is negatively correlated with reporting lag, but what distinguishes this research from them is that we continue to find that it is news *B* that provides underlying motivation for managers to advance or delay earnings announcement dates, and the probability of delaying announcement is increasing with the difference between news *B* and news *A*. Finally, we find empirical evidences from listed Chinese firms to support our theoretical arguments.

Key words: Timeliness of earnings announcement, Prospect theory, Good news, Bad news

1. Introduction

"Good news early, bad news late" seems to be a rule for firms who are obliged to reveal information to the public and is evidenced by a great many literatures on timeliness of firms' earnings announcement, such as Givoly and Palmon (1982), Lawrence (1983), Begley and Fischer (1998), Haw et al.(2000), Owusu-Ansah(2000), Ku Ismail and Chandler(2003), Chen et al.(2003). Announcements are identified by managers and shareholders as "good news" or "bad news" according to the unanticipated changes to expected earnings, and the usual method in many empirical literatures is to take the value of the earnings variable in the prior year or the analyst's forecast of earnings outstanding at the end of this year as a proxy for the expected earnings on the firm's earnings announcement.

Anecdotal evidence shows that managers and shareholders are not only concerned with a firm's unexpected earnings compared to the prior year but also care about whether the firm's profitability out-performs or under-performs its rivals in the same industry, which implies that the news content of the earnings announcement can be decomposed into two aspects: unexpected earnings related to the prior year (news *A*) and unexpected earnings related to industry-wide medium earnings this year (news *B*). For example, consider a firm who earns \$0.5 per dollar this year and outperform last year by \$0.2 per dollar, will shareholders of the firm consider this news as good news? The answer of course is *Yes* if

shareholders do not care about news *B*. However, when the shareholders realize that the industry-wide medium earnings level is $0.8 per dollar, the answer may be *No*, and the "good news" may turn into bad news.

Although it seems to be a conventional wisdom that whether earnings announcement contains good news or bad news depends on the shareholders' perceptions on both news *A* and news *B*, few studies have ever separately considered how news *A* and news *B*, especially news *B*, influence the mangers' choice on reporting lag, which is exactly what this paper does. Intuitionally, when earnings are announced, news *A* is immediately revealed and absorbed by shareholders while news *B* might not be revealed because the industry-wide medium earnings level might be still unknown at that time and shareholders might gradually learn it as time goes and more announcements have been made in the industry. Thus, if managers attempt to influence the financial market assessment of the firm's value, they may choose to advance announcements if they expect that the evaluation by shareholders on the firm's value based only on news *A* will be greater than the evaluation based on both news *A* and news *B*, which implies that managers will report earlier when they believe that compared to news *A*, news *B* is the worse news, or they may choose to delay announcement if they think that the evaluation by shareholders on firm's value based on both news *A* and news *B* will be greater than the evaluation based only on news *A*, which implies that managers will postpone reporting when they believe that news *B* is the better news when compared to news *A*.

How news *B* influences the firm's reporting lag is worth studying. Firstly, unlike news *A* which is revealed simultaneously with the earnings announcement, by changing the reporting lag, managers could determine whether news *B* is revealed or not from the earnings announcement. Thus, the study on news *B*' s impact on reporting lag will give us an opportunity to learn if managers indeed manipulate their reporting lag in order to maximize the shareholders' assessment on the firm' value. Secondly, if the intuition mentioned above is true, that is, managers tend to advance announcement when they think news *B* is the worse news when compared to news *A* and prefer to delay announcement when they believe new *B* is the better news when compared to news *A*, news *B* is the information that seems to deviate the rule of "good news early, bad news late", and it is interesting to see if this phenomenon really exists.

Our paper is built on the assumption that advancing or delaying reporting lag is motivated by managers' attempt to influence shareholders' evaluation, or perceptions on the firm's value. In classical economic and finance theory, the shareholders are assumed to maximize their expected utility and they are risk averse. In a famous paper by Kahneman and Tversky (1979), they show that the actual behavior of individuals systematically and consistently violates these assumptions. They present their framework as prospect theory and in which the outcomes of the choices are evaluated by a value function. The value function has three essential characteristics. *Reference dependence*: the carriers of value are gains and losses defined relative to a reference point. *Loss aversion*: the function is steeper in the negative than in the positive domain; looses loom larger than the corresponding

gains. *Diminishing sensitivity*: the marginal value of both gains and losses decrease with size. Three properties give rise to an asymmetric S-shaped value function, concave above the reference point and convex below it. In our paper, we assume shareholders behave as prospect theory describes[1]. When they evaluate a firm's value, shareholders have two reference points, earnings in the prior year and the industry-wide medium earnings level, and by comparing the actual earnings with the two reference points respectively, shareholders get news *A* and news *B*. If the industry-wide medium earnings level is still unknown when the firm's earnings is announced, the number of the reference point of the shareholders reduces to only one, and what they can get is only news *A*.

The paper contributes to the existing literatures in this field in two aspects: firstly, we decompose the news content into two aspects, and see separately how they influence the firm's reporting lag. We find that firms with good news *A* tend to advance announcement and firms with bad news *A* tend to delay announcement, which is similar to the conclusion of previous literatures. Aside from them, we go further to find that the announcement pattern of firms varies with the managers' belief on news *B*. Managers will have more motivation to advance the earnings announcement or will advance announcement dates to some great extent if they believe that news *B* is worse news than news *A*, and if managers believe that news *B* is better news than news *A*, they will have more motivation to delay the earnings announcement dates or will delay announcement dates to some great extent.

[1] There are a great number of academic researches in which shareholders(investors) are assumed or are proved to behaves as prospect theory describes. For example, Burgstahler and Dichev(1997), Degeorge et al.(1999) theoretically infer that shareholders' loss aversion is a possible motivation for firms' earnings management, and in Shen and Chih(2005), prospect theory is empirically proved as an explanation for earnings management. Besides, many literatures on behavior finance, such as Benartzi and Thaler(1995), Barberis and Huang(2001), Grinblatt and Han(2005), have assumed that investors are loss averse.

Therefore, we find that news *A* and news *B* do play different roles in the variation of reporting lag. Secondly, we provide another theoretical explanation about why managers change their firm's earnings announcement lag. In previous studies, As Ku Ismail and Chandler (2003) summarized, several reasons have been advanced in the literature as to why firms with good news report promptly than those with bad news. Givoly and Palmon(1982) argued that it is the manager's natural desire to defer any repercussions from shareholders, and managers wish to continue and complete recent negotiations and contracts in the best possible light. Dye and Sridhar (1995) stated that because a company with good news will experience a rise in market values of both its outstanding equity shares and management (Watts and Zimmerman,1986), it is reasonable to expect managers of a successful company to report its good news to the public on a timely basis. Watts and Zimmerman (1990) argued that by delaying the bad news, management is giving its shareholders a silent signal and the opportunity to divest themselves of the firm's share before the information reaches the market, while announcing good news early will ensure that it is not preempted by other sources. Different from them, we argue that it is the disparity between shareholders' valuations of gains and losses that that motivate the managers to manipulate the reporting lag. In our model, we assume that managers try to maximize shareholders evaluations on firms, and for shareholders, the losses from bad news loom larger than the corresponding gains from good news. For instance, for firms with good news *A*, shareholders have a positive value on firms, and based on the value on news *A*, better news *B* will increase shareholders' value, while corresponding worse news *B* will sharply decrease shareholders' value to some great extent according to S-shaped

value function of the shareholders, thus managers who only knows the possibility on news *B ex ante* prefer advancing earnings announcement to avoid news *B* revealed unless they believe that the probability that news *B* is better than news *A* is big enough to increase the expected shareholders' value. Inversely, for firms with bad news *A*, shareholders have a negative value on firms, and based on the value on news *A*, better news *B* will sharply increase shareholders' value, while corresponding worse news *B* will decrease shareholders' value to some relative small extent, thus managers tend to delay earnings announcement to let news *B* revealed even if they think that the probability that news *B* is better than news *A* is small. Therefore, what distinguishes our paper from previous literatures is that we find that resulting from the shareholders' value function as prospect theory describes, firms tends to advance earnings announcement because managers believe that delaying announcement until news *B* is revealed may decrease shareholders' evaluation on the firm's value, and firms prefer postponing their earnings announcement for managers think that delaying until news *B* is disclosed may increase the shareholder's evaluation on the firm's value.

The remainder of the paper is organized as follows. Section 2 presents our model and derives two observations from the informal analysis. Section 3 provides formal analysis on the model. Section 4 provides empirical evidence of our theoretical conclusions from listed Chinese firms. Section 5 contains conclusion comments.

1. The model and the informal analysis

In this section, we build a model by assuming that shareholders behave as the prospect theory describes, which indicates that shareholders are reference dependent, loss averse, and with diminishing sensitivity, and their value function can be denoted by $U(\bullet)$. Because anecdotal evidence shows that managers and shareholders are not only concerned with a firm's unexpected earnings related to the prior year, but also care about whether the firm out-performs or under-performs its rivals in the same industry, the news contents conveyed by the earnings announcement are divided into two aspects, one is the unexpected earnings related to the prior year, denoted by A, and the other is the unexpected earnings related to the industry-wide medium earnings level, denoted by B. Shareholders rely on both news A and B to evaluate the firm's value and the total value of the firm is given by:

$$B_w = wA + (1-w)B,$$

where w and $1-w \in [0, 1]$are the weights endowed by the shareholders respectively to news A and B, and different shareholders may endow different weights on news A and B.

We consider an individual firm's choice of earnings announcement dates at t=0, and we divide the reporting time into two periods, 1 and 2. In period 1 from t=0 to t=1, it is assumed that few firms in the industry have reported their earnings, and in period 2 from t=1 to t=2, more firms in the industry are assumed to have their earnings reported. Managers make a choice to report the earnings either in period 1 or in period 2. If the earnings are reported in period 1, the announcement only reveals news A to shareholders, then shareholders evaluate the firm's value only based on news A, and get a value as denoted by $U(A)$. If the earnings are reported in period 2, besides news A, news B is also revealed from the earnings announcement and the shareholders can further assess the

firm's earnings performance in the industry, hence they can evaluate the firm's profitability depending on both news *A* and *B*, and obtain a value as denoted by $U(B_w)$. Managers chooses the announcement date to maximize shareholders' evaluation on the firm's value, therefore managers must compare $U(A)$ with $U(B_w)$ to decide whether advancing announcement or delaying announcement is better.

We further assume that instead of knowing exactly about *B*, at $t=0$, that is, when managers have to decide the earnings announcement date, managers only know there are two possibilities on B[2], that is, B^+ with probability $1-p$ and B^- with probability p, where $B^- < B < B^+$, thus the distribution of *B* can be described as the following specification:

$$B = \begin{cases} B^* + C = B^+ & 1-p \\ B^* - C = B^- & p \end{cases},$$

where $B^* = \frac{B^+ + B^-}{2}$, $C = \frac{B^+ - B^-}{2} > 0$.

Therefore, B_w is a random variable at $t=0$ with distribution as followings:

$$B_w = \begin{cases} B_w^+ = wA + (1-w)(B^* + C) & 1-p \\ B_w^- = wA + (1-w)(B^* - C) & p \end{cases}.$$

Shareholders' value function is assumed as the prospect theory provided by Kahneman and Tversky (1979) describes:

$$U(x) = \begin{cases} x^\alpha & x \geq 0 \\ -k(-x)^\alpha & x < 0 \end{cases},$$

where $1 > \alpha > 0$, and $k > 1$. In our model, we assume that shareholders have two reference points when they evaluate a firm's value: the firm's earnings in the prior year and the

[2] We believe that the assumption is true in markets with imperfect information. Even in the mature stock markets, as U.S. market and others, managers rarely have the perfect knowledge about other firms' actual earnings in the same industry. Because managers are always assumed to have more information than shareholders in the markets, it is reasonable for us to assume in this paper that shareholders have no knowledge about the industry-wide medium earnings level at the end of the fiscal year, and they may get this information as firms announce their earnings.

industry-wide medium earnings this year, and if the industry-wide medium earnings level is still unknown when the firm's earnings is announced, the number of the reference point of the shareholders reduces to one, and what shareholders can get is only news A from earnings announcement. Without the knowledge of B, shareholders perceive $A>0$ as good news and $A<0$ as bad news, thus shareholders get a value as $U(A)$.

It is obvious that when $B^{+}<A$, $EU(B_w)$ is always less than $U(A)$, and the optimal choice of managers is to announce earnings in period 1 since waiting until period 2 will just decrease the shareholders' evaluation on the firm's value. Correspondingly, $EU(B_w)$ is always more than $U(A)$ if $B^{-}>A$, and managers will prefer to report earnings in period 2 since B is no doubt better than A, and the shareholders' evaluation on the firm's value must be increased. Thus, in the following of the paper, we concentrate on discussing the case when A is between B^{-} and B^{+}.

According to the sign of A, firms are divided into two types, one is earnings increased related to the prior year, i.e., $A>0$ and the other is earnings decreased related to the prior year, i.e., $A<0$. Then, based on the relation between A and B^*, firms are re-divided into the other two types, i.e., $B^*>A$, and $B^*<A$. Thus, we get four types of firms as table 1 shows.

Table 1 is inserted here.

As we have argued above, whether firms advancing or delaying earnings announcement is depending on managers' comparison between $U(A)$ and $EU(B_w)$, and as an informal analysis, we illustrate in figures for each type of firm how managers choose the

announcement dates to maximize the shareholders' evaluation on the firm's value given shareholders' value function and managers' belief on B^*. In the next section, we will provide formal analysis.

In the figures, shareholders' value function is S-shaped as the prospect theory describes, which indicates that shareholders are risk-aversive when they face gains and are risk seeking when they face loss. The negative domain is steeper than the positive domain, which indicates that loss looms larger than the corresponding gains. Here, shareholders are assumed to perceive good news as gains and bad news as loss, and they evaluate the firm according to the value they obtain from the news. As we have assumed, managers do not know about B exactly *ex ante*, and their knowledge about B is only two possibilities, B^- and B^+, with respective probabilities, p and $1-p$. The sequence of manager's decisions is as follows: firstly, based on their presumptions on shareholders' weights endowed to A and B, managers could deduce the value shareholders would get from news A and B^+, or from news A and B^-, as denoted by $U(B_w^+)$ and $U(B_w^-)$. Secondly, managers could obtain the expected shareholders' value, $EU(B_w)$, according to managers' own belief on p. the small p is, which implies that manager believe that B^+ is more likely to happen and the firm's earnings are probably above the industry-wide medium earnings level, the bigger $EU(B_w)$ is, and *vice versa*. Thirdly, managers compare $U(A)$ with $EU(B_w)$. If $U(A) < EU(B_w)$, it is optimal for managers to delay the earnings announcement until the industry-wide medium earnings level is revealed, inversely, if $U(A) > EU(B_w)$, managers would prefer to advance earnings reports. In these figures, each point on the oblique line denotes a $EU(B_w)$ with a

given p, and this line is divided into dashed parts and solid parts to show the range of p which satisfy $U(A) > EU(B_w)$, and $U(A) < EU(B_w)$ respectively. For instance, if the dashed parts is prominently longer than solid parts, we could say that firms would advance earnings announcement with a great probability because there are a wide range of p which satisfies $U(A) > EU(B_w)$.

Figure 1 $A>0$, $B^*<A$ is inserted here

In figure 1, it is obvious that the dashed parts dominate the whole oblique line, which implies that type 1 firms are more likely to advance earnings announcement. As figure 1 illustrates, when A is good news and managers believe that the median of B, denoted by B^*, is worse news than news A, managers will probably advance their earnings announcement even if they think that B^+ is more likely to happen than B^-. We will prove in section 3 that it is shareholders' loss aversion and diminishing sensitivity that motivates managers to advance their announcements.

Figure 2 $A>0$, $B^*>A$ is inserted here

In figure 2, we find that it is hard to tell whether type 2 firms will advance their earnings announcements or will delay their earnings announcement because the dashed parts and the solid parts of the oblique line seem to be of equal length.

Figure 3 $A<0, B^*<A$ is inserted here

In figure 3, similar to figure 2, we find that it is hard to tell whether type 3 firms will advance their earnings announcements or will delay their earnings announcement because the dashed parts and the solid parts of the oblique line seem to be of equal length.

Figure 4 $A<0, B^*>A$ is inserted here

In figure 4, Contrary to figure 1, the solid parts are dominant on the whole oblique line, which implies that type 4 firms are more likely to report earnings in period 2 rather than in period 1. As figure 4 illustrates, when A is bad news while managers believe that the median of B, denoted by B^*, is better news than A, managers will probably delaying their earnings announcement even if they think that B^+ is more likely to happen than B^-. We will prove in section 3 that it is shareholders' loss aversion and diminishing sensitivity that motivates managers to delay their announcements.

For clarity, we give a summary on the announcement pattern of the four types of firms in table 2.

Table 2 is inserted here.

In order to understand table 2, we firstly observe it column by column. As the first column

of table 2 shows, for firms with $A>0$, those with $B^*<A$ are more likely to report their earnings in period 1 and the others with $B^*>A$ show no strong tendencies, and in general, firms belonging to the first column of the table 2 probably advance their announcement; In contrast, As the second column shows, in firms with $A<0$, those with $B^*<A$ show no strong tendencies and the others with $B^*>A$ are more likely to report their earnings in period 2, and in general, firms belonging to the second column probably delay their announcement. By this way, we give observation 1as below:

Observation 1 *Firms will probably advance the earnings announcement dates if their earnings is increased related to the prior year, i.e., $A>0$, and will probably delay the earnings announcement datse if the earnings is decreased related to the prior year, i.e., $A<0$.*

Then we observe table 2 row by row. As the first row of table 2 shows, for firms with $B^*<A$, those with $A>0$ are more likely to report their earnings in period 1 and the others with $A<0$ show no strong tendencies, and in general, firms belonging to the first row probably advance their announcement; In contrast, As the second row shows, for firms with $B^*>A$, those with $A>0$ show no strong tendencies and the others with $A<0$ are more likely to report their earnings in period 2, and in general, firms belonging to the second row probably delay their announcement. Therefore, we give observation 2:

Observation 2 *Firms will probably advance the earnings announcement dates if they*

think that $B^*<A$, that is, managers thinks that waiting will brings no better news to the shareholders. On the other hand, firms will probably postpone reporting the earnings when they believe that $B^*>A$ because managers are willing to wait until better news comes to the shareholders.

In the following section, we provide formal analysis on observation 1 and 2.

3. Formal analysis

As section 2 mentioned, managers will compare $EU(B_w)$ and $U(A)$ when they make a decision on when to announce the firm's earnings announcement. If $EU(B_w)>U(A)$, it is optimal for firms to delay earnings announcement because managers believe that waiting until news B is revealed from the earnings announcement will increase the shareholders' evaluation on the firm's value by increasing shareholders' value from getting news B. In contrast, if $EU(B_w)<U(A)$, managers will optimally advance their earnings announcement since managers think that waiting until B is revealed from the earnings announcement will only decrease the shareholders' assessment on the firm's value. In this section, we provide formal proof to our observations in section 2.

At $t=0$, managers estimate about B^- and B^+, and their probabilities, respectively p and $1-p$. We define p^* as the critical probability which lets $EU(B_w)= U(A)$. If managers believe that the actual p is equal to p^*, there will be no difference for firms to advance or delay earnings announcement because the news B will not decrease or increase shareholders' value, thus will not change shareholders' evaluation on the firm's value.

We use $V(p)$ to denote the difference between $EU(B_w)$ and $U(A)$ as follows:

$$
\begin{aligned}
V(p) &= EU(B_w) - U(A) \\
&= (1-p)[U(B_w^+) - U(A)] + p[U(B_w^-) - U(A)] \\
&= (1-p)[U(B_w^+) - U(A)] - p[U(A) - U(B_w^-)]
\end{aligned}
$$

Let $x_1 = U(B_w^+) - U(A)$, $x_2 = U(A) - U(B_w^-)$, and $V(p)$ could be simplified as below:

$$V(p) = (1-p)x_1 - px_2,$$

where x_1 and x_2 are both positive because $B^+ > A > B^-$, and it is easy to find that $V(p)$ is decreasing in p. As we have defined before, p^* is the critical probability which lets $EU(B_w) = U(A)$, then $V(p^*)$ is equal to 0 and p^* can be given by:

$$p^* = \frac{x_1}{x_1 + x_2}.$$

When managers think that p is less than p^*, i.e., $p \in [0, p^*]$, then $EU(B_w) > U(A)$, and the optimal choice is to postpone earnings announcement, and therefore p^*, the length of the delay-announcement range, measures the probability of firms to delay announcement. However, if managers think that p is larger than p^*, i.e., $p \in [p^*, 1]$, then the firm should advance the earnings announcement for $EU(B_w) < U(A)$ and therefore $1-p^*$, the length of advance-announcement range, measures the probability of firms to advance announcement. If the delay-announcement range is more narrow than the advance-announcement range, that is, $p^* < 1-p^*$, and $p^* < 0.5$, firms will probably choose to announce their earnings earlier and *vice versa*. In section 2, we have shown informally in figures 1 and 4 that for type 1 firms, p^* is less than 0.5 and more firms will choose to advance earnings announcement while for type 4 firms, p^* is larger than 0.5 and firms will probably delay announcement dates. By the definition of p^*, it can be inferred that the less p^* is, firms will probably report their earnings earlier, and the greater p^* is, firms tend to delay earnings

announcement. Here we provide proposition 1 and 2 to verify the observation 1 and proposition 3 to verify the observation 2.

Proposition 1

For type 1 firms, that is, for firms with A>0, B<A, if*

(a) $B^{-}=B^{*}-C \geqslant 0$ *or*

(b) $B^{-}=B^{*}-C<0$ *and* $A \geqslant A(k,\alpha)$, *where* $A(k,\alpha)=\dfrac{(B^{*}-C)^{2}}{2Ck^{\frac{1}{1-\alpha}}+B^{*}-C} \geq 0$,

the critical probability, p, is always smaller than 0.5.*

The proof of proposition 1 is in the appendix.

Proposition 1 implies that the probability range for advancing earnings announcement is wider than the range for postponing earnings announcement, and type 1 firms are more likely to advance their announcements.

Proposition 2

For type 4 firms, that is, for firms with A<0, B>A, if*

(a) $B^{+}=B^{*}+C \leqslant 0$ *or*

(b) $0<B^{+}=B^{*}+C<2Ck^{\frac{1}{\alpha-1}}$ *and* $A<A(k,\alpha)$, *where* $A(k,\alpha)=\dfrac{(B^{*}+C)^{2}}{B^{*}+C-2Ck^{\frac{1}{\alpha-1}}}<0$,

the critical probability, p, is always greater than 0.5.*

The proof of proposition 2 is in the appendix.

Proposition 2 indicates that the probability range for announcing earnings in period 1 is more narrow than the range for postponing reporting to period 2, therefore type 4 firms are more likely to postpone their announcements.

For type 2 and type 3 firms, we are not sure whether x_1 is bigger than x_2 or not, therefore we are not sure whether p^* is greater than 0.5 or not. In this way, we identify that these two types of firms have no strong tendencies, and whether they would advance the earnings announcement, or would postpone the earnings announcement depending on managers' beliefs on p.

By far, we have proved formally the observation 1 in section 2 that firms will probably advance the earnings announcement if their earnings is increased related to the prior year, i.e., $A>0$, and will probably delay the earnings announcement if the earnings is decreased related to the prior year, i.e., $A<0$. In the following, we give proposition 3 to verify the observation 2.

Proposition 3

Given A and C, the critical probability, p, is increasing in B*– A.*

The proof of proposition 3 is in the appendix.

Proposition 3 implies that if B^*-A increases, which implicates better news would be brought by increased B^* as A is given, p^* is increasing, and as we have shown above, it is more possible for firms to advance the announcements. Inversely, with B^*-A decreases, which implicates worse news would be brought by decreased B^* as A is given, p^* is

decreasing, and it is more possible for firms to delay the announcements. Particularly, when B^* increases to some extent that turns B^*-A from negative to positive, firms will change their choice from advancing earnings announcement to delaying earnings announcement, which support the observation 2. However, proposition 3 go further than observation 2 in that it indicates that p^* varies with B^*-A, which implies that managers' belief on news B may change the firm's earnings announcement dates.

4. Empirical evidence from listed Chinese firms

4.1 Data

The China Securities Regulatory Commission (CSRC) requires all listed firms to make earnings announcements of the fiscal year by the end of April in next year. As requested, listed Chinese firms should forecast the announcement date and put it on records of the CSRC. Although firms could do some adjustment on the date later, for most firms, the difference between the actual announcement date and the forecast one is little. Hence, managers should make decision on when to report their earnings announcement at the end of the fiscal year. In the Chinese stock market, there are two kinds of shares in circulation among public shareholders: A-shares and B-shares. A-shares are common stocks, denominated in Chinese Renminbi, and are only available to domestic investors. B-shares are common stocks denominated in foreign currencies and are only available to international investors during our sample period. The B-shares that are listed on the Shanghai Stock Exchange (SHSE) are traded in the U.S. dollars, while those on the Shenzhen Stock Exchange (SZSE) are traded in Hong Kong dollars. In this paper, we focus on the announcement dates for firms who issue A-shares.

6894 earnings announcement dates for listed firms and other related data were collected from the China Stock Market and Accounting Research (CSMAR) database for the years 1999 to 2004. We delete samples in two industries because the number of firms in "wood and furniture" industry are too few to do industry-wide analysis and firms belonging to "the other" industry cannot compare their earnings with each other, thus the sample remains 6813 earnings announcement dates in 19 industries. Because the prior year's earnings announcement dates and other accounting data are used as expected values, the final samples were reduced to 5904, from 2000 to 2004.

4.2 Hypotheses and methodology

The variables used in our empirical test are listed in table 3.

Table 3 is inserted here

The primary hypothesis that we test is the relation between the unexpected reporting lag and unexpected earnings as predicted by the good news early bad news late relation. By unexpected reporting lag, we mean the difference between the reporting lag for the fiscal year and the expected reporting lag, where the expected one is proxied by the reporting lag in the prior year, and the reporting lag is defined as the number of days from the end of the fiscal year to the actual announcement date in the next year[3]

[3] Ideally, we should use firms' forecasted announcement date to the CSRC at the end of the fiscal year as the measure of the reporting lag because in our framework, managers choose the announcement dates on the basis of their expectations on news *B* at the end of the fiscal year. However, the forecasted announcement date is unavailable for us and we use the actual announcement date as a substitute to compute the reporting lag.

H1: *Firms with increased earnings related to the prior year probably advance reporting date, and firms with decreased earnings related to the prior year probably delay their announcement date.*

Haw et al.(2000), Owusu-Ansah(2000), Ku Ismail and Chandler(2003), Chen et al.(2003), testing firms in emerging capital markets, such as China, Malaysia, and Zimbabwe, and Givoly and Palmon(1982), Bergley and Fischer(1998), testing firms in mature capital markets, such as U.S. market, find evidences which is consistent with this hypothesis. In our paper, H1 indicates that news *A* is negatively related to the reporting lag, which is theoretically deduced from observation 1 in section 2 and proposition 1 and 2 in section 3.

As we have emphasized in this paper, not only news *A*, but also news *B* has impact on the firm's announcement pattern. According to observation 2 and proposition 3, we go further to test the following hypotheses:

Hypothesis 2a: *Firms tend to delay the reporting date if* $\Delta NEWS>0$, *and tend to advance the reporting date if* $\Delta NEWS<0$.

Hypothesis 2b: *The probability of delaying the earnings announcement is increasing with ΔNEWS.*

The implication of hypothesis 2a and 2b is that firms tend to delay reporting earnings waiting for news *B* to be better than news *A*, and prefer advancing reporting earnings if they believe that waiting only brings worse news *B* than news *A*. The three propositions in section 3 will be empirically proved if both hypothesis 1 and 2 are true.

4.3 Results

Before testing our hypothesis, in table 4 some basic descriptive statistics for type 1-4 firms' choice of announcement dates are reported.

Table 4 is inserted here

Table 4 illustrates in each four types of firms as described as table 1 respectively, the number of firms who advance, delay, or maintain their earnings announcement date. Since there are 452 observations with A=0, the sum of the type 1 to type 4 observations is equal to 5452.

Firstly we observe table 4 vertically. In table 4, Column 1(C1) indicates that for 2936 observations whose earnings have increased related to the prior year, i.e., A>0, there are 1546 (52.72%) observations who advance earnings announcement and 1289 (43.9%) observations who delay earnings announcement. χ^2 test the null hypothesis that the difference in the percentage of observations between advancing and delaying announcements is zero, and χ^2 =23.65 reject the null hypothesis at 99% significant level, which implies that for firms whose earnings announcements conveys a good "news A", they prefer to advance their earnings announcements. Column 2(C2) indicates that for 2516 observations whose earnings have decreased related to the prior year, i.e., A<0, there are 984 (39.11%) observations who advance earnings announcements and 1434 (57%) observations who delay earnings announcements, and χ^2 =83.75 reject the null hypothesis

that the difference in the percentage of observations advancing and delaying announcements is zero at 99% significant level, which implies that for firms whose earnings announcements conveys a bad "news *A*", they tends to delay their earnings announcements. Thus from the descriptive statistics on C1 and C2, we find some primary evidences to support the observation 1 mentioned above in section 2.

Then we observe table 4 horizontally. Row 1(R1) illustrates that for 2876 observations with $\Delta NEWS<0$, that is, relative to news *A*, no matter *A* sis good or bad news itself, news *B* is the news that is worse than news *A*, there are 1349 (46.91%) observations who advance earnings announcement and 1405 (48.85%) observations who delay earnings announcement, and χ^2 =1.14 indicates that the difference in the percentage of observations advancing and delaying announcements is not statistically significant, which implies that there is no clear tendency for firms to advance or delay announcements when $\Delta NEWS<0$ and it seems not to agree with what the observation 2 indicates. However we cannot conclude that it is the fact only *via* descriptive statistics, and it needs further formal analysis. Row 2 (R2) illustrates that for 2576 observations with $\Delta NEWS>0$, that is, relative to news *A*, news *B* is the news that is better than news *A*, there are 1183 (45.92%) observations who advance earnings announcements and 1318 (51.16%) observations who delay earnings announcement, and χ^2 =7.29 indicates that the difference in the percentage of observations advancing and delaying announcements is significant, which implies that firms prefer to delaying announcements when $\Delta NEWS>0$, and it is primarily consistent with what the observation 2 indicates.

Test of hypothesis 1

In table 5, the sample is put into 10 portfolios based on the size of *A*, from the lowest *A* group to the highest *A* group (here we employ Chambers and Penman's (1984) and Begley and Fischer's (1998) method). We find that for the firms from Q1 to Q5 with negative *A*, whose average are respectively -0.17, -0.02, -0.01, -0.003, -0.0001, will significantly delay their earnings announcement by 8.02, 8.16, 5.94, 3.88, 1.19 days respectively. We also find that the firms belonged to Q9 and Q10 with average positive *A*, whose average are respectively 0.02 and 0.10, will significantly advance their earnings announcement by 5.93 and 9.44 days respectively. In the last two columns of table 5, the t-test and the Mann-Whitney test test the null hypothesis that portfolio 10 announcements are not significantly earlier or later than portfolio 1 announcements, and both tests reject the null hypothesis and the results show that portfolio 10 announcements are significantly earlier than the portfolio 1 announcements. Hence, hypothesis 1 is supportedd and firms with increased earnings related to the prior year probably advance announcement, and firms with decreased earnings are more likely to delay their announcement dates.

Table 5 is inserted here

Test of hypothesis 2a

In table 6, the sample is put into 10 portfolios based on the size of Δ*NEWS*, from the lowest Δ*NEWS* group to the highest Δ*NEWS* group. Δ*NEWS* is equal to *B* minus *A*, where *B* is measured by the firm's adjusted *EPS* less the industrial median adjusted *EPS*.

$\Delta NEWS>0$ means that news *B* is better news when compared to news *A*, and $\Delta NEWS>0$ means that news *B* is worse news when compared to news *A*. We find that for the firms belonging to P1 with the most negative $\Delta NEWS$, whose average is -0.12, will significantly delay their earnings announcement by 7.77 days. We also find that the firms belonged to P10 with the most positive news *A*, whose average is 0.03, will significantly advance their earnings announcement by 2.49 days. In the last two columns of table 6, the t-test and the Mann-Whitney test test the null hypothesis that portfolio 10 announcements are not significantly earlier or later than portfolio 1 announcements, and both tests reject the null hypothesis and the results show that portfolio 10 announcements are significantly later than the portfolio 1 announcements. Hence, hypothesis 2a is proved and firms probably delay reporting earnings while waiting for better news *B* than news *A*, or advance reporting earnings if they believe that waiting only brings worse news than news *A*.

Table 6 is inserted here

Test of hypothesis 2b

Then, we go further to test hypothesis 2b and see if the probability of delaying the earnings announcement is increasing with $\Delta NEWS$ by logistic model. Firstly, we recode ΔLAG into a standard 0-1 variable, denoted by *SYMBOL*, which can be specified as:

$$SYMBOL = \begin{cases} 0 & if\ the\ \ firm\ \ advance\ the\ earnings\ announcement \\ 1 & if\ the\ \ firm\ \ delay\ the\ earnings\ announcement \end{cases},$$

and the logistic model is given by:

$$P(SYMBOL=1)=F(Z)=\frac{1}{1+e^{-Z}}=\frac{1}{1+e^{-[a_0+a_1A+a_2\Delta NEWS+a_3\Delta\log(MV)]}}.$$ [4]

Here $\Delta LOG(MV)$ is the proxy for the firms size as a control variable. Firstly, we randomly sample the total observations into 2 groups *via* the SPSS program, in which 50 percent of the total sample enters the prediction group and the other 50 percent enters the test group, thus each group contains 2628 observations (648 samples with $\Delta\ LAG_{i,t}=0$ is excluded from the estimation, and there remains 5256 observations in total).

We put the prediction group into regression and the result is reported in table 7.

Table 7 is inserted here

In table 7, we find that the probability of delaying announcement dates is decreasing in news *A* and the change of firm size, $\Delta LOG\ (MV)$, but is increasing in $\Delta NEWS$, which is exactly consistent to H2b and the proposition 3 in section 3 has been supported perfectly empirically. It is worth noting that news *B*, contrary to news *A*, giveS the motivation for managers to deviate the rule of good news early bad news late, and it is neglected by previous literatures.

Then we use the test group to testify the prediction power of the logistic model. The method is to put regression coefficients from a_0 to a_3 into the estimation equation and then compute *P* for each sample. We expect that firms with $P\geqslant 0.5$ would delay their earnings announcement, and firms would advance the announcement if $P<0.5$. The prediction result

[4] We have done Spearman correlation analysis on the 3 explanatory variables before estimating the logistic model, and the absolute value of correlation coefficient between any two variables is less than 0.5 but significantly different from zero at 0.01 level. Specifically, the correlation coefficient between *A* and $\Delta NEWS$ is -0.168.

is depicted in table 8.

Table 8 is inserted here

Table 8 shows that the proportion of total correct prediction approaches 58%, and for firms who delay announcements, the proportion of correct prediction is close to 70%. Thus, we can conclude that our model succeeds to predict delay of firms' announcement dates. Whereas, the model fails to predict firms' advancing reports, which may result from managers' conservatism when they expect news *B*, that is, they tend to underestimate news *B* than it really is, which implies that some firms should delay their earnings announcement but advance it. Another possible reason may lies in that managers believe that the shareholders may view the delay of announcement as the signal of bad news, therefore they will avoid delaying reports even if they believe that delay will bring better news *B* to shareholders.

In this section, we have found strong empirical evidence by testing hypotheses 1, 2a and 2b to support the propositions 1-3 in our theoretical model, and we conclude that firms tends to advance earnings announcement because managers believe that delaying announcement until news *B* is revealed may decrease shareholders' evaluation on firm's value, and firms prefer to postpone their earnings announcement because managers think that delaying until news *B* is revealed may increase the shareholder's evaluation of them.

5. Conclusion

In this paper, we try to answer one question: how does news revealed from the earnings announcement impact on the firm's announcement pattern, and why? We divide news contents into two aspects, news *A* (unexpected earnings related to the prior year) and news *B* (unexpected earnings related to the industry-wide medium earnings), and the role news *B* plays in determining the firm's announcement dates is what we are really interested in because news *B* is the news revealing whether from the earnings announcement is determined by managers through manipulating the announcement dates. To the authors' knowledge, few literatures on the timeliness of earnings announcement have taken news *B* into account but as we have showed, studying on news *B* gives us an opportunity to learn if managers indeed manipulate their reporting lag in order to maximize the shareholders' assessment on the firm's value. In our model, we assume shareholders behave as prospect theory describes, that is, they are reference dependent, loss averse and with diminishing sensitivity, and we find that it is just the disparity between the shareholders' valuations of gains and losses that motivate managers to manipulate the reporting lag. Our main conclusion is that firms show different announcement pattern according to managers' belief on news *B*: firms tends to advance earnings announcement because managers believe that delaying announcement until news *B* is revealed may decrease shareholders' evaluation on firm's value, and firms prefer to postpone their earnings announcement because managers think that waiting until news *B* is revealed may increase the shareholder's evaluation on them, and the empirical test using listed Chinese firms as sample gives strong evidences for our conclusions.

References

[1] Barberis, N., and Huang, M., 2001, Mental accounting, loss aversion, and individual stock returns, *Journal of Finance*, LVI(4), 1247-1292.

[2] Begley, J., and Fischer, P. E., 1998, Is there Information in an Earnings Announcement Delay?, *Review of accounting studies*, 3 347-363.

[3] Benartzi, S., and Thaler, R. H., 1995, Myopic loss aversion and the equity premium puzzle, Quarterly journal of economics, 110(1), 73-92.

[4] Burgstahler, D., and Dichev, I., 1997, Earnings management to avoid earnings decreases and losses. *Journal of accounting and economics*, 24, 99–126.

[5] Chambers, A.E., and Penman, S.H.,1984, Timeliness of reporting and the stock price reaction to earnings announcements, *Journal of accounting research*, 22, 21-47.

[6] Chen, G., Cheng L. T. W., and Gao, N., 2003, Information content and timing of earnings announcements, *Journal of business finance and accounting*, 32,65-92.

[7] Degeorge, F., Patel, J., and Zeckhauser, R., 1999, Earnings management to exceed thresholds. *Journal of business*, 72 (1), 1–33.

[8] Dye, R. A., and Sridhar, S. S., 1995, Industry-wide disclosure dynamics, *Journal of accounting research*, 33(1), 157-174.

[9] Givoly, D., and Palmon, D., 1982, Timeliness of annual earnings announcements: some empirical evidence, *Accounting review*, 57(3), 486-508.

[10]Grinblatt, M., and Han, B., 2005, Prospect theory, mental accounting and momentum, *Journal of financial economics*, 78,311-339.

[11]Haw, In-Mu, Qi D., and Wu W, 2000, Timeliness of annual report releases and market

reaction to earnings announcements in an emerging capital market: The case of China, *Journal of international financial management and accounting*, 11(2), 108-131.

[12]Kahneman, D., and Tversky, A., 1979, Prospect theory: An analysis of decision under risk, *Econometrica*, 47, 263-291.

[13]Ku Ismail, K. N. I., and Chandler, R., The Timeliness of quarterly financial reports of companies in Malaysia (June 2003). *http://ssrn.com/abstract=415047*.

[14]Lawrence, E. C., 1983, Reporting delays for failed firms, *Journal of accounting research*, 22(1), 606-610.

[15]Owusu-Ansah, S., 2000, Timeliness of corporate financial reporting in emerging capital markets: empirical evidence from the Zimbabwe Stock Exchange, *Accounting and business research*, 30(3), 241-254.

[16]Shen C. H, and Chih H. L., Investor protection, prospect theory, and earnings management: an international comparison of the banking industry, *Journal of banking and finance*, 2005, 29(10), 2675-2697.

[17]Watts, R. L., and Zimmerman, J. L., 1986, *Positive accounting theory*, Englewood Cliffs, New Jersey: Prentice-Hall.

[18]Watts, R. L., and Zimmerman, J. L., 1990, Positive accounting theory: a ten year perspective, *Accounting review*, 65(1), 131-156.

Appendix

The proof of proposition 1.

(a) If $B^{-}=B^{*}-C\geqslant 0$, we have,

$$x_1 = U(B_w^+) - U(A) = U'(\xi_1)(B_w^+ - A) = U'(\xi_1)(1-w)[C-(A-B^{*})],$$

and

$$x_2 = U(A) - U(B_w^-) = U'(\xi_2)(A - B_w^-) = U'(\xi_2)(1-w)[C+(A-B^{*})]$$

where $A \le \xi_1 \le B_w^+$, and $0 \le B_w^- \le \xi_2 \le A$.

It is obvious that $\xi_1<\xi_2$, and $U(x)$ is a concave and strict increasing function when $x>0$ as we have assumed. Thus, we get $U'(\xi_1) < U'(\xi_2)$. For type 1 firms, $A>0$, $B^{*}<A$, then we have the following inequality:

$$0<x_1<x_2.$$

Therefore, $p^{*} = \dfrac{x_1}{x_1 + x_2} < 0.5$.

(b) If $B^{*}-C<0$, then $B_w^- = wA + (1-w)(B^{*}-C)$ is possible to be negative. If $w=1$, $B_1^- = A > 0$, and if $w=0$, $B_0^- = B^{*}-C < 0$. So there exits a $w_0 = \dfrac{-B^{*}+C}{A+(-B^{*}+C)}$ which makes $B_{w_0}^- = 0$, and when $w> w_0$, $B_w^- > 0$, then $p^{*} <0.5$ is still hold.

when $w< w_0$, $B_w^- < 0$. We define a positive δ to identify the difference between w_0 and w. Then we can rewrite B_w^- and B_w^+ as the following specification:

$$\begin{aligned} B_w^- &= (w_0-\delta)A + [1-(w_0-\delta)](B^{*}-C) \\ &= w_0 A + (1-w_0)(B^{*}-C) - \delta(A - B^{*}+C). \\ &= B_{w_0}^- - \delta(A - B^{*}+C) = -\delta(A - B^{*}+C) \end{aligned}$$

$$\begin{aligned} B_w^+ &= (w_0-\delta)A + [1-(w_0-\delta)](B^{*}+C) \\ &= w_0 A + (1-w_0)(B^{*}+C) + \delta(B^{*}+C-A) \\ &= B_{w_0}^+ + \delta(B^{*}+C-A) \end{aligned}$$

Let $x_1^0 = U(B_{w_0}^+) - U(A)$, and $x_2^0 = U(A) - U(B_{w_0}^-) = U(A)$, we can rewrite x_1 and x_2 as the follows:

$$x_1 = U(B_w^+) - U(A) = U(B_w^+) - U(B_{w_0}^+) + U(B_{w_0}^+) - U(A) = \Delta x_1 + x_1^0,$$

$$x_2 = U(A) - U(B_w^-) = U(A) - U(B_{w_0}^-) + U(B_{w_0}^-) - U(B_w^-) = \Delta x_2 + x_2^0.$$

We have proved before that $x_2^0 > x_1^0$, and we have,

$$\Delta x_1 = U(B_w^+) - U(B_{w_0}^+) = U'(\eta_1)(B_w^+ - B_{w_0}^+) = U'(\eta_1)\delta(B^* + C - A), \quad \text{and}$$

$$\Delta x_2 = U(B_{w_0}^-) - U(B_w^-) = U(0) - U(B_w^-) = U(0) - U[-\delta(A - B^* + C)] = U'(\eta_2)\delta(A - B^* + C),$$

where $B_{w_0}^+ \le \eta_1 \le B_w^+$ and $B_w^- \le \eta_2 \le 0$.

As we have defined in our model that the shareholders' value function is given by:

$$U(x) = \begin{cases} x^\alpha & x \ge 0 \\ -k(-x)^\alpha & x < 0 \end{cases}, \text{ where } 1>\alpha>0, \ k>1.$$

When *x* is negative, *U*(*x*) is a convex and increasing function, thus the inequality holds as below:

$$U'(\eta_2) \ge U'(B_w^-) = U'(B^* - C) = k\alpha(-B^* + C)^{\alpha-1}.$$

When *x* is positive, *U*(*x*) is a concave and increasing function, therefore we have:

$$U'(\eta_1) \le U'(B_{w_0}^+) = U'\left(\frac{2AC}{A + C - (B^* - C)}\right) = \alpha\left(\frac{2AC}{A + C - (B^* - C)}\right)^{\alpha-1}.$$

Let $A(k, \alpha) = \dfrac{(B^* - C)^2}{2Ck^{\frac{1}{1-\alpha}} + B^* - C}$, and if $A \geqslant A(k, \alpha)$, then there must be

$$\alpha\left(\frac{2AC}{A + C - (B^* - C)}\right)^{\alpha-1} \le k\alpha(-B^* + C)^{\alpha-1},$$

and we get

$$U'(\eta_1) < U'(\eta_2).$$

Because of $B^* < A$, then we get $\Delta x_1 < \Delta x_2$, and withal, $x_2^0 > x_1^0$, we find that:

$$x_2 = x_2^0 + \Delta x_2 > x_1^0 + \Delta x_1 = x_1.$$

Therefore, $p^* = \dfrac{x_1}{x_1 + x_2} < 0.5$.

Q.E.D.

The proof of proposition 2

(a) if $B^{-}=B^{*}+C\leqslant 0$, we have,

$$x_1 = U(B_w^+) - U(A) = U'(\xi_1)(B_w^+ - A) \\ = U'(\xi_1)(1-w)[C + (B^* - A)]$$

,

and

$$x_2 = U(A) - U(B_w^-) = U'(\xi_2)(A - B_w^-) \\ = U'(\xi_2)(1-w)[C - (B^* - A)]$$

where $A \le \xi_1 \le B_w^+$, and $0 \le B_w^- \le \xi_2 \le A$.

It is obvious that $0>\xi_1 \geqslant \xi_2$, and $U(x)$ is a convex and strict increasing function when $x<0$ as we have assumed. Thus, we get $U'(\xi_1) > U'(\xi_2)$. For type 4 firms, $A<0$, $B^{*}>A$, then we have the following inequality:

$$0<x_2<x_1.$$

Therefore, $p^* = \dfrac{x_1}{x_1 + x_2} > 0.5$.

(b) If $B^{*}+C>0$, then $B_w^+ = wA + (1-w)(B^* + C)$ is possible to be negative. If $w=1$, $B_1^+ = A < 0$, and if $w=0$, $B_0^+ = B^* + C > 0$. So there exits a $w_0 = \dfrac{B^* + C}{B^* + C - A}$ which makes $B_{w_0}^+ = 0$, and when $w> w_0$, $B_w^+ < 0$, then $p^{*} >0.5$ is still hold.

when $w< w_0$, we get $B_w^+ > 0$. We define a positive δ to identify the difference between w_0 and w. Then we have the following specification:

$$B_{w_0}^- = w_0 A + (1-w)(B^* - C) = \frac{(B^* + C)A}{B^* + C - A} + \frac{(-A)(B^* - C)}{B^* + C - A} = \frac{2AC}{B^* + C - A}$$

.

Let

$x_1^0 = U(B_{w_0}^+) - U(A) = -U(A)$, and

$x_2^0 = U(A) - U(B_{w_0}^-) = U(A) - U(\dfrac{2AC}{B^* + C - A})$, we can rewrite x_1 and x_2 as the follows:

$$x_1 = U(B_w^+) - U(A) = U(B_w^+) - U(B_{w_0}^+) + U(B_{w_0}^+) - U(A) \\ = \Delta x_1 + x_1^0$$

,

$$x_2 = U(A) - U(B_w^-) = U(A) - U(B_{w_0}^-) + U(B_{w_0}^-) - U(B_w^-)$$
$$= \Delta x_2 + x_2^0 \quad .$$

We have proved before that $x_2^0 < x_1^0$, and we have,

$$\Delta x_1 = U(B_w^+) - U(B_{w_0}^+) = U'(\eta_1)(B_w^+ - B_{w_0}^+)$$
$$= U'(\eta_1)[(w_0 - \delta)A + (1 - w_0 + \delta)(B^* + C)], \quad \text{and}$$
$$= U'(\eta_1)\delta[C + (B^* - A)]$$

$$\Delta x_2 = U(B_{w_0}^-) - U(B_w^-) = U(\frac{2AC}{B^* + C - A}) - U[(w_0 - \delta)A + (1 - w_0 + \delta)(B^* - C)]$$
$$= U(\frac{2AC}{B^* + C - A}) - U[\frac{2AC}{B^* + C - A} - \delta(A - B^* + C)] \quad ,$$
$$= U'(\eta_2)\delta[C - (B^* - A)]$$

where $0 \le \eta_1 \le B_w^+ = B^* + C$ and $B^* - C \le B_w^- \le \eta_2 \le B_{w_0}^- = \frac{2AC}{B^* + C - A}$.

As we have defined in our model that the shareholders' value function is given by:

$$U(x) = \begin{cases} x^\alpha & x \ge 0 \\ -k(-x)^\alpha & x < 0 \end{cases}, \text{ where } 1 > \alpha > 0, \ k > 1.$$

Thus, $U'(\frac{2AC}{B^* + C - A}) = k\alpha(-\frac{2AC}{B^* + C - A})^{\alpha - 1}$ and

$$U'(B^* + C) = \alpha(B^* + C)^{\alpha - 1}.$$

If $k\alpha(-\frac{2AC}{B^* + C - A})^{\alpha - 1} < \alpha(B^* + C)^{\alpha - 1}$, then we have:

$$(-A)[2C - k^{\frac{1}{1-\alpha}}(B^* + C)] > k^{\frac{1}{1-\alpha}}(B^* + C)^2 .$$

When $B^* + C < 2Ck^{\frac{1}{\alpha - 1}}$, there exits a $A(k, \alpha)$ which let both sides of the above inequality become equal as follows:

$$A(k, \alpha) = \frac{(B^* + C)^2}{B^* + C - 2Ck^{\frac{1}{\alpha - 1}}},$$

and when $A < A(k, \alpha)$, $U'(B^* + C) > U'(\frac{2AC}{B^* + C - A})$.

Therefore, we can get a series of inequalities:

$$U'(\eta_2) \le U'(\frac{2AC}{B^* + C - A}) < U'(B^* + C) \le U'(\eta_1),$$

so we get $\Delta x_1 > \Delta x_2$, and withal, $x_1^0 > x_2^0$, we find that:

$$x_1 = x_1^0 + \Delta x_1 > x_2^0 + \Delta x_2 = x_2 .$$

Therefore, $p^* = \frac{x_1}{x_1 + x_2} > 0.5$.

Q.E.D.

The proof of proposition 3

B_w^+ and B_w^- can be rewritten as another specification for convenience:

$B_w^+ = wA + (1-w)(B^* + C) = (1-w)(B^* - A) + A + (1-w)C$, and

$B_w^- = wA + (1-w)(B^* - C) = (1-w)(B^* - A) + A - (1-w)C$.

Define $X = B^* - A$, and the first order derivative of $p^* = \frac{x_1}{x_1 + x_2}$ with respect to X is given by:

$$\frac{dp^*}{dX} = \frac{d}{dX}\left(\frac{x_1}{x_1 + x_2}\right) = \frac{(x_1 + x_2)x_1' - x_1(x_1 + x_2)'}{(x_1 + x_2)^2} = \frac{x_2 x_1' - x_1 x_2'}{(x_1 + x_2)^2}.$$

Because that

$$x_1' = [U(B_w^+) - U(A)]_X' = (1-w)U'(B_w^+) > 0 \quad \text{and}$$

$$x_2' = [U(A) - U(B_w^-)]_X' = -(1-w)U'(B_w^-) < 0,$$

we get $\frac{dp^*}{dX} > 0$, that is, p^* is increasing in $B^* - A$.

Q.E.D.

Table 1 Four types of firms

	$A>0$	$A<0$
$B^*<A$	Type 1	Type 3
$B^*>A$	Type 2	Type 4

Table 2 The announcement pattern of the four types firms

	$A>0$	$A<0$
$B^*<A$	Firms probably advance the earnings announcement	Show no strong tendencies
$B^*>A$	Show no strong tendencies	Firms probably delay the earnings announcement

Table 3 Definition of the variables

Variables' Name	Variables' Definition
$\Delta LAG_{i,t}$ unexpected reporting lag	$\Delta LAG = LAG_{i,t} - LAG_{i,t-1}$, where $LAG_{i,t}$ is the actual earnings announcement *lag* for firm *i* at year *t* and is defined as the number of days from the end of the fiscal year to the actual announcement date in the next year.
$A_{i,t}$ Unexpected adjusted *EPS* related to prior year	$A_{i,t} = EPS_{it}/p_{i,t} - EPS_{i,t-1}/p_{i,t-1}$, where EPS_{it} is the reported earnings per share for firm *i* at year *t*, and $p_{i,t}$ is the close price of firm *i* on the last day of year *t*.
$B_{i,t}$ Unexpected adjusted *EPS* related to industrial median adjusted *EPS*.	$B_{i,t} = EPS_{it}/p_{i,t} - EPS_{ind,t}$, where $EPS_{ind,t}$ is the median adjusted $EPS_{it}/p_{i,t}$ in an industry at year *t*. $B_{i,t} > 0$ implicates that firms performs better than the median performance level of the whole industry, and $B_{i,t} < 0$ implies that the firm's performance is under the median performance of the whole industry.
$\Delta NEWS_{i,t}$	$\Delta NEWS_{i,t} = B_{i,t} - A_{i,t}$
$\Delta LOG(MV_{i,t})$ The change of firm's market value	$\Delta LOG(MV_{i,t}) = LOG(MV_{i,t}) - LOG(MV_{i,t-1})$, where $MV_{i,t}$ is the market value for firm *i* at year *t*, and is a proxy for firm size.

Table 4 Descriptive statistics for the reporting lag of type 1-4 firms during 2000-2004 period *

		C1: $A>0$			C2: $A<0$			SUM	χ^2 test
		$\Delta LAG<0$ Observations (Percentage)	$\Delta LAG>0$ Observations (Percentage)	$\Delta LAG=0$ Observations (Percentage)	$\Delta LAG<0$ Observations (Percentage)	$\Delta LAG>0$ Observations (Percentage)	$\Delta LAG=0$ Observations (Percentage)		
R1: $\Delta NEWS<0$ *i.e.*, $B<A$	$\Delta LAG<0$ Observations (Percentage)	930 (53.42%)	--	--	419 (36.92%)	--	--	1349 (46.91%)	1.14
	$\Delta LAG>0$ Observations (Percentage)	--	747 (42.91%)	--	--	658 (57.97%)	--	1405 (48.85%)	
	$\Delta LAG=0$ Observations (Percentage)	--	--	64 (3.67%)	--	--	58 (5.11%)	122 (4.24%)	
R2: $\Delta NEWS>0$ *i.e.*, $B>A$	$\Delta LAG<0$ Observations (Percentage)	618 (51.72%)	--	--	565 (40.91%)	--	--	1183 (45.92%))	7.29***
	$\Delta LAG>0$ Observations (Percentage)	--	542 (45.36%)	--	--	776 (56.19%)	--	1318 (51.16%)	
	$\Delta LAG=0$ Observations (Percentage)	--	--	35 (2.92%)	--	--	40 (2.90%)	75 (2.92%)	
SUM		1548 (52.72%)	1289 (43.9%)	99 (3.38%)	984 (39.11%)	1434 (57%)	98 (3.89%)	5452 (100%)	
χ^2 test		23.65***			83.75***				

*Data are colleted from the China Stock Market and Accounting Research (CSMAR) database

*** indicates significance at 1% level

Table 5 Portfolio test of good news early/bad news late hypothesis. Announcements are ranked and put into portfolios based on the size of *A*.[a]

		Bad news									Good news		
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	*t* test	Mann-Whitney test (sig)
A	Average	-0.17***	-0.02***	-0.01***	-0.003***	-0.0001***	0.001***	0.005***	0.009***	0.02***	0.10***	11.23***	0.00
	Average ΔLAG[b]	8.02***	8.16***	5.94***	3.88***	1.19**	0.99	-0.22	-0.49	-5.93***	-9.44***	-17.05***	0.00

a. A is measured by the actual adjusted EPS in year t less adjusted EPS in year t-1.

b. $\Delta LAG = LAG_{i,t} - LAG_{i,t-1}$, where $LAG_{i,t}$ is the actual earnings announcement *lag* for firm *i* at year *t* and is defined as the number of days between the end of year *t* and the announcement of year *t*'s earnings.

**(***) indicates significance at the 5%(1%) based on a two-tailed test. The individual portfolio significance tests test the null hypothesis that the portfolio mean is not significantly different from zero. The t-test and the Mann-Whitney test test the null hypothesis that portfolio 10's average *A* is not significantly greater than portfolio 1's average *A*, and portfolio 10 announcements are not significantly earlier or later than portfolio 1 announcements.

Table 6 Portfolio test of the impact of Δ*NEWS*[a] on the unexpected reporting lag. Announcements are ranked and put into portfolios based on the size of ΔNEWS[a].

	Bad news									Good news		
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	*t* test	Mann-Whitney test (sig)
Average Δ*NEWS*	-0.12***	-0.02***	-0.01***	-0.006***	-0.002***	0.001***	0.005***	0.009***	0.016***	0.03***	-19.08***	0.00
Average Δ*LAG*[b]	-7.77***	1.63*	2.77***	1.62*	2.13**	1.77*	1.89*	3.77***	1.78	2.49***	-6.18***	0.00

a. Δ*NEWS*= *B* – *A* where *B* is measured by the firm's adjusted *EPS* less the industrial median adjusted *EPS*, and *A* is measured by the actual adjusted *EPS* in year *t* less adjusted *EPS* in year *t*-1.

b. $\Delta LAG_{i,t} = LAG_{i,t} - LAG_{i,t-1}$, where $LAG_{i,t}$ is the actual earnings announcement *lag* for firm *i* at year *t* and is defined as the number of days between the end of year *t* and the announcement of year *t*'s earnings.

*(**,***) indicates significance at the 10% (5%, 1%) level based on a two-tailed test. The individual portfolio significance tests test the null hypothesis that the portfolio mean is not significantly different from zero. The t-test and the Mann-Whitney test test the null hypothesis that portfolio 10's average Δ*NEWS* is not significantly greater than portfolio 1's average Δ*NEWS*, and portfolio 10 announcements are not significantly earlier or later than portfolio 1 announcements.

Table 7 Regression of *SYMBOL* on *A*, Δ*NEWS* and Δ*LOG*(*MV*) by logistic model

Explanatory variables	coefficients	Estimated value	*Wald* test	Cox & Snell R^2	Nagelkerke R^2
	a_0	-0.012	0.09		
A	a_1	-2.552	16.07***	0.034	0.045
Δ*NEWS*	a_2	3.815	13.85***		
Δ*LOG*(*MV*)	a_3	-0.662	38.14***		

*** indicates significance at the 1% level based on a two-tailed test. The individual coefficient significance tests test the null hypothesis that the coefficient is not significantly different from zero. The logistic model is: $P(SYMBOL=1)=F(Z)=\frac{1}{1+e^{-Z}}=\frac{1}{1+e^{-[a_0+a_1A+a_2\Delta NEWS+a_3\Delta\log(MV)]}}$, where by *SYMBOL*=1, we indicates firms delaying earnings announcement.

Table 8 Prediction power of the logistic model

	Observations	Correct prediction	False prediction	The proportion of correct prediction
Advance announcement	1257	567	690	45.11%
Delay announcement	1371	952	419	69.44%
Sum	2628	1519	1109	57.8%

Figure 1. Type 1, $A>0$, $B^*<A$

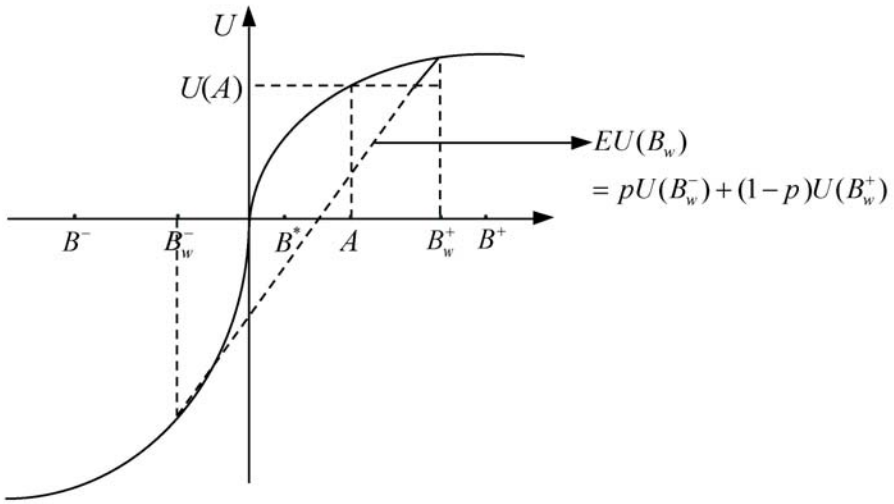

Figure 2. Type 2, $A>0$, $B^*>A$

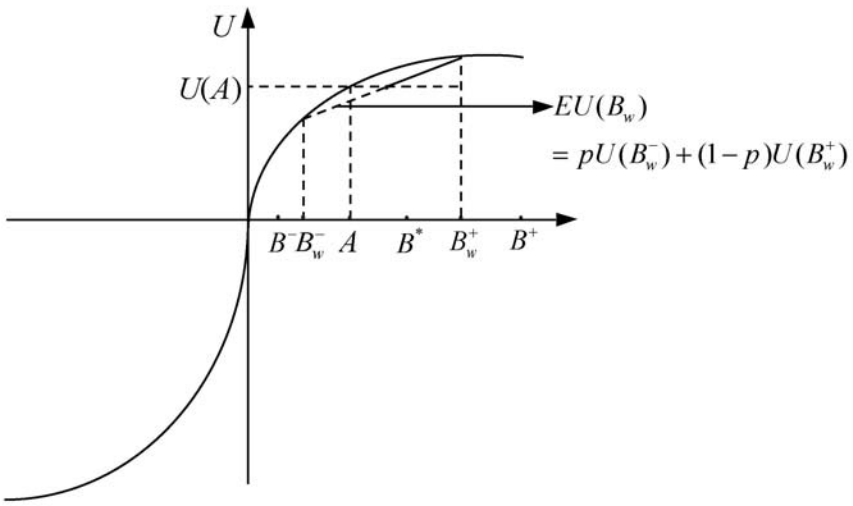

Figure 3. Type 3, $A<0$, $B^*<A$

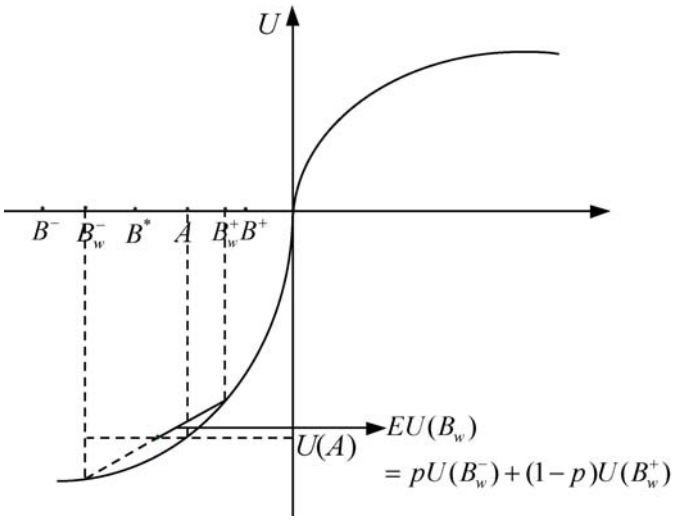

Figure 4. Type 4, $A<0$, $B^*>A$