Earnings Quality and Financial Performance

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Abstract

We extend and complement prior work investigating the earnings quality of firms with different financial health characteristics and growth prospects. By using insights from option theory to construct option-based default likelihood and growth-option factor measures that allow the use of all available firms, without being limited to a specific event, this study is in a position to provide a more clean and comprehensive setup for analyzing the earnings characteristics of the universe of firms rather than examining distressed firms with persistent losses, dividend reductions or bankruptcy-filings. We find that the relation between earnings quality and financial health is not monotonic. Distressed firms show evidence of low level of earnings timeliness for bad news and high level for good news. They also show evidence of earnings managing towards a positive target more frequently than healthy firms. On the other hand, healthy firms show evidence of high level of earnings timeliness for bad news but not for good news. Growth aspects seem to play an important role in firms ability to manage earnings. Interestingly, growth firms show evidence of earnings managing towards a positive target more frequently than value firms, in contrast to prior studies.

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1. Introduction

In recent years, especially after the major scandals of Enron and Worldcom, quality of financial information has received extensive attention. Several studies investigated financial reporting behaviour in response to various incentives related to a specific event, one of those events being the firm's financial health (Rosner, 2003, DeFond and Jimbalvo, 1994, DeAngelo et al., 1994).[1] For example, Defond and Jiambalvo (1994) examined the abnormal accruals of a sample of firms that reported debt covenant violations in annual reports. DeAngelo et al., (1994) examined accounting choice in NYSE firms with persistent losses and dividend reductions. One of the major advantages of these studies is that researchers could draw conclusions for firms that meet this specific characteristic or event. On the other hand though, financial health is much broader in nature, and by selecting a specific event, may lead to self selection bias, and thus could bias the results as well. Moreover, earnings management is also much broader in nature as well and it is not restricted to specific event either. We extend and complement prior work investigating the earnings quality, proxied by earnings timeliness and managing towards a target, of firms with different financial health characteristics and growth prospects. By using insights from option theory to construct option-based default likelihood and growth-option factor measures that allow the use of all available firms, without being limited to a specific distress event, this study is in a position to provide a

[1] For example, earnings-increasing behavior may be chosen by (existing) management acting in self-interest (possibly implying manipulation) to make managers look better and/or avoid management turnover potentially associated with the appearance of distress (e.g., to save their own jobs), or to temporarily inflate market prices and increase their own gain from cashing stock-based compensation holdings (Bergstresser and Philippon, 2005). Contrary, earnings-decreasing behavior may be due to the implementation of more conservative accounting practices during the distress period to reduce potential exposure to litigation (prudent practice, not manipulation) (Rosner, 2003). For detailed discussions of earnings management incentives literature, see Charitou et al., (2006).

more clean and comprehensive setup for analyzing the earnings choices of the universe of firms rather than examining only distressed firms with persistent losses, dividend reductions or bankruptcy-filings.

In general, prior studies show that earnings quality increases with firms' performance (Lee et al., 2006). Managers of distressed firms are expected to engage in unusual earnings practices more frequently than healthy firms mainly due to various incentives facing to mislead earnings in the thread of subsequent default. On the other hand, not all the healthy firms have high degree of earnings quality. Growth-option aspects may play an important role in earnings quality, in addition to the degree of financial health. Ghosh et al., (2005) show that firms reporting sustained increases in both earnings and revenues have higher earnings quality in comparison to firms reporting sustained increases in earnings alone, suggesting that established (value) firms have superior earnings quality. Similarly, Lee et al., (2006) suggest that because the market uses a dividend discount model to value the firm's equity, firms with higher growth rate have higher price responsiveness which triggers larger amount of managed earnings. Thus, growth firms, in general, are expected to have lower earnings quality than value firms.

Consider the case of Gesmtar, one of the most growing firms in the US the last years. Mr Yuen, ex CEO of Gemstar, made optimistic forecasts of Gemstar's advertising revenues, fired executives who disagreed about his forecast, and manipulated financial statements to show exaggerated earnings. Eg., he booked as income about $100m as revenue from royalties under a patent agreement with another company that expired and the company was in courts refusing to pay. He gave

assurances himself to his accounting firm (KPMG) who signed off on the $100m as income even though it was never billed for or received. When the following year (in the midst of spreading auditing scandals), KMPG put pressure to disclose that the revenue had not yet been collected. The stock price reaction was to wipe off $3 billion from the stock cap (eventually losing 97% from its peak). Gemstar was not under distress. To the contrary, it was growing very rapidly. Management had incentives to make optimistic forecasts to further boost the stock, and manipulated its earnings upwards to support its optimistic story.

We recognize that firms in similar financial position may face incentives to shift earnings to opposite direction.[2] It is, however, important to consider that even thought firms have incentives (and are willing) to mislead earnings (either upwards or downwards manipulation), this may not always be practicable (able). For example, when growth firms are in distress may have incentives to manipulate earnings more frequently than growth healthy firms for survival reasons (i.e., manage earnings towards a target), however, as being distressed firms they attend great attention by the market that may reduce their ability to manage earnings. On the other hand, healthy growth firms may recognize "bad news" more frequently than healthy value firms due to their ability to show losses immediately (i.e., the nature of these firms makes investors not overreacting in the presence of losses). Thus, incentive (willing) and ability to mislead earnings have to be jointly considered.[3]

[2] For example, DeFond and Jiambalvo (1994) investigate how debt covenant restrictions affect accounting choice and find positive abnormal accruals both in the year prior to and in the year of violation. On the other hand, DeAngelo, DeAngelo, and Skinner (1994) investigate specific incentives that might cause managers of troubled firms to report lower earnings.

[3] Note that our proxy for distress is based on default likelihood which may be tracked much before a distress event attracts public attention, so the overeporting of earnings may be more plausible.

In this study, therefore, we jointly consider these two factors, default likelihood and growth option factors, to provide a novel perspective regarding earnings quality. Consistent to prior evidence, the managers' behaviour is closely related to the degree of financial health and growth potential of the firms. Lee et al. (2006) suggest that prices and managerial incentives of growth firms are less sensitive to earnings and may comfortably engage in earnings averaging practices partly to mitigate the effect of higher environmental concerns (they also may not need to manipulate earnings as much to earn bonus the subsequent year). By contrast, managers of value or established firms are more sensitive to earnings figures. Thus, the incentive and ability of managers to shift earnings depend on the degree of the interaction between growth prospects and financial distress. Notice that, by splitting the sample into distress vs. growth sub-groups, we aim to investigate the earnings properties of firms in various financial positions and not to sort out the various incentives.

Most prior studies link earnings management to a specific event.[4] In contrast, Lee et al., (2006) investigate the relationship between the amount of managed earnings and firms' earnings performance and expected growth in a reporting model unrelated to a specific event. However, their model applies *only* to cases when firms face a clear motivation to inflate reported earnings, for example, in periods before firms' SEO, IPO, and stock acquisitions or before the execution of managers' opinions. Additionally, Lee et al. (2006) using the one-period framework *cannot* address earnings management with

[4] Lang, Ready and Wilson (2005); Barth, Landsman and Lang (2005); Li, Zhang and Zhou (2005), Chen, Lin, Wang, Wu (2005), Charitou, Louka and Vafeas (2007), among others.

inter-temporal nature such as earnings smoothing, timely loss recognition, managing towards a target, the reversal of accruals, and the reputation maintenance incentives.[5]

Our study extends prior studies in several respects. First, using alternative measures of earnings quality with inter-temporal nature, we investigate earnings management due to earnings timeliness and managing towards a target. Secondly, our model applies to cases when firms face motivation to shift earnings to any direction. Third, we investigate the earnings behavior of the universe of firms rather than examining only distressed firms with persistent losses, dividend reductions (DeAngelo et al., 1994, DeFond and Jiambalvo, 1994) or bankruptcy-filings (Rosner, 2003). Moreover, using insights from option theory to construct option-based default likelihood and growth-option factor measures, we explore the earnings quality of firms with different financial health characteristics and growth prospects. Overall, by using all available firms and proxies for distress and growth factors, without being limited to a specific distress event, this theoretically-grounded study is in a position to provide a more clean and comprehensive setup for analyzing the earnings properties of the universe of firms.

Our results show that the relation between earnings quality and financial health is *not* monotonic. Distressed firms show evidence of low level of earnings timeliness for bad news and high level for good news. On the other hand, healthy firms show evidence of high level of earnings timeliness for bad news but not for good news. Growth aspects seem to play an important role in firms ability and willing to manage earnings. For example, healthy

[5] Prior studies mainly use empirical models to decompose total accruals into discretionary and non-discretionary accruals (Teoh et. al., 1998). The most widely used discretionary-accruals models are variations of the Jones model. However, various empirical studies find that discretionary accruals estimated from these Jones model are correlated with performance and expected future earnings growth (Dechow et al., 2005, Kasznik, 2999, McNichols, 2000). The conventional explanation for the evident relationship between discretionary accruals and firms' performance and growth is that Jones models are mis-specified in identifying discretionary accruals. However, Lee et al., (2006) implicitly reject the conclusion of mis-specification from the existence of the relationship.

growth firms seem to recognize bad news more frequently than healthy value firms. Moreover, distressed firms seem to managing earnings towards a positive target more frequently than healthy firms. Finally, in contrast to prior evidence, we find that growth firms, in general, manage earnings towards a positive target less frequently than value firms.

This study contributes to the financial distress and earnings quality literature in several ways. First, the use of a theoretical framework in defining financial health allows unconditional sample selection, in contrast to prior *event* studies focusing on restricted sample of firms, such as firms with persistent losses, dividend reductions or bankruptcy-filings. Our unconditional sample makes it feasible to examine firms in a range of financial health situations rather than only firms in extreme or specific situations. Our methodology also allows the use of a much larger sample of firm-year observations. The larger dataset allows for higher statistical power. Third, our methodology avoids reliance on ex-post information widely used in many prior studies. Prior studies use information on firms known to have an unusual event in the relative period. This likely causes selection bias problems that in many cases may significantly affect the results. Our theoretically-based methodology avoids such sample selection problems. Finally, we use alternative measures of earnings quality with inter-temporal nature such as earnings managing towards a target and earnings timeliness in the light of Basu (1997).

The remainder of our paper is organized as follows. Section two presents our research design, data and methodology. Section three discusses our results. The final section presents our conclusions.

2. Research Design, Data and Methodology

This section presents our default likelihood and growth option measures, our earnings quality proxies and hypotheses tests.

2.1. Default Likelihood and Growth Factors

As suggested, the default likelihood (DL) summarizes a firm's financial (distress) condition. We use a default likelihood measure motivated from option theory, similar to the Black-Scholes-Merton probability of default at debt's maturity, $N(-d_2)$.[6] The basic intuition behind the option model (e.g., Merton, 1973, 1974) is that the equity of a levered firm can be viewed as a call option to acquire the value of the firm's assets (V) by paying off (i.e., having as exercise price) the face value of the debt (D) at the debt's maturity (T).[7] From this perspective, a firm will be insolvent if the value of the firm's assets falls below what the firm owes its creditors at debt maturity (i.e., when $V_T < D$). The total market value of the firm's assets at time t, V_t, is assumed to follow a standard diffusion process of the form:

$$dV_t/V_t = (\alpha - \delta)\, dt + \sigma\, dz \qquad (1)$$

where α denotes the (instantaneous) total expected rate of return on firm value, δ is the total payout by the firm (including dividends and coupon payments to debtholders) expressed as a

[6] Vassalou and Xing (2004) use Merton's option model (1974) to examine the effect of default risk on stock returns and find that default risk is systematic. KMV Corporation uses an alternative measure, distance-to-default, to discriminate among firms according to their financial performance. Charitou and Trigeorgis (2004) use option variables and cash flow/liquidity measures to explain or predict business bankruptcy based on a sample of 420 matched pairs of bankrupt and control U.S. firms for the period 1986-2001. Distance-to-Default (D2D) related to the difference between the firm's asset value (V) and the book value of debt due (D) in units of σ, measuring how many standard deviations firm value would need to move down to trigger default

[7] Essentially, from an economic perspective it is the creditors who are considered to be the owners of the firm (rather than the equityholders, who are the legal owners), with equityholders having the right to acquire the firm after paying off what they owe.

% of V, σ is the (instantaneous) standard deviation of the firm's returns (% asset value changes), and dz is an increment of a standard Wiener process.

The value of equity of such a levered firm, being analogous to a call option on the value of the firm's assets, V, is given by the Black-Scholes-Merton formula for a European call option (adjusted for a payout δ on firm value):

$$E(V, \tau) = V e^{-\delta\tau} N(d_1) - D e^{-r\tau} N(d_2) \qquad (2)$$

where $d_2 = \{\ln(V/D) + (r - \delta - 1/2\sigma^2)\,\tau\}/\,\sigma\sqrt{\tau}$; $d_1 = d_2 + \sigma\sqrt{\tau}$

N(d) = (univariate) cumulative standard normal distribution function (from $-\infty$ to d)

D = face value (principal) of the debt

V = value of firm's assets

σ = standard deviation of firm value changes (returns in V)

δ = constant payout on firm value

r = risk-free interest rate

τ ($\equiv$ T - t) = time to debt's maturity

The first term in eq. (2) above is the discounted expected value of the firm if it is solvent. $N(d_2)$ in the second term of eq. (2) is the (risk-neutral) probability the firm will be solvent at maturity, i.e., Prob($V_T > D$), in which case it will pay off the debt principal B (with a present value cost of $D e^{-r\tau}$). The (risk-neutral) probability of default at the debt's maturity is given by:

Prob. default (on principal D at maturity T) = Prob($V_T < D$) = $1 - N(d_2) = N(-d_2)$

with $d_2 = \{\ln(V/D) + (r - \delta - 1/2\sigma^2)\,\tau\}/\,\sigma\sqrt{\tau}$.[8] (3)

[8] Note that d_2, and hence Prob($V_T < D$), depend on V, D, σ, τ , r.

It is worth noting that while the value of the option depends on the risk-neutral probability of default (where d_2 depends on the value of the risk-free rate, r), the actual probability of default at the debt's maturity depends on the future value of the firm's assets and hence on the expected asset return, μ. This is obtained simply by substituting the expected return on assets, μ, for the risk-free rate, r, in the above equation for d_2, i.e.,

$$\text{Actual prob. of default (on principal B at maturity T)} = \text{Prob}(V_T < D) = N(-d_2)$$

$$\text{where } -d_2(\mu) = -\{\ln(V/D) + [(\mu - \delta) - \tfrac{1}{2}\sigma^2]\tau\} / \sigma\sqrt{\tau}. \qquad (3')$$

The main advantage of using option-pricing models in calculating the default likelihood is that they provide guidance about the theoretical determinants of bankruptcy and they supply the necessary structure to extract bankruptcy-related information from market prices. The effectiveness of accounting data based bankruptcy probability measures is being questioned for several reasons (Begley J., J. Ming and S. Watts 1996, Hillegeist et al 2004). Not only are financial statements designed to measure past performance and may therefore not be very informative about the future status of the firm, but they are also formulated under the going concern principle, which consequently limits, by design, the accuracy and reliability of the bankruptcy probability assessment. Additionally, two other important deficiencies are the failure of these accounting-based bankruptcy models to incorporate any asset volatility measure which likely leads to a substantial reduction of their performance as firms exhibit considerable cross sectional variation in volatility, as well as the fact that they face the potential shortcoming of the stock market's inefficiency to impound all publicly-available information into prices. Hillegeist et al (2004) suggest that researches should use Black-Scholes-Merton models as a proxy for the probability of bankruptcy instead of the traditional accounting-based measures which do not seem to

add any incremental information beyond the standard option variables. Grice S. J and Dugan T. M. (2001), demonstrate the necessity of researches understanding regarding the uses of the prediction models as well as their limitations.[9]

We suggest that growth-option aspects may play an important role in earnings quality, in addition to the degree of financial health. Prior studies, among others Lakonishok et al. (1994) and Berk et al. (1999), widely use book-to-market, Tobin's q and/or earnings-to-price variables to proxy for growth opportunities. However, these variables are only indirectly linked with the level of growth options and have no theoretical underpinning. Specifically, regarding the application of the B/M in prior studies as simple proxy for growth options, evidence shows that B/M is sensitive to the treatment of extreme observations (Knez and Ready, 1997), the period under study (Hawawini and Keim, 1995), and the influence of young growth stocks (Loughran, 1997). However, the most serious problems rise when combining B/M with distress. For example, when a firm has negative book value, B/M variable is impossible to distinguish if this firm is distressed or is extremely growth-oriented (having large amount of capital expenditures). In general, B/M behaves well as proxy for growth options in normal situations. Since our aim is to investigate the earnings quality of firms in different financial positions, B/M ratio is inappropriate proxy for growth options.

In contrast, we employ a theoretical measure to value the growth prospects of the firms, which is linked directly to the value of growth options. Our measure of growth

[9] An alternative source for calculating default probabilities is the bond market. One may use bond ratings or individual spreads between a firm's debt issues and an aggregate yield measure to deduce the firm's risk of default. When bond downgrades and upgrades are used as a measure of default, they rely implicitly on the assumptions that all assets within a rating category share the same default risk and that this default risk is equal to the historical average default risk. They also assume that it is impossible for a firm to experience a change in its default probability without experiencing a rating change.

opportunities is the present value of firms' growth options (GO). This variable should differentiate between firms with valuable growth options and firms with few opportunities. The basic intuition behind the calculation of GO is that the market value of the firm can be split into two components, the value of assets in place and the present value of the growth options.[10] The present value of free cash flow is the proxy for the assets in place part of firm value, which gives:

$$GO_{i,t} = V_{i,t} - PVC_{i,t} \tag{4}$$

where $V_{i,t}$ is the market value of the *whole* firm:

$$V_{i,t} = S_{i,t} + D_{i,t} \tag{5}$$

where $S_{i,t}$ is the firm's value of equity and $D_{i,t}$ is the firm's value of debts at time *t*. $PVC_{i,t}$ is the present value of the free cash flows under a zero growth hypothesis:

$$PVC_{i,t} = \frac{Free\ Cash\ Flow_{i,t}}{E[R_{i,t}]} \tag{6}$$

In equation (2), the expectation of the firm-specific discount rate, $E[R_{i,t}]$, is the weighted average cost of capital (WACC) of each firm calculated by

$$WACC_t = (1-\tau_c)k_d \frac{D}{D+S} + k_s \frac{S}{D+S}, \tag{7}$$

[10] Traditional corporate finance methodology indirectly measures growth options as the residual of total equity value less the value of assets in place. In principle, when using this excess-value approach, it is total enterprise value that should be the departure point from which growth options value is measured as a residual: Total Enterprise Value = GO + PV(A). If total enterprise value is to be inferred from the value of financial claims against enterprise value, then the value of debt must be taken into account as well. In this case, it is the capitalized value of the firm's sustainable total free cash flows that should be used to estimate PV(A), not simply earnings. Obviously, capitalizing the value of free cash flows will require the researcher to estimate an appropriate discount rate such as a WACC, or to estimate asset betas and an unlevered cost of capital, and then adjust for tax shields (e.g., to use Adjusted Present Value).

where τ_c is the tax rate of the firm, k_d the cost of debts, and k_s the cost equity (estimated by CAPM). [11]

2.2. Earnings Quality Measures

We utilize measures of accounting quality identified in prior research. We consider two measures: earnings timeliness and earnings managing towards a target. These measures are intended to provide insights regarding earnings properties relating to both upwards and downwards management.

2.2.1. Timeliness of earnings

In the light of Basu (1997) we use a formal model in which the response of reported earnings to changes in market value varies according to whether the value change is good news or bad. Basu (1997) shows that the contemporaneous sensitivity of earnings to negative returns is two to six times that of earnings to positive returns. Higher earnings quality should result in a higher association with stock returns to the extent that firms that manage earnings have a lower association between earnings and stock returns. We use two-stage procedure to obtain an R^2 measure that is unaffected by differences in value relevance across industries. In the first stage, we regress net income divided by beginning of year stock price on industry and time fixed effects. In the second stage, we regress the residuals from the first-stage regression on *Return*, which is the twelve-month stock return commencing nine months before fiscal year end and ending three months after fiscal year end (Lang,

[11] We also used an alternative measure of the growth option factors as in Trigeorgis and Lambertides (2007). A GO score is obtained from a regression using option-motivated variables such as business volatility skewness, R&D etc. Results are qualitatively similar.

Raedy, and Wilson, 2005). For ease of exposition, we label the dependent variable in the second regression *NI/P*. Timeliness is represented by the R^2 from equation (8).[12]

$$\text{NI/P} = a_0 + a_1 \text{Return} + \varepsilon \quad (8)$$

We estimate equation (8) as a "reverse" regression with accounting earnings as the dependent variable rather than stock return because this method permits us to partition firms based on the sign of the return when considering whether the association differs for good news and bad news, i.e., for positive and negative stock return. Ball, Kothari, and Robin (2000) predicts that accounting quality differences will be most pronounced for bad news because when firms have good news they have less incentive to manage earnings.[13] Similarly, we predict that healthy firms have less incentive to manage earnings than distressed firms for bad news. Distressed firms have more incentive to manage earnings in the presence of bad news (delaying recognition of losses). Therefore healthy firms are expected to timely recognize losses more frequently than distressed firms. To examine this, we estimate equation (8) separately for positive and negative return subsamples of distressed and healthy firms.[14]

Hypothesis 1: Healthy firms have a higher level of earnings timeliness than distressed firms for bad news.

[12] We test for significance in difference of R^2s in all comparisons tested based on the Cramer (1987) test.
[13] Moreover, Pope and Walker (1999) suggest that when evaluating comparative conservatism, it is important to capture two distinct properties of conservative accounting: delays in reporting good news and early recognition of bad news.
[14] We divide our sample into four categories based on the default likelihood (DL) measure in order to provide clearer evidence regarding our hypotheses and conclusions. DL1 represents most healthy firms, DL2 and DL3 represent "moderately" healthy firms, and DL4 represent highly distressed firms.

Moreover, healthy firms may use unusual earnings management in the case of good news. Since managers of healthy firms have the ability to smooth earnings (without being detected) may smooth earnings for several reasons. For example, delaying positive earnings (or earnings decreasing) may be chosen by managers, as part of a wider strategy to reach a higher target the following year, increasing their own bonus. Another reason for hiding "good news" is the managers effort to reduce temporarily the market price such as to increase their own gain from a subsequent management buyout (Perry and Williams, 1994). On the other hand, distressed firms certainly have a high level of earnings timeliness for good news since they immediately recognize gains for survivor reasons. Consistent with these arguments our second hypothesis states:

Hypothesis 2: Healthy firms have a lower level of earnings timeliness than distressed firms for good news.

Consistent with Basu (1997), we also test our hypotheses by regressing annual earnings on current annual returns and dummy variables capturing the intercept and slope effects of negative return sample as follows:

$$\text{NI/P} = \beta_0 + \beta_1 \text{Dummy} + \beta_2 \text{Return} + \beta_3 \text{Return*Dummy} + \varepsilon \quad (9)$$

where Dummy is one if Return < 0, and zero otherwise. The interactive slope coefficient, β3, measures the difference in sensitivity of earnings to negative and positive returns. We estimate these regressions separately for distressed and healthy firms. For healthy firms, earnings, the dependent variable, is expected to contain more timely information for "bad news" firms, resulting in a greater slope coefficient, β_3 because earnings is predicted to be more sensitive to contemporaneous unexpected returns. For distressed firms, earnings is expected to contain more timely information for "good news" firms, resulting in a lower slope coefficient, β_3.

Regarding circumstances under which firms have higher ability to use unusual earnings management, we consider separately the ability of firms to postpone good news and bad news. We suggest that by nature growth-oriented firms have a higher ability to show losses as a result of unsuccessful investment in previous year or due to the high levels of R&D expenditures. The market is conservative regarding growth firms and does not overreact in the presence of losses. Since the market rationally expects this and the sensitivity of price response to reported earnings (price responsiveness hereafter) increases with reported earnings, may induce managers with higher economic earnings to overstate earnings by a larger amount (Lee et al., 2006). Therefore we expect growth firms to exhibit higher timeliness for bad news comparing to value firms, especially for healthy firms (distressed-growth firms as having strong opposite incentive and ability to show losses may have conflicting timeliness evidence).

Hypothesis 3A: Growth healthy firms have a higher level of earnings timeliness than value healthy firms for bad news.

On the other hand, for good news, value healthy firms as being highly established may have the ability to use more frequently unusual strategies than growth healthy firms. These strategies, such as delaying positive earnings, are usually followed by managers aiming for a higher bonus or management buyout the following year. Therefore, we expect value healthy firms to exhibit lower timeliness for good news comparing to growth healthy firms.

Hypothesis 3B: Growth healthy firms have a higher level of earnings timeliness than value healthy firms for good news.

2.2.2 Managing towards a target

Our second approach of earnings quality is to examine whether firms manage earnings towards a target. A common target considered is small positive earnings (Burgstahler and Dichev, 1997; Leuz, Nanda, and Wysocki, 2003). The assumption is that management prefers to report small positive (SPOS) earnings rather than negative earnings. Distressed firms, as having greater incentive to inflate earnings, are expected to report small positive earnings more frequently than other firms.

Hypothesis 4A: Distressed firms manage earnings towards a positive target more frequently than healthy firms.

Our measure therefore is the coefficient on small positive net income *SPOS* in equation (10), which includes industry and time fixed-effects. The dependent variable, DL, is the default likelihood variable:[15]

$$\text{DL}= \alpha_0 + \alpha_1 \text{ SPOS}+ \alpha_2 \text{SIZE}+ \alpha_3 \text{LEV}+ \alpha_4 \text{CFC}+ \alpha_5 \text{AUD}+ \alpha_6 \text{AUDIOP}+ \varepsilon \qquad (10)$$

[15] We re-run equation (10) using as dependent variable a distress dummy indicator set to one if a firm is distressed and zero for healthy firms. Distressed (healthy) firms are defined as those with default likelihood (DL) higher (lower) than the median DL of the entire sample. The results are qualitatively equals.

SPOS is an indicator variable that equals one if net income scaled by total assets is between 0 and 0.01 (Lang, Raedy, and Yetman, 2003). Since the default likelihood is likely to be sensitive to a variety of other factors unrelated to earnings management, such as industry and firm size, model (10) includes various control variables. SIZE is the natural log of end-of-year market value of equity, LEV is end-of-year total liabilities divided by total equity book value, CFC is annual cash flow coverage, AUD is an indicator variable that equals one if the firm's auditor is a big-5 accounting firm (PwC, KPMG, Arthur Andersen, E&Y, or D&T) and zero otherwise, and AUDIOP is an indicator variable that equals one if the firm received a qualified audit opinion and zero otherwise. A positive coefficient on *SPOS* would suggest that distressed firms manage earnings toward small positive amounts more than do healthy firms.[16]

Concerning the ability of growth and value firms to use earnings management towards a positive target, we consider value firms as having a higher flexibility to show small positive earnings (without being detected). Similar to hypothesis 3B (good news), value firms, as being highly established, may have the ability to use more frequently unusual strategies than growth firms. Therefore, we expect value firms to exhibit less earnings management towards a positive target than growth firms. This hypothesis contradicts to the general perspective that value firms have superior earnings quality than growth firms.

Hypothesis 5A: Value firms have less earnings management towards a positive target than growth firms.

[16] We use the coefficient on *SPOS* from equation (10) rather than directly comparing the distressed and healthy percentages of small positive income to assess whether distressed firms are more or less likely to manage earnings in order to fully control for undesirable economic factors associated with distress risk.

Our measure therefore is the coefficient on small positive net income *SPOS* in equation (11), which includes industry and time fixed-effects. The dependent variable, GO, is the growth option factor:

$$\text{GO}= \alpha_0 + \alpha_1 \text{ SPOS}+ \alpha_2 \text{SIZE}+ \alpha_3 \text{LEV}+ \alpha_4 \text{CFC}+ \alpha_5 \text{AUD}+ \alpha_6 \text{AUDIOP}+ \varepsilon \qquad (11)$$

A positive coefficient on *SPOS* would suggest that growth firms manage earnings toward small positive amounts more than do value firms.

Regarding the jointly consideration of the default likelihood and growth options factors in reflecting earnings managing towards a target, it relates to the jointly consideration of the incentives and ability of those firms to inflate earnings. Thus, based on hypotheses 4A and 5A, distressed value (established) firms, having both motive and ability to shift earnings upwards, may manage earnings towards a positive target more frequently than distressed growth firms. Lee et al., (2006) suggest that managerial incentives of growth firms are less sensitive to earnings and may comfortably engage in earnings averaging practices partly to mitigate the effect of higher environmental concerns. Our next hypothesis states:

Hypothesis 4B: Distressed value firms manage earnings towards a positive target more frequently than distressed growth firms.

To examine hypothesis 4B we include an additional interaction term between SPOS and a growth indicator variable, *SPOS*GO_dummy*, in equation 10. *GO_dummy* is set to one if

the firm is considered growth, and zero otherwise (value), based on the median growth variable. A positive coefficient on *SPOS*GO_dummy* would suggest that distressed growth firms manage earnings towards small positive amounts more than do distressed value firms.

Finally, expectations on differences between growth distressed and growth healthy firms are more complicated. Regarding the ability to inflate earnings as it is considered by growth-value hypothesis 5A cannot be applied in this case since both groups are growth-oriented firms. Thus, one factor to be considered is distress that gives great *incentive* to manage earnings towards a positive target. The second factor is that distressed firms have less *ability* to inflate earnings than healthy firms (since distressed firms attain high attention by the market comparing to healthy firms). We suggest that comparing these two groups, growth-distressed and growth-healthy, the factor "ability" will dominate the factor "incentive" (because of the high chances the managers to be sued). Therefore, we expect growth distressed firms to exhibit less earnings management towards a target than growth healthy firms.

Hypothesis 5B: Growth distressed firms manage earnings towards a positive target less frequently than growth healthy firms.

To examine hypothesis 5B we include an additional interaction term between SPOS and a distress indicator variable, *SPOS*DL_dummy*, in equation 10. *DL_dummy* is set to one if the firm is considered distressed, and zero otherwise (healthy), based on the median default likelihood variable. A positive coefficient on *SPOS*DL_dummy* would suggest

that distressed growth firms manage earnings towards small positive amounts more than do healthy growth firms.

2.3. Data Set

Our sample consists of all U.S. firms during the most recent 15-year period (1990-2004) with data available in the Compustat annual industrial and research tapes. The sample comprises 47,136 firm-year observations. Following standard practice, we removed utilities and financial institutions (SIC 6000-6999) from the sample.[17] We investigate the earnings quality of firms by ranking firms into portfolios based on their default likelihood (DL). We also control for growth-option effects and provide two-way (dependent) ranking portfolio analysis based on default likelihood (DL) and growth options (GO) factors.

3. Results

Table I presents descriptive statistics for our sample firms in terms of industry representation. The sample comprises a range of industries, with most firms in manufacturing, utilities and services. We control for industry fixed effects in our models. Table I includes statistics for our default likelihood (DL) and growth option (GO) factors across industries. In general, services exhibit higher default likelihood than the remainder industries (that exhibit no significant differences between them). These firms tend to be newer and smaller, incorporating higher default risk. The high default risk of these firms seems to be associated with high growth options. However, the relation between default

[17] We eliminated utilities and financial institutions in our sample selection procedures because firms in these industries may be structurally different, may face a different regulatory and bankruptcy environment, and their cash flow characteristics may differ from those of other firms.

likelihood and growth options factor is not monotonic. The two factors exhibit particular behavior within specific groups that needs to be carefully considered.

Table II reports descriptive statistics for our main variables across portfolios. DL1 represents most healthy firms, while DL4 more distressed firms. In terms of the variables of interest, more distressed firms have significantly more incidents of small positive earnings than healthy firms, consistent with the hypothesis that distressed firms are more likely to manage earnings towards a target. As expected, returns and earnings (NI/P) decrease with distress. In terms of control variables, more distressed firms have lower size. Finally, it seems that firms that were audited by one of the "big 5" international accounting firms have a higher probability to belong to a healthy portfolio.[18] Qualified audit opinion is positively associated with distress likelihood. These results corroborate our option-based default likelihood and growth options measures.

Table III presents our results for earnings timeliness along the four default portfolios and the two growth portfolios. Panel A focuses on earnings timeliness of the default portfolios. Using separate regression test within each of the four default portfolio, we examine our hypotheses based on equation (8). Our results are consistent with our expectations. Specifically, healthy firms have higher R^2 than distressed firms for bad news consistent with hypothesis 1. Particularly, R^2 for bad news increases from 1.3% for the distressed portfolio DL4 to 8.9% for the healthy portfolio DL1. The small R^2 of distressed firms for bad news is consistent with a higher incentive to smooth earnings and may delay recognizing losses.

On the other hand, R^2 for healthy firms is extremely small for good news comparing with any other portfolio, suggesting that healthy firms avoid recognizing good

[18] Currently, literature refers to "Big 4" auditing firms.

news immediately. In contrast, the high (6.2%) $R^2$of distressed firms for good news suggests that distressed firms have a high level of earnings timeliness for good news. Positive news is likely a life-belt for distressed firms, which certainly recognize quickly. These results are consistent with hypothesis 2. In part, our findings are consistent with prior evidence that earnings quality increases with firm performance (Lee et al, 2007). However, for good news, the earnings timeliness of distressed firms and the weak timeliness of healthy firms contradict to the overall perspective.

In order to examine further our hypotheses, Table III Panel A also shows results based on equation (9). In this regression analysis firm year observations are divided into "good news" and "bad news" samples based on whether the return was greater than or less than zero. Dummy variable capture the intercept and slope effects for the negative return sample. The interactive slope coefficient, β_3, which measures the difference in sensitivity of earnings to negative and positive returns is significant for all default portfolios. Specifically, β_3 implies that earnings is about two times $[(\beta_2 + \beta_3)/\beta_2]$ as sensitive to negative returns as it is to positive returns for the first three healthy portfolios. For the distressed portfolio, β_3 implies that earnings is more sensitive to positive returns than it is to negative returns, corroborating our evidence.

Table III Panel B relates to the earnings timeliness information separately for growth and value firms. These findings will help understand better our findings regarding the incentive and ability of firms in recognizing losses and/or gains timely. Growth firms, having the ability to present losses (without being punished by the market), have less incentive to manage earnings for "bad news". Consistent with our hypothesis 3A, healthy growth firms exhibit an extremely high R^2 for "bad news" (16%). On the other hand,

healthy value firms have a lower R^2 for "bad news". These findings corroborate our argument that incentive (willing) to manage earnings is not adequate factor for managers to use earnings management. The ability of managers to use earnings management also plays an important role. In our case, growth firms by nature are considered more risky firms having the opportunity to spend large amounts on projects that finally become unsuccessful. The market, however, is aware of the risk of these firms and they do not overreact in the presence of "bad news". This gives the ability to managers to recognize losses timely. Our finding is consistent with Lev et al., (2006), who show that firms with high R&D growth rate relative to their profitability report conservatively, while firm with low R&D growth rate (mature firms) tend to report aggressively under current GAAP. However, this result contradicts the Lee et al., (2006) findings that earnings quality decreases with earnings growth.

On the other hand, for good news, value healthy firms exhibit a slightly lower (2.1%) R^2 than healthy growth firms (3.2%). However, the Cramer (1987) test shows that the difference of R^2s is insignificant. Therefore, we failed to support our hypothesis 3B.

[FURTHER DISCUSSION-NOT RELATED TO HYPOTHESIS BUT INTERESTING]

Regarding findings on earnings timeliness of distressed firms separately for value vs. growth, the R^2 is higher (lower) for "good news" ("bad news") on distressed value firms than growth firms. For "bad news", although distressed growth firms exhibit a higher R^2 than distressed value firms (likely due to their ability to do that as growth-oriented firms), in this case the ability of distressed growth firms is not enough to boost the R^2 for "bad news" (3.3%) close to that of healthy growth firms. This is because distressed growth firms are under distress and have more incentive to delay recognition of

losses (conflict factors, ability and incentive). For "good news", the insignificant lower R^2 of distressed growth firms may suggest that these firms use alternative strategies in order to reach a certain target the following year. These managers likely consider their firms as temporarily distressed trying to benefit from subsequent improvement rather than trying to save their firm.

Our findings, in part, contradict to the general conclusions of prior studies (Lee et al., 2006, Dechow et al., 1995, McNichols, 2000). Specifically, Lee et al., (2006) using two different proxies for the amount of managed earnings (discretionary accruals from Kang and Sivaramakrishnan's, 1995 model and the restated amount of earnings), predict that performance is *monotonically* positively related to earnings management or earnings quality. In contrast, our evidence diverges in two certain cases. First, distressed firms also exhibit high quality of earnings relating to timeliness of bad news and second, healthy firms exhibit low quality of earnings relating to timeliness of good news.

Table IV presents our results for managing earnings towards a positive target. Panel A shows the coefficient on small positive earnings (SPOS) from equation (10). The significantly positive, 0.226, SPOS coefficient suggests that distressed firms report small positive earnings more frequently than healthy firms, and manage earnings towards a target. This finding complements the previous earnings timeliness findings, indicating that distressed firms not only exhibit more earnings timeliness for "good news" than healthy firms but also appear more likely to manage earnings towards a target. This result is consistent with our hypothesis 4A, implying that distressed firms having more incentive to inflate earnings than healthy firms use earnings management towards a positive target.

The second model of Panel A in Table IV presents the findings of the differential impact of earnings management towards a target on value vs. growth firms using a growth option (GO) dummy. To capture the incremental coefficient on SPOS of equation (10) for growth vs. value firms, we include an interaction term between SPOS and GO_dummy. GO_dummy equals one for growth firms and zero otherwise. Consistent with our hypothesis 4B, the negative interaction coefficient shown in Panel A suggests that the higher reporting of small positive earnings by distressed firms (found in the first model) is higher for value firms and less for growth firms. This finding is consistent with Lev et al., (2006), who show that firms with high R&D growth rate relative to their profitability (typically early-cycle firms) report conservatively, while firms with a low R&D growth rate (mature firms) tend to report aggressively under current GAAP.[19] Consistent with our expectations, distressed established (value) firms, having both motive and ability to shift earnings, exhibit managing towards a positive target more frequently than distressed growth firms.[20] Lee et al., (2006) suggest that managerial incentives of growth firms are less sensitive to earnings and may comfortably engage in earnings averaging practices partly to mitigate the effect of higher environmental concerns.

In order to investigate further the differential impact of earnings management towards a target on value vs growth firms, Panel B of Table IV shows results using the growth option (GO) factor as dependent variable. To capture the incremental coefficient on SPOS for distress vs. healthy firms, we include an interaction term between SPOS and

[19] Lee et al. (2006) suggest that in the unique revealing equilibrium to the model, firms with higher performance and growth overreport earnings by a larger amount because price responsiveness increases with earnings performance and growth. They show that earnings quality increases with earnings performance but decreases with earnings growth.

[20] In contrast to "bad news" where growth firms are considered as having the ability to recognize losses immediately, for small positive smoothing the ability is for value firms. This is because established firms may receive less attention (scrutiny) by the market providing the ability of small positive smoothing.

default likelihood dummy (DL_dummy). Results show that, in general, growth firms manage earnings towards a positive target less frequently than value firms consistent with our hypothesis 5A. However, the (significant) negative interaction coefficient, SPOS*DL_dummy, suggests that the distressed growth firms manage earnings towards a positive target less frequently than healthy growth firms. This result is consistent with our notion that distressed growth firms, although have the incentive to shift earnings, they don't have adequate ability to manage earnings comparing with the healthy growth firms. This result is consistent with our hypothesis 5B and with Gemstar case as well.

4. Conclusions

Our study, by using insights from option theory to construct option-based default likelihood and growth-option factor measures that allow the use of all available firms, without being limited to a specific distress event, provides a comprehensive analysis on the earnings quality of firms in various financial positions. We use two proxies for earnings quality, earnings timeliness (Basu, 1997) and earnings managing towards a positive target (Burgstahler and Dichev, 1997; Leuz, Nanda, and Wysocki, 2003).

We suggest that even thought firms have incentives to mislead earnings, this may not always be applicable. Thus, by jointly consideration of default likelihood and growth option factors we examine cases where incentives (willing) and ability (applicability) to mislead earnings are interwoven.

In contrast to the general perspective, we show that the relation between earnings quality and financial health is not monotonic. Distressed firms show evidence of low level of earnings timeliness for bad news and high level for good news. On the other

hand, healthy firms show evidence of high level of earnings timeliness for bad news but not for good news. Growth aspects seem to play an important role in firms ability and willing to manage earnings. For example, healthy growth firms seem to recognize bad news more frequently than healthy value firms. Moreover, distressed firms seem to manage earnings towards a positive target more frequently than healthy firms. Finally, in contrast to prior evidence, we find that growth firms in general manage earnings towards a positive target less frequently than value firms.

Our study extends prior studies in several respects. First, using alternative measures of earnings quality with inter-temporal nature, we investigate earnings management due to earnings timeliness and managing towards a target. Secondly, our model applies to cases when firms face motivation to shift earnings to any direction. Third, we investigate the earnings behavior of the universe of firms rather than examining only distressed firms with persistent losses, dividend reductions (DeAngelo et al., 1994, DeFond and Jiambalvo, 1994) or bankruptcy-filings (Rosner, 2003). Moreover, using insights from option theory to construct option-based default likelihood and growth-option factor measures, we explore the earnings quality of firms with different financial health characteristics and growth prospects. Overall, by using all available firms and proxies for distress and growth factors, without being limited to a specific distress event, this study is in a position to provide a more clean and comprehensive setup for analyzing the earnings properties of the universe of firms.

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Table I

Industry Analysis: Frequencies, Default Likelihood and Growth Options

This table reports the number of firm-year observations, the default likelihood and growth option mean and median separately for each major industry sector

	Number of Firm-Year Obs	Percentage of Firm-Year Obs	Default Likelihood (DL) Mean	Default Likelihood (DL) Median	Growth Option (GO) Mean	Growth Option (GO) Median
Agriculture, Forestry and Fishing	204	0.43	0.138	0.005	0.450	0.460
Mining	2549	5.41	0.148	0.020	0.034	0.130
Construction	607	1.29	0.155	0.030	0.663	0.570
Manufacturing	23701	50.28	0.125	0.010	0.563	0.480
Utilities	8145	17.28	0.124	0.000	0.341	0.240
Retail Trade	3872	8.21	0.145	0.020	0.275	0.300
Services	7621	16.17	0.182	0.040	0.589	0.560
Public Administration	437	0.93	0.220	0.090	1.086	0.850
Totals	47136	100.00				

Table II
Descriptive Statistics for Main Variables Across Default Likelihood (DL) Portfolios

This table presents univariate statistics for our main variables separately for each default likelihood (DL) portfolio. DL1 portfolio represents the most healthy quartile, while DL4 represents the most distressed quartile as defined by ranking all firms based on our option-based default probability. GO is the growth option factor defined by model (4); ΔNI is the change in annual net income, where NI is scaled by end-of-year total assets; ΔCF is the change in annual cash flow, where cash flow is scaled by end-of-year total assets; AC is earnings less cash flow from operations, scaled by end-of-year total assets; SPOS is an indicator set to 1 for observations for which annual earnings scaled by total assets is between 0 and 0.01; Size is the natural log of market value of equity in $m as of end of year; AU is an indicator taking on a value 1 if the auditor is one of the big-5 international accounting firms, AUDIOP is an indicator set to 1 for firms with qualified audit opinion and zero otherwise.

Var	DL1 - Most Healthy			DL2			DL3			DL4 - Most Distressed			DL4 - DL1	
	Mean	Median	Std. Dev	Mean	Median	Std. Dev	Mean	Median	Std. Dev	Mean	Median	Std. Dev	Mean	Median
DL	0.0001	0.0000	0.0013	0.0153	0.0000	0.0339	0.1130	0.0700	0.1209	0.4639	0.4400	0.2351	0.4637*	0.4400*
GO	0.3406	0.3600	0.8486	0.3972	0.3700	1.0327	0.4733	0.4200	1.2818	0.7558	0.6600	1.5205	0.4151*	0.3000*
ΔNI	0.0142	0.0100	0.5721	0.0116	0.0100	0.4382	0.0175	0.0000	8.8380	-1.4542	-0.0100	142.4969	-1.46838	-0.0200*
ΔCF	0.0166	0.0100	0.2320	0.0097	0.0100	0.2018	0.0370	0.0000	3.2719	-0.0217	0.0000	5.6169	-0.03829	-0.0100*
NI/P	4.0873	1.1900	93.5111	3.4055	0.6900	46.5827	-2.4718	0.2900	120.7643	-23.5474	-0.4700	433.7131	-27.634*	-1.6609*
ACC	-0.0793	-0.0400	2.5787	-0.0662	-0.0500	0.3195	-0.2360	-0.0600	14.7967	-1.9758	-0.0800	165.5692	-1.89648	-0.0400*
SPOS	0.0486	0.0000	0.2151	0.0520	0.0000	0.2220	0.0647	0.0000	0.2460	0.0648	0.0000	0.2463	0.01619	0.0000*
Return	0.5565	0.2900	1.3666	0.2904	0.0991	1.1302	0.1133	-0.0667	1.6409	0.1438	-0.2859	13.0926	-0.4126*	-0.5759*
Size	6.0857	6.0000	2.1131	5.2590	5.0000	2.2074	4.4266	4.0000	2.2450	3.3119	3.0000	2.2420	-2.7737*	-3.0000*
AU	0.8982	1.0000	0.3023	0.8601	1.0000	0.3469	0.8196	1.0000	0.3845	0.7550	1.0000	0.4301	-0.14324*	0.0000*
AUDIP	0.2659	0.0000	0.4418	0.2881	0.0000	0.4529	0.3102	0.0000	0.4626	0.3950	0.0000	0.4889	0.1291*	0.0000*
N	13742			13194			12611			11483				

* Significantly different between distressed (DL4) and most healthy (DL1) portfolios at the 0.01 levels respectively (two-tailed).

Table III
Earnings Timeliness

The regression is based on a two-stage regression. In the first stage, net income divided by beginning of year price is regressed on industry and time fixed-effect indicator variables. The second stage regression is $NI/P = \alpha_0 + \alpha_1 Return + \varepsilon$, where NI/P is the residual from the first stage regression, and Return is the stock return computed over the twelve months ending three months after year-end. Good news observations are those for which Return is nonnegative. Bad news observations are those for which Return is negative. β_1, β_2, β_3 represent coefficient estimates of equation $NI/P = \beta_0 + \beta_1 Dummy + \beta_2 Return + \beta_3 Return*Dummy + \varepsilon$, where Dummy is one if Return < 0, and zero otherwise. * represent significant difference from zero at the 0.01 level (two-tailed). Panel A shows results using all available firms and Panel B shows results separately for value and growth firms.

Panel A. All firms

	R^2				
	Good news	Bad news	β_1	β_2	β_3
DL1 - Healthy	0.0063	0.0897	0.2243*	1.5161*	1.5046*
DL2	0.0162	0.0124	-0.0600	0.6210*	0.7300*
DL3	0.0096	0.0369	0.1328*	0.5456*	0.5547*
DL4 - Distressed	0.0626	0.0135	0.0074	0.5346*	0.3454*

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Panel B. Value vs. Growth

	R^2			
	Value		Growth	
	Good news	Bad news	Good news	Bad news
DL1 - Healthy	0.0212	0.0990	0.0323	0.1638
DL2	0.0570	0.0581	0.0480	0.0370
DL3	0.0410	0.0505	0.0242	0.0914
DL4 - Distressed	0.0611	0.0146	0.0449	0.0332

Table IV
Managing Towards a Target

This table presents results regarding earnings management towards a positive target. In panel A, we regress the default likelihood (DL) variable on SPOS and control variables. SPOS is an indicator set to 1 for observations for which annual net income for ordinary shares scaled by total assets is between 0 and 0.01 and set to 0 otherwise; the coefficient on the indicator variable is reported. In panel B, we regress the growth options (GO) variable on SPOS and control variables. The second model in both panels shows regression coefficients including additional interaction term between SPOS and DL_dummy (GO_dummy). DL_dummy is set equal to one for distressed firms and zero otherwise. GO_dummy is set equal to one for growth firms and zero otherwise.

Panel A: Distressed vs. Healthy (Dependent variable: DL variable)

Small positive NI (SPOS)	GO_dummy	SPOS*GO_dummy
0.226***		
0.496***	0.163***	-0.501*

Panel B: Growth vs. Value Firms (Dependent variable: GO variable)

Small positive NI (SPOS)	DL_dummy	SPOS*DL_dummy
-0.134***		
0.026	0.109***	-0.300***

*, **, *** Significantly different from zero at the 0.10, 0.05, 0.01 level (two-tailed), respectively.