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How Well Do Investors Understand Loss Persistence?

By

Ke Li

A dissertation submitted in partial satisfaction of the

Requirements for the degree of

Doctor of Philosophy

in

Business Administration

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Patricia M. Dechow, Chair

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Fall 2010

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Dedication

This dissertation is dedicated to my parents Hongwen Li and Jie Zhao, my wife Yi Zhang, and my lovely children Anya and Andrew Li. Without their patience, understanding, support, and most of all love, the completion of this work would not be possible.

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Abstract

How Well Do Investors Understand Loss Persistence?

By

Ke Li

Doctor of Philosophy in Business Administration

University of California, Berkeley

Professor Patricia M. Dechow, Chair

This dissertation examines investors' expectations of loss persistence. Loss persistence varies across firms. I develop a model to forecast loss firms' future earnings based on Joos and Plesko (2005). This model produces smaller forecast errors than random walk models or a model that assumes losses are transitory. Using the forecast earnings generated by the model, I classify losses observations into predicted persistent losses and transitory losses. Predicted persistent losses are loss observations with forecast earnings in the lowest quintile of the quarterly distribution, while predicted transitory losses are loss observations in the highest quintile of the distribution.

Using the Mishkin (1983) framework, I examine investors' expectations of loss persistence embedded in the stock prices. The results suggest that investors do not fully distinguish the differences in loss persistence captured by the model, and instead appear to assume that all losses are transitory. Consequently, investors are surprised by future announcements of negative earnings for firms with predicted persistent losses, and these firms experience significantly negative abnormal returns over the following four quarters. Consistent with market underreacting to loss persistence of firms with predicted persistent losses, the future

negative abnormal returns of these firms are clustered around future earnings announcement dates.

Security analysts and institutional investors are sophisticated market participants. The expectations embedded in analyst forecasts, albeit optimistic, largely capture the difference in loss persistence. As a result, the future negative returns of firms with predicted persistent losses are smaller in magnitude when these firms are followed by more analysts. The future negative returns of firms with predicted persistent losses are also smaller in magnitude when these firms have higher institutional holdings, suggesting that the optimistic bias about loss persistence is concentrated in naive retail investors.

The results are robust to controls for various risk factors and price anomalies. The results are not driven by short sales constraints or influential observations. Finally, the results are not driven by factors related to the new economy industries.

Chapter 1

Introduction

Firms reporting losses are prevalent in the U.S. economy. The proportion of loss firms on Compustat is 9.7% in 1976 and peaks at 45.2% in 2001 before it drops to 33.7% in 2007.¹ In theory, losses should not persist because returning to profitability is a maintained hypothesis of financial reporting, embodied in the going-concern assumption (Joos and Plesko, 2005). In practice, firms can take actions to avoid persistent losses, such as liquidating loss-generating assets (Hayn, 1995). However, some firms do report persistent losses. For example, General Motors Corporation (GM) had four consecutive years of losses starting in 2005 and filed for Chapter 11 bankruptcy protection on June 1, 2009; Exelixis Inc., a biotech pharmaceutical company, has not reported a profit since its initial public offering in 2000. These examples show that there is a large heterogeneity in loss persistence. However, anecdotal evidence suggests that investors may not fully understand the persistence of losses. For example, when discussing the future prospects of GM on MSN.com message board in July 2008, many people believed that the automaker could survive its persistent losses or even thrive.²

In this study, I have two objectives. First, I develop an earnings forecast model for loss firms to predict the persistence of losses. Second, I examine whether investors can correctly assess loss persistence.

¹ Loss firms are defined as firms reporting negative earnings before extraordinary items and discontinued operations. The pattern before 2001 is similar to the results documented by prior studies, e.g., Hayn (1995), Collins et al. (1999), Givoly and Hayn (2000), Joos and Plesko (2005), Klein and Marquardt (2006), and Darrough and Ye (2007).

² See “Will General Motors survive and even thrive?”:

http://moneycentral.msn.com/community/message/thread.asp?threadid=726399&boardname=Hide&header=SearchOnly&footer=Show&boardsparam=Page%3d1&linktarget=_parent&pagestyle=money1&forumid=18&board=MarketTalkwithJimJubak

The earnings forecast model developed in this study is based on Joos and Plesko (2005).³ The model predicts loss firms' earnings in the following quarter. The results show that this model produces smaller forecast errors than two types of random walk models or a model that assumes all losses are transitory. I classify loss observations with forecast earnings in the lowest quintile of the quarterly distribution as predicted persistent losses and those in the highest quintile of the distribution as predicted transitory losses. The results show that future earnings of firms with predicted persistent losses exhibit high serial correlations and 75% of these firms are in the lowest quintile of the year-over-year forecast earnings, i.e., the expected earnings in the same quarter next year, derived from an alternative model. Hence, the forecast earnings not only provide relevant information about these firms' earnings in the next quarter, but also are informative about their performance in the longer horizon.

Next I examine investors' expectations of loss persistence. Losses provide a unique setting to examine investors' expectations of the overall earnings persistence. Because of the average low persistence of losses, loss firms are likely to experience large fluctuations in earnings from the period they incur losses to future periods. The large variations in loss firms' earnings not only make it difficult for investors to assess loss persistence, hence leaving room for errors, but also make it feasible to use a parsimonious model to separate losses that are more likely to persist from those that are more likely to be transitory. Compared to losses, the majority of profits have similar persistence. This has two effects. First, a similar earnings forecast model may not be powerful enough to separate profits that are likely to persist from those that are likely

³ The model in Joos and Plesko (2005) is to estimate the probability of a loss firm to return to profitability in the next period. I choose to forecast loss firms' future earnings because forecast earnings contain both information of loss reversal probability and information of the expected earnings in loss and profit outcomes. Consequently, results based on forecast earnings are stronger, even though forecast earnings and estimated loss reversal probability are highly correlated. More discussion on the modeling choice is in Chapter 4.

to be transitory. Second, investors may have a better sense about the persistence of profits. Sloan (1996) finds that in a sample dominated by profit firms, stock prices correctly reflect the implications of current earnings for future earnings using annual data. Because of the aforementioned two effects, I do not find evidence indicating that investors misunderstand the overall persistence of profits.

Using the framework developed by Mishkin (1983), I find that investors do not fully distinguish the differences in loss persistence identified by the model; instead they appear to assume that all losses are transitory. Consequently, investors are surprised by future announcements of negative earnings for firms with predicted persistent losses. The abnormal returns over the following four quarters are significantly negative for firms with predicted persistent losses, but close to zero for firms with predicted transitory losses. The overvaluation of firms with predicted persistent losses appears to be economically significant. A trading strategy that takes a long position in firms with predicted transitory losses and a short position in firms with predicted persistent losses yields hedge returns of 10.4% per annum. Additional results show that the hedge returns are clustered around future earnings announcement dates, suggesting that the abnormal returns represent a delayed response to predictable changes in future earnings. I further show that the optimistic bias about loss persistence is concentrated in naive investors and less pronounced among two groups of sophisticated market participants: sell-side analysts and institutional investors. Specifically, tests on analysts' expectations of loss persistence reveal that analyst forecasts, albeit optimistic, largely reflect the differences in loss persistence. As a result, the overvaluation of firms with predicted persistent losses is mitigated in firms with higher analyst coverage, measured by the number of analysts following the firm. Institutional ownership also helps correcting investors' optimistic bias about loss persistence, and the negative

abnormal returns of firms with predicted persistent losses are smaller in magnitude when these firms have higher institutional holdings.

I provide several robustness tests to support my inference that the negative abnormal returns of firms with predicted persistent losses are due to investors' incorrect assessment of loss persistence.

- 1) In a subsample of observations with positive short interest ratio (SIR), the negative abnormal returns of firms with predicted persistent losses are larger in magnitude when these firms have high SIR, but become insignificant when these firms have low SIR. This is inconsistent with short sales constraints explanation, which predicts that prices deviate more from fundamental value in firms that are harder to short.
- 2) The hedge returns based on forecast earnings are robust to controls for accruals, book-to-market ratio, standardized unexpected earnings (SUE), momentum, return volatility, earnings-to-price ratio and the level of current earnings. This suggests that investors' misunderstanding of loss persistence is largely uncorrelated with other price anomalies.
- 3) The hedge returns remain statistically and economically significant after controlling for the four systematic risk factors in Carhart (1997), indicating that the abnormal returns are not compensation for risks.
- 4) In a subsample of loss firms with zero special items, the abnormal returns of firms with predicted persistent losses are similar to the results of the full sample. This suggests that the overvaluation of firms with predicted persistent losses is not

driven by investors' failure to price the implications of special items for future earnings (e.g., Burgstahler et al., 2002; Dechow and Ge, 2006).

- 5) The negative abnormal returns of firms with predicted persistent losses in subsamples of observations from the "new economy" and "traditional economy" industries compare well with the full sample results.⁴ This suggests that the overvaluation of firms with predicted persistent losses is not driven by factors related to the "new economy" industries, such as the market's failure to price the implications of R&D expenses for future earnings (e.g., Lev and Sougiannis, 1996; Chan et al., 2001).
- 6) I implement the least trimmed squares procedure and drop 1% (10%) of total observations that are the most influential. Future abnormal returns of the loss firms in the remaining samples are still positively associated with forecast earnings, and the hedge returns are even larger than the full sample results. This suggests that the results are not driven by a small number of extreme observations.
- 7) To ensure that the results are not caused by the peak-ahead bias introduced by the restated Compustat quarterly data, I re-estimate the model using Compustat annual data and obtain similar results.

This study contributes to the prior literature along three dimensions. First, I provide an improved model to predict loss firms' future performance. This model produces significantly smaller forecast errors than two types of random walk models or a model that assumes all losses are transitory. The model can help investors evaluate loss firms' future performance, which is especially beneficial to investors of the loss firms with no analyst coverage.

⁴ There is no standard definition of new economy. Many studies use SIC codes to classify new economy industries, e.g., Ittner et al. (2003). In this study, new economy industries include pharmaceutical products, telecommunications, computers, and electronic equipment. Industry classification is based on Fama and French (1997) 48 industry groups.

Second, this study discovers a new area where stock markets may not be efficient. Prior studies of investors' expectations of earnings persistence focus on the persistence of components of earnings in a broader sample including both profit and loss observations (e.g., Sloan, 1996; Burgstahler et al., 2002; Richardson et al., 2005; Dechow and Ge, 2006). I examine investors' expectations of the overall earnings persistence in loss firms. I show that investors fail to fully distinguish the differences in loss persistence and appear to assume that all losses are transitory. The overvaluation of firms with predicted persistent losses is economically significant and becomes more costly to investors and capital markets as the proportion of loss firms in the U.S. economy increases over time.

Finally, this study offers a new explanation for the smaller market reaction to negative earnings than to positive earnings. Prior studies take the low earnings response coefficient (ERC) of loss firms as evidence that losses are less informative than profits about firms' future prospects (e.g., Hayn, 1995). In this study, I offer an alternative explanation: investors underestimate loss persistence and do not penalize loss firms sufficiently for their poor performance. The finding that loss firms on average have negative future abnormal returns supports the misvaluation explanation.

The remainder of this dissertation is organized as follows. Chapter 2 discusses background of accounting losses and related research. Chapter 3 develops the hypotheses. Chapter 4 presents the earnings forecast model. Chapter 5 describes the sample selection and variable measurement. Chapter 6 presents the main empirical results. Chapter 7 presents robustness tests. Chapter 8 provides conclusions.

Chapter 2

Background and Related Research

2.1 *Accounting losses in the U.S. economy*

Firms reporting losses become more prevalent in the U.S. economy since 1980s. Several studies document this trend, e.g. Hayn (1995), Collins et al. (1999), Givoly and Hayn (2000), Klein and Marquardt (2006), Joos and Plesko (2005) and Darrough and Ye (2007). Givoly and Hayn (2000) attribute the decrease in return on assets over time to an increase in accounting conservatism, measured by non-operating accruals. Klein and Marquardt (2006) examine accounting and non-accounting factors behind accounting losses over a 50-year period. They find that the annual percentage of losses for U.S. firms is significantly related to accounting conservatism, Compustat coverage of small firms, real firm performance as measured by cash flows from operations, and business cycle factors. However, they show that accounting conservatism is not as significant as other non-accounting factors in explaining the increase in accounting losses over time.

Another factor that may contribute to the increase of accounting losses is the rise of new economy or knowledge-based economy, which relies more on human capital and less on brick and mortar operations. One of the key characteristics of the firms in new economy industries is that investments in intangible assets like R&D account for a significant part of these firms. Nakamura (2001) reports that investment in intangible assets in the U.S. economy has accelerated after the 1980s, increasing from 4.4% of GDP in 1978 to 10.5% in 2000. Many of these assets are expensed under U.S. GAAP. Consequently, firms investing heavily in intangible assets are more likely to report losses.

2.2 *Investors react less to losses than to profits*

Hayn (1995) examines the association between earnings and contemporaneous stock returns, i.e., the ERCs, in loss firms and profit firms. Hayn argues that losses indicate situations where the abandonment option could be attractive. Consequently, losses are less informative about firms' future prospects than profits, which is manifested in the lower ERC of loss firms. Basu (1997) examines the impacts of accounting conservatism on the persistence of earnings. Basu argues that accounting conservatism results in earnings reflecting "bad news" more quickly and fully, but recognizing "good news" over time. Consequently, negative earnings shocks are less persistent than positive earnings shocks. Basu finds that consistent with this asymmetric persistence, ERC is higher for positive earnings changes than for negative earnings changes.

2.3 *The anomalous association between negative earnings and stock prices*

The dampened relationship between loss firms' current and future earnings poses a serious challenge to valuation models that use accounting earnings as a proxy for the expected earnings of firms' assets. Jan and Ou (1995) document a positive price-earnings relation for profit firms and a negative one for loss firms. Several studies investigate the anomalous negative coefficient on losses in the earnings capitalization model (Collins et al., 1999; Joos and Plesko, 2005; Darrough and Ye, 2007). The common findings of this line of research are that the simple earnings capitalization model is misspecified for loss firms, and the inclusion of proxies for loss firms' future prospects, such as book value (Collins et al., 1999), loss reversal probability (Joos and Plesko, 2005), and R&D investment and external financing (Darrough and Ye, 2007), can solve the puzzling negative price-earnings relation observed in loss firms.

2.4 *Loss persistence varies across firms*

Loss avoidance is important to managers (e.g., Degeorge et al., 1999; Graham et al., 2005), and is rewarded by investors (e.g., Brown and Caylor, 2005). Nevertheless, the potential to return to profitability varies across loss firms. Joos and Plesko (2005) develop a model to estimate loss reversal probability, i.e., the probability of a loss firm to return to profitability in the next year. Joos and Plesko examine whether the relation between firms' negative earnings and contemporaneous stock returns varies with firms' loss reversal probabilities. They find that ERC in firms with predicted transitory losses is significantly positive over their sample period. In contrast, ERC in firms with predicted persistent losses is negative, insignificant during the early sample period but becoming statistically significant in the 1990s. The finding that ERC is lower in loss firms with lower reversal probabilities is consistent with their argument that low loss reversal probability indicates a situation where the abandonment option could be attractive.

Using stock prices as a benchmark to examine the value-relevance of earnings, Joos and Plesko (2005) implicitly assume that stock markets are efficient. In this study, I examine whether investors can correctly anticipate loss persistence. The different assumptions and research questions lead to different research methodologies. I examine the association between loss firms' forecast earnings and their future stock returns instead of focusing on the relation between loss firms' reported earnings and their contemporaneous stock returns.

2.5 *Investors' inefficient pricing of losses*

The contemporaneous research by Balakrishnan et al. (2010) examines post-profit and post-loss announcement drift using quarterly data. They partition profit and loss firms based on

current earnings (scaled by total assets) and find that firms with big profits earn significantly positive future returns, while firms with big losses earn significantly negative future returns. To some extent, results in this study and those in Balakrishnan et al. (2010) complement each other because current earnings is an important predictor of forecast earnings. However, forecast earnings contain more information about loss persistence than current earnings. More importantly, this additional information is orthogonal to the information contained in other well-known predictors of firms' future prospects. Consequently, hedge returns based on the level of forecast earnings remain statistically and economically significant after controlling for the effects of other return predictors, while hedge returns based on current earnings become insignificant.

Narayanamoorthy (2006) examines different behaviors of the post-earnings announcement drift (PEAD) in profit and loss firms. Narayanamoorthy finds that the autocorrelations of SUEs are significantly lower for loss firms than for profit firms, consistent with losses having a greater tendency to mean revert than profits (Basu, 1997). Consequently, PEAD is significantly smaller in loss firms than in profit firms.

2.6 Investors' inefficient pricing of special items

Loss persistence and special items are closely related. Given the transitory nature of special items, losses caused by special items are expected to be transitory as well. The results of prior studies on the pricing of special items are largely contextual. Burgstahler et al. (2002) and Dechow and Ge (2006) show that investors fail to price the implications of negative special items for future earnings. Both studies find that negative special items lead to positive future abnormal returns.

Burgstahler et al. (2002) find that although stock prices reflect relatively more of the effects of special items compared to other earnings components, they still do not fully impound the implications of special items for future earnings. Specifically, they find that positive special items are highly transitory while negative special items have the characteristics of inter-period transfers. Stock prices seem to fully impound the effects of positive special items, but only partially impound the effects of negative special items. Burgstahler et al. (2002) show that a trading strategy that takes a long position in firms with negative special items and a short position in firms with positive special items earns small but statistically significant abnormal returns during the three-day window four quarters subsequent to the original announcement of special items, with the majority of the hedge returns coming from the long position.

Dechow and Ge (2006) examine the impacts of special items on the persistence of earnings and cash flows. They find that the low earnings persistence in low accrual firms is primarily driven by special items. In addition, they show that large negative special items in low accrual firms lead to positive stock returns.

McVay (2006) examines whether managers use classification shifting of items within the income statement as an earnings management tool. Focusing on negative special items, McVay presents evidence consistent with managers opportunistically shifting expenses from core expenses to special items. Although classification shifting does not change bottom-line earnings, it overstates core earnings. McVay finds that classification shifting is associated with (weakly significant) negative returns in the subsequent year, suggesting that investors are surprised when expenses that were previously excluded from core earnings recur. McVay also documents that the main effect of negative special items on future returns is weakly positive, consistent with the findings in Burgstahler et al. (2002) and Dechow and Ge (2006).

In contrast to the findings in the first three studies, Bartov et al. (1998) examine a sample of 315 write-offs in 1984 and 1985 and find that these write-offs (i.e., negative special items) lead to significantly negative abnormal returns over a two-year period following the announcements of the write-offs.

Finally, Doyle et al. (2003) examine the predictive value of expenses excluded from pro forma earnings. They show that even though expenses excluded from pro forma earnings are labeled as "non-core" or "non-recurring", these expenses significantly predict future cash flows. Specifically, they find that higher level of exclusions other than special items lead to significantly lower future cash flows from operations and free cash flows. In contrast, special items, which are constantly excluded from pro forma earnings, have no implications for firms' future cash flows from operations. Consequently, Doyle et al. show that special items are not associated with future stock returns.

Chapter 3

Development of Hypotheses

To investigate whether stock prices fully reflect available information about loss persistence, it is necessary to specify an alternative naive expectation model against which to test the null of market efficiency. Prior studies on the value-relevance of losses provide some evidence of how investors price accounting losses. Joos and Plesko (2005) show that ERC is lower for loss firms with lower loss reversal probabilities. Hayn (1995) finds that ERC is lower for firms with more loss years in the past, an important predictor of loss persistence. These results suggest that contemporaneous stock returns are less associated with losses that are more likely to persist. Hayn (1995) and Joos and Plesko (2005) take the results as evidence that the value-relevance of earnings decreases as the likelihood of exercising the abandonment option increases. Alternatively, these results can be interpreted as investors underreact to losses that are likely to persist, which raises the possibility that investors underestimate the persistence of these losses. Consequently, the naive expectation model employed in this study is that investors fail to fully distinguish the differences in loss persistence and treat all losses as transitory.

H1(a): The earnings expectations embedded in loss firms' stock prices fail to fully reflect the different persistence of losses.

If investors treat all losses as transitory and underestimate the persistence of predicted persistent losses, then firms with predicted persistent losses will be overvalued and firms with predicted transitory losses will be valued at close to their fair value.

H1(b): Future abnormal returns are negative for firms with predicted persistent losses and close to zero for firms with predicted transitory losses.

Note that the prediction of H1(b) is different from the prediction of SUE-based post-earnings announcement drift strategy. Bernard and Thomas (1990) hypothesize that investors' expectations of future earnings follow a seasonal random walk model. If investors' expectations follow the seasonal random walk model, then they will expect loss firms to continue reporting the same level of losses in the future *regardless of the persistence of the losses*. Consequently, firms with predicted persistent losses will be valued at close to their fair value, while firms with predicted transitory losses will be undervalued because these firms have the highest forecast earnings and are the least likely to report losses in the future.

Prior studies examining price anomalies use the abnormal returns over earnings announcement period to disentangle systematic valuation errors from risk compensation, e.g., La Porta (1996), La Porta et al. (1997), and Sloan (1996). If the abnormal stock returns of firms with predicted persistent losses represent a delayed response to predictable changes in future earnings, then they should be concentrated around information events that reveal those changes, such as future earnings announcements.

H2: The abnormal stock returns predicted in H1(b) are clustered around future earnings announcement dates.

If the optimistic bias about loss persistence is caused by investors' inability to process complicated financial information or other behavioral heuristics, such as the disposition effect, it should be concentrated in naive investors and less pronounced among sophisticated market participants. Sell-side analysts are sophisticated participants in stock markets. Prior studies provide evidence that larger analyst coverage, measured as the number of analysts following the firm, is likely to correspond to more information available about the firm, e.g., Lang and Lundholm (1996), Hong et al. (2000), and Gleason and Lee (2003). However, analyst forecasts are shown to be optimistic, e.g., Richardson et al. (2004), and Bradshaw et al. (2006). Therefore, it is unclear whether analysts' forecasts will help investors correct their optimistic bias about loss persistence. Institutional investors are another group of sophisticated market participants. Collins et al. (2003) find that institutional ownership helps correct mispricing of accruals. Ayers and Freeman (2003) find that institutional ownership helps stock prices incorporate future earnings faster. If analyst coverage and institutional ownership help investors correct their bias about loss persistence, then the negative abnormal returns of firms with predicted persistent losses would be smaller in magnitude when these firms are followed by more analysts or have higher institutional ownership.

H3: The abnormal stock returns predicted in H1(b) are smaller in magnitude for loss firms with larger analyst coverage or higher institutional ownership.

Chapter 4

The Earnings Forecast Model for Loss Firms

Joos and Plesko (2005) develop a model to estimate the annual loss reversal probability.

Their model is as follows:

$$\begin{aligned} REVERSAL_{t+1} = & \beta_1 EARN_t + \beta_2 PAST_EARN_t + \beta_3 SIZE_t + \beta_4 SALESG_t \\ & + \beta_5 FIRSTLOSS_t + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 DIVSTOP_t + \varepsilon_{t+1} \end{aligned} \quad (1)$$

where $REVERSAL_{t+1}$ is an indicator variable that is equal to one if the loss firm becomes profitable in the next year, and zero otherwise (other variables will be defined later).

Building on the model of Joos and Plesko (2005), I propose the following quarterly earnings forecast model for loss firms:

$$\begin{aligned} EARN_{t+1} = & \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALESG_t + \beta_5 FIRSTLOSS_t \\ & + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 SPI_t + \beta_9 SPI_{t-3} + \beta_{10} Q3_t + \beta_{11} Q4_t + \varepsilon_{t+1} \end{aligned} \quad (2)$$

where $EARN_t$ is quarterly income before extraordinary items and discontinued operations, scaled by total assets at the beginning of quarter t; $SIZE_t$ is the logarithm of market value of equity at the end of quarter t; $SALESG_t$ is the percentage growth in sales over quarter t; $FIRSTLOSS_t$ is an indicator variable that is equal to one if the current quarter loss is the first one in a sequence, and zero otherwise; $LOSS_SEQ_t$ is the number of sequential quarterly losses over the four quarters before the current loss; $DIVDUM_t$ is an indicator variable that is equal to one if the firm pays dividends during the loss quarter, and zero otherwise; SPI_t is special items scaled by total assets

at the beginning of quarter t ; $Q3_t$ and $Q4_t$ are dummy variables indicating the third and the fourth fiscal quarters, respectively.

In this study, I choose to forecast loss firms' future earnings because the forecast earnings contain both information about the loss reversal probability and information about the expected earnings in the loss and profit outcomes. Although the forecast earnings and the estimated loss reversal probability are highly correlated (Pearson correlation is 0.760 and Spearman correlation is 0.895), the forecast earnings are more informative about loss firms' future performance. Consequently, the results based on the forecast earnings are stronger.

I extend the model of Joos and Plesko (2005) in the following aspects. First, I change their annual loss reversal model to a quarterly earnings forecast model. Consequently, $EARN_t$, $SALESG_t$, $FIRSTLOSS_t$, $LOSS_SEQ_t$, and $DIVDUM_t$ are all measured using quarterly data, and $PAST_EARN_t$, the average $EARN$ over the past five years, is dropped from the forecast model. $DIVSTOP_t$, the dummy variable indicating that firms stop paying dividends during the loss period, is also dropped from the model because its coefficient changes from negative for annual results to positive for quarterly results, inconsistent with the prediction of Joos and Plesko (2005).⁵ According to the results of Joos and Plesko (2005, p. 859), loss firms' future earnings should be positively associated with $EARN_t$, $SIZE_t$, $FIRSTLOSS_t$ and $DIVDUM_t$, negatively associated with $LOSS_SEQ_t$, and not significantly associated with $SALESG_t$.⁶ To control for the well-documented seasonal effects of quarterly earnings, the earnings in the same quarter last year

⁵ The exclusion of $DIVSTOP_t$ does not change the results significantly since only 2% of the observations stop paying dividends.

⁶ Joos and Plesko (2005) do not have a specific prediction about the sign of $SALESG_t$. They argue that sales growth is expected to be positively associated with the likelihood of loss reversal. But the effect is weakened if high sales growth identifies young firms that have not yet achieved profitability. Their results show that the coefficient on sales growth is positive but statistically insignificant.

($EARN_{t-3}$) are added to the model.⁷ In addition, this model includes two dummy variables indicating the third and the fourth fiscal quarters. In practice, the results of the fourth fiscal quarter are backed out from annual results, which are audited and hence more conservative (Brown and Pinello, 2007). In addition, the majority of write-offs take place at the end of the fiscal year rather than during interim quarters (Elliott and Shaw, 1988). Consequently, more firms report losses in the last fiscal quarter than in other interim quarters and the magnitude of losses is higher in the last quarter. This suggests that observations from the third fiscal quarter will have lower expected earnings in the following quarter (i.e., the fourth quarter) and observations from the fourth fiscal quarter will have higher expected earnings in the following quarter (i.e., the first quarter of the next fiscal year). Hence, ceteris paribus, future earnings should be negatively associated with $Q3_t$ and positively associated with $Q4_t$.

Second, this model includes special items as predictors of future earnings. Fairfield et al. (1996) show that the disaggregation of earnings into operating earnings, special items, and other components improves forecasts of earnings. Firms with losses caused by one-time write-offs are likely to report profits in the next quarter. Hence, ceteris paribus, earnings in quarter $t+1$ should be negatively associated with special items in quarter t (SPI_t). To control for the seasonal effects of special items on earnings documented by Burgstahler et al. (2002), the special items in the same quarter last year (SPI_{t-3}) are added to the model.⁸ Based on the results of Burgstahler et al. (2002, p. 596), earnings in quarter $t+1$ should be negatively associated with special items in quarter $t-3$.

Similar to Joos and Plesko (2005), I estimate equation (2) by quarter and compute the forecast earnings of quarter $t+1$ using independent variables measured in quarter t and the mean

⁷ The inclusion of other interim earnings, $EARN_{t-1}$ and $EARN_{t-2}$, does not change the results significantly.

⁸ The inclusion of other interim special items, SPI_{t-1} and SPI_{t-2} , does not change the results significantly.

of the coefficients of quarter t-4 to quarter t-1.⁹ For example, to estimate the earnings in the second quarter of 1984 for the firms reporting losses in the first quarter, I first calculate the mean of the quarterly estimated coefficients of equation (2) over the four quarters of 1983, then multiply it by the independent variables measured in the first quarter of 1984. I classify loss observations into predicted persistent and transitory losses using the quarterly quintiles of the distribution of forecast earnings. Predicted persistent losses are loss observations with forecast earnings in the first quintile of the distribution, and predicted transitory losses are loss observations in the fifth quintile of the distribution.

I also use an alternative model to forecast loss firms' year-over-year earnings. The model is as follows:

$$EARN_{t+4} = \alpha + \beta_1 EARN_t + \beta_2 SIZE_t + \beta_4 SALES_t + \beta_5 FIRSTLOSS_t + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 SPI_t + \varepsilon_{t+1} \quad (3)$$

By comparing the forecasts derived from equation (2) and equation (3), I can assess the persistence of predicted persistent losses in a longer horizon. Because both models produce similar results, I only report the main test results based on equation (2).

⁹ The results are similar if the coefficients are (1) averaged over the past eight or sixteen quarters, (2) weighted by the number of observations in each quarter, (3) weighted by a scheme that gives the highest weight to the coefficient of the most recent quarter and progressively lower weights to the coefficients of older quarters, or (4) estimated in pooled observations of the past four, eight or sixteen quarters.

Chapter 5

Sample Selection and Variable Measurement

5.1 *Data sources and sample selection*

I obtain quarterly financial statement data from the Compustat (Xpressfeed) database and daily stock returns from the CRSP database. The consensus analyst forecast (mean estimate) of quarterly earnings per share (EPS) is obtained from the I/B/E/S Summary History files. Shares held by institutional investors and shares outstanding are collected from Thomson-Reuters Mutual Fund Holdings database (S12). Because analyst forecasts and loss observations are sparse in earlier years, the sample period is from 1984 to 2006. To minimize data errors, I require that firm-quarter observations have positive total assets (ATQ), positive sales (SALEQ), and positive market value of equity at the end of the fiscal quarter (PRCCQ*CSHOQ).¹⁰ Financial firms (SIC between 6000 and 6999) and utilities (SIC between 4900 and 4999) are excluded from the sample. To minimize the effects of thinly traded stocks, I exclude observations with stock prices below five dollars (measured in 2006 dollars) at the end of the quarter.¹¹ I replace missing values of special items (SPIQ) with zero.¹² All financial statement variables are winsorized at the 1% tails. Because the calculation of forecast earnings requires financial information for the past four quarters, financial data are collected starting from the first quarter of 1983. There are 64,539 loss observations from 1983 to 2006 with sufficient data to calculate

¹⁰ The mnemonics in parentheses are Compustat Xpressfeed Quarterly variable names.

¹¹ This criterion reduces the sample from 123,806 firm-quarter observations to 64,539 firm-quarter observations. The tenor of the results does not change in the larger sample. For example, the value-weighted portfolio return for predicted persistent losses over the one-year measurement window is -13.3% in the larger sample and -11.6% in the smaller sample.

¹² The results are similar if observations with missing special items are excluded.

forecast earnings. The final sample consists of 62,370 loss observations from 1984 to 2006 with non-missing forecast earnings.

5.2 Variable definitions

Consistent with prior studies (e.g., Hayn, 1995; Joos and Plesko, 2005), I define loss firms as firm-quarter observations with negative income before extraordinary items and discounted operations (IBQ). The predictors in the earnings forecast model are defined as follows. $EARN_t$ is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t . $SIZE_t$ is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t . $SALESG_t$ is the percentage growth in sales (SALEQ) during quarter t . $FIRSTLOSS_t$ is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter $t-1$), and zero otherwise. $LOSS_SEQ_t$ is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. $DIVDUM_t$ is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t , and zero otherwise. SPI_t is special items (SPIQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t . $Q3_t$ ($Q4_t$) is a dummy variable indicating the third (fourth) fiscal quarter.

Raw stock returns include dividends and other distributions. If a stock is delisted during the return window, then the CRSP delisting return is included in the buy-hold return, and the proceeds are reinvested in the CRSP size-matched decile portfolio for the remainder of the return window. If the delisting return is missing, I use the replacement values suggested by Shumway (1997) and Shumway and Warther (1999). Specifically, if the stock is traded on NYSE or AMEX prior to delisting, I replace the missing delisting return with -30% (Shumway, 1997;

Shumway and Warther, 1999); if the stock is traded on NASDAQ prior to delisting, I replace the missing value with -55% (Shumway and Warther, 1999). Size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The portfolios are based on the size deciles of NYSE, AMEX and NASDAQ firms. The portfolio membership is determined using the market value of equity at the beginning of the calendar year in which the return cumulation period begins.

Appendix A lists the definitions of all variables used in this study.

Chapter 6

Empirical Analysis

6.1 The prevalence of losses in U.S. firms

Figure 1 plots the percentage of Compustat (Xpressfeed) firms reporting quarterly losses (aggregated by calendar year) from 1976 to 2007. The percentage of loss firms increases from 9.7% in 1976 to 45.2% in 2001. The trend reverses after 2001. In 2007, 33.7% of firms report losses. Givoly and Hayn (2000) attribute the decrease in earnings over time to an increase in accounting conservatism. However, Klein and Marquardt (2006) show that accounting conservatism is not as significant as other non-accounting factors in explaining the increase in losses over time. The non-accounting factors they identify include Compustat coverage of small firms, real firm performance measured by cash flows from operations, and business cycle factors.

The U.S. economy has experienced significant changes since the 1970s as it moves away from brick-and-mortar manufacturing industries to service and knowledge-based industries. Figure 1 shows that the percentage of Compustat firms in the "new economy" industries, which include pharmaceutical products, telecommunications, computers, and electronic equipment, has increased steadily, from 7.3% in 1976 to 18.4% in 2007. One of the key characteristics of firms in these industries is that they invest heavily in intangible assets. Corresponding to the rise of new economy industries, investment in intangible assets in the U.S. economy has accelerated since the 1980s, increasing from 4.4% of GDP in 1978 to 10.5% in 2000 (Nakamura, 2001). Under U.S. GAAP, many investments in intangibles are expensed, such as investments in R&D activities. Hence, firms in the new economy industries are more likely to report losses. For example, Figure 1 shows that 69.7% of new economy firms report losses in 2001, significantly

higher than the 45.2% of the general population. The evidence suggests that structural changes in the U.S economy may also contribute to the increase in losses over time.

6.2 *The different persistence of losses and profits*

Losses can be less persistent than profits for at least three reasons. First, conservative accounting results in earnings reflecting "bad news" more quickly than "good news" (Basu, 1997). Losses are recognized in lumps, e.g., asset write-offs as the result of a decrease in the asset's useful life. In contrast, an increase in an asset's useful life will lead to increases in earnings over time. Second, managers can liquidate loss firms or redeploy loss-generating assets to avoid persistent losses (Hayn, 1995). Finally, firms that constantly incur losses will need external financing to sustain the operations and hence are more likely to go bankrupt.

Figure 2 plots the distribution of change in earnings from quarter t to quarter $t+1$ (scaled by total assets at the end of quarter t) for firms reporting losses and profits in quarter t . The sample selection criteria for profit firms are the same as those for loss firms discussed in Chapter 5. There are 221,591 firm-quarter observations reporting profits from 1983 to 2006. Figure 2 shows that only 34% of loss firms (Panel A) have quarterly earnings changes within 1% of total assets, while 68% of profit firms (Panel B) have earnings changes within this range. The distribution of earnings changes for loss firms is positively skewed (range=[-0.42, 0.73]; mean=0.012; median=0.007), while the distribution for profit firms is fairly symmetric (range=[-0.41, 0.38]; mean=-0.004; median=0.000). In addition, the standard deviation of the distribution for loss firms is much larger than that for profit firms (0.064 vs. 0.026). The larger variations in loss firms' earnings provide a unique setting to test investors' expectations of the overall earnings persistence.

6.3 *The earnings forecast model for loss firms*

6.3.1 *Descriptive statistics of the sample*

Table 1 Panel A reports the distribution of the sample's loss observations by the number of *sequential* quarterly losses. The results show that some losses are very persistent. For example, 15% of loss firms have more than eight quarters of sequential losses. The longest loss sequence in the sample is 66 quarters or 16.5 years (untabulated), which belongs to RIBI ImmunoChem Research Inc, a biotechnology company acquired by Corixa Corporation in October 1999. Panel A also reports the proportion of loss firms that return to profitability in the next quarter ($REVERSAL_{t+1}$) and the mean earnings in the next quarter ($EARN_{t+1}$). Both $REVERSAL_{t+1}$ and $EARN_{t+1}$ decrease monotonically in the length of loss sequence.

Panel B presents descriptive statistics of the variables in equation (2). On average, quarterly losses account for 4.8% of the beginning balance of total assets. A typical loss firm experiences 1.8 quarters of sequential losses in the past four quarters before the current loss. 15.3% of loss firms still pay dividends during the loss quarter. Finally, loss firms on average report negative special items (mean=-0.010).

Panel C shows that, on the univariate base, $EARN_{t+1}$ is positively correlated with $EARN_t$, $EARN_{t-3}$, $SIZE_t$, $FIRSTLOSS_t$, $DIVDUM_t$, SPI_{t-3} and $Q4_t$, and negatively correlated with $SALESG_t$, $LOSS_SEQ_t$, SPI_t and $Q3_t$. All variables except SPI_{t-3} have the predicted correlation with $EARN_{t+1}$.

6.3.2 *Fama-MacBeth regression results of the forecast model*

Table 2 Panel A reports the Fama-MacBeth regression results of equation (2). On average, the model explains approximately 46% of the variations in loss firms' future earnings. Consistent

with the results in Joos and Plesko (2005, p. 859), future earnings ($EARN_{t+1}$) increase with current earnings ($EARN_t$) and firm size ($SIZE_t$), and are higher if the current loss is the first one in a row ($FIRSTLOSS_t$) or if the firm still pays dividends during the loss period ($DIVDUM_t$); $EARN_{t+1}$ decreases in the length of loss sequence ($LOSS_SEQ_t$); and finally, $EARN_{t+1}$ is not significantly associated with sales growth ($SALESG_t$). All the new variables added to the model have significant coefficients in the predicted direction. The significantly positive coefficient on $EARN_{t-3}$ ($t=25.86$) is consistent with the seasonal effects of quarterly earnings. The coefficients on SPI_t and SPI_{t-3} are -0.604 ($t=-27.93$) and -0.344 ($t=-11.33$), respectively. This suggests that SPI_{t-3} has much less incremental effect on $EARN_{t+1}$ than SPI_t after controlling for other variables.¹³ Consistent with the fourth fiscal quarter results being the most conservative, $EARN_{t+1}$ is positively associated with $Q4_t$ ($t=13.69$) and negatively associated with $Q3_t$ ($t=-14.16$).¹⁴

6.3.3 Descriptive statistics of portfolios formed on forecast earnings

I use the mean of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and the independent variables measured in quarter t to compute the forecast earnings ($FEARN_t$), i.e., the expected earnings of quarter $t+1$. Table 2 Panel B reports descriptive statistics of portfolios formed on $FEARN_t$. The second column of the results shows that there are 3,094 unique firms in the predicted persistent loss portfolio and 5,023 unique firms in the predicted

¹³ Note that this finding does not conflict with the results of Burgstahler et al. (2002), who show a prominent effect of lag four special items on seasonally-differenced earnings. In their study (Table 2 Panel B), seasonally-differenced earnings in quarter $t+1$ to $t+4$ are separately tested against special items in quarter t , while in this study special items in quarter $t-1$ and $t-3$ are put together in one regression to test their incremental effects on total earnings in quarter $t+1$ after controlling for other variables. In addition, the sample in their study is not restricted to loss firms.

¹⁴ I use a similar earnings forecast model for profit firms. I replace $FIRSTLOSS_t$ with $FIRSTPROFIT_t$ and $LOSS_SEQ_t$ with $PROFIT_SEQ_t$ (note that the signs of $FIRSTPROFIT_t$ and $PROFIT_SEQ_t$ are opposite from those of $FIRSTLOSS_t$ and $LOSS_SEQ_t$). The coefficients of the forecasting model for profit firms are similar to those for loss firms. However, the adjusted R-square is only 22%, much lower than that for loss firms, which suggests that the model is less powerful in explaining future earnings of profit firms.

transitory loss portfolio, consistent with the differences in loss persistence across portfolios. The third column of the results shows that, on average, firms with predicted persistent losses (the first quintile of $FEARN_t$) are expected to lose 11.3 cents per dollar of assets in the next quarter, while firms with predicted transitory losses (the fifth quintile of $FEARN_t$) are expected to earn 1.1 cents. The next three columns report the actual earnings in quarter t , quarter $t+1$, and quarter $t+4$, respectively. Moving from quarter t to quarter $t+1$, there is little change in earnings for firms with predicted persistent losses (from -0.117 to -0.114). After four quarters, these firms still report significant losses (mean $EARN_{t+4}=-0.100$). In contrast, the earnings of firms with predicted transitory losses increase significantly from quarter t to $t+1$ (from -0.020 to 0.004). On average, these firms are profitable four quarters after their loss quarter (mean $EARN_{t+4}=0.003$). The seventh column shows that only 8.5% of firms with predicted persistent losses return to profitability in the next quarter. In contrast, 67.4% of firms with predicted transitory losses are profitable in the next quarter. This suggests that $FEARN_t$ contains information about the loss reversal probability measured in Joos and Plesko (2005). The final column of Panel B shows that firms with predicted persistent losses are smaller than firms with predicted transitory losses.

Figure 3 provides the time-series plots of the mean earnings of firms with predicted persistent and transitory losses. Quarter t represents the quarter in which firms are ranked into $FEARN_t$ quintiles. Firms with predicted transitory losses on average have positive earnings in the four quarters prior to the loss quarter and return to profitability immediately after the loss quarter. This suggests that the losses in quarter t are temporary deviations from these firms' normal performance. In contrast, firms with predicted persistent losses remain unprofitable for the entire nine quarters. In addition, the earnings of these firms are relatively stable over time. This suggests that the losses in quarter t for firms with predicted persistent losses represent the norm

of their future performance. The results in Table 2 Panel B and Figure 3 show that the forecast earnings derived from equation (2) capture the expected persistence of losses.

6.3.4 *Comparing forecast accuracy of different earnings forecast models*

Table 2 Panel C reports forecast errors of different earnings forecast models for loss firms. The forecast errors are the difference between actual earnings in quarter $t+1$ and the expected earnings derived from each model. Model 1 is the earnings forecast model in equation (2). Model 2 is the random walk model, i.e., the expected earnings for quarter $t+1$ equal to the earnings in quarter t . Model 3 is the seasonal random walk model, i.e., the expected earnings for quarter $t+1$ equal to the earnings in quarter $t-3$. Model 4 assumes that losses are transitory, i.e., the expected earnings for quarter $t+1$ are zero. For firms with predicted persistent losses, the mean forecast errors of Model 1 and Model 3 are the smallest in magnitude and statistically insignificant. This suggests that both Model 1 and Model 3 produce unbiased earnings forecast for firms with predicted persistent losses. The mean forecast error of Model 4 is significantly negative and is the biggest in magnitude among the four models. This naive forecast model produces significantly optimistic forecasts for firms with predicted persistent losses.

Table 2 Panel D compares the forecast errors of the other three models with the forecast errors of Model 1. Because forecast errors can be either positive or negative, I subtract the absolute value of the forecast errors of Model 1 from the absolute value of the forecast errors of the other three models. A positive number means that Model 1 produces smaller (in magnitude) forecast errors than the other model. The results show that Model 1 produces more accurate forecasts than Model 2 and Model 3 in all portfolios formed on $FEARN_t$. Although Model 1 and Model 3 have similar mean forecast errors for firms with predicted persistent losses as Panel C

shows, the variance of the forecast errors of Model 1 is smaller than that of Model 3. Model 1 also produces smaller forecast errors than Model 4 for firms with predicted persistent losses. The results in Panel C and Panel D of Table 2 suggest that the earnings forecast model developed in this study is superior to two types of random walk models or a model that assumes all losses are transitory.

6.3.5 *The persistence of predicted persistent losses*

Table 3 Panel A compares the quintile classifications based on the forecast earnings from equation (2) and equation (3). Equation (3) produces year-over-year forecast earnings ($FYOYEARN_t$). The results show that 75% of the firms with predicted persistent losses are in the lowest quintile of $FYOYEARN_t$, indicating that the majority of the firms with predicted persistent losses are expected to have poor performance one year later. Panel B reports serial correlations of future earnings in portfolios formed on $FEARN_t$. Future earnings of firms with predicted persistent losses exhibit high serial correlations. For example, the Pearson correlation is 0.565 between $EARN_{t+1}$ and $EARN_{t+2}$, and is 0.445 between $EARN_{t+1}$ and $EARN_{t+4}$. The serial correlations of earnings are much lower in the remaining four portfolios formed on $FEARN_t$. The results in Table 3 suggest that the earnings of firms with predicted persistent losses are highly persistent. Hence, the forecast earnings ($FEARN_t$) of firms with predicted persistent losses not only provide relevant information about these firms' earnings in the next quarter, but also are informative about their performance in the longer horizon.

6.4 *Investors' expectations of loss persistence and the association between forecast earnings and future stock returns*

6.4.1 *Investors' expectations of loss persistence*

To test Hypothesis 1(a), I use the framework developed by Mishkin (1983). The econometric specification of the Mishkin test comprises one "forecast equation" and one "pricing equation":

$$\text{Forecast equation:} \quad EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + \delta_{t+1} \quad (4)$$

$$\text{Pricing equation:} \quad BHAR_{t+1} = \beta(EARN_{t+1} - \alpha_0 - \alpha_1^* EARN_t) + \mu_{t+1} \quad (5)$$

where $BHAR_{t+1}$ is the buy-hold size-adjusted return over the period starting two trading days after the earnings announcement date for quarter t and ending one trading day after the earnings announcement date for quarter $t+1$.¹⁵ The null hypothesis of market efficiency imposes the constraint: $\alpha_1 = \alpha_1^*$. Alternatively, if investors underestimate loss persistence, then the coefficient on $EARN_t$ in the pricing equation will be smaller than the one in the forecast equation, i.e., $\alpha_1 > \alpha_1^*$. In addition, if investors treat the losses as transitory, then the coefficient on $EARN_t$ in the pricing equation (α_1^*) will be insignificantly different from zero.

Table 4 Panel A reports the Mishkin test results for the 12,438 firm-quarter observations with predicted persistent losses. The coefficient on $EARN_t$ in the forecast equation, α_1 , is 0.409 ($t=42.38$), consistent with the high loss persistence in this portfolio. The corresponding coefficient in the pricing equation, α_1^* , is 0.020 ($t=0.16$), which is significantly lower than α_1 .

¹⁵ Results are similar using abnormal returns over the four-trading-day window starting two trading days prior to the earnings announcement date of quarter $t+1$. Results are also robust to the inclusion of the additional explanatory variables identified by Kraft et al. (2007) and additional lags of earnings.

The statistical insignificance of α_1^* suggests that investors treat predicted persistent losses as if they are transitory. The likelihood test for market efficiency is 11.14 (marginal significance level=0.001), and the null hypothesis of $\alpha_1=\alpha_1^*$ is strongly rejected. Panel B reports the Mishkin test results for the 12,454 firm-quarter observations with predicted transitory losses. α_1 is 0.007 (t=0.69) and α_1^* is 0.034 (t=0.49). Both α_1 and α_1^* are statistically insignificant, which is consistent with the transitory nature of losses in this portfolio. The likelihood test for market efficiency is 0.15 (marginal significance level=0.700), and the null hypothesis of $\alpha_1=\alpha_1^*$ is not rejected. The results in Table 4 suggest that investors do not fully distinguish the differences in loss persistence identified by the model, and instead appear to assume that all losses are transitory. Specifically, the expectations embedded in the stock prices of firms with predicted persistent losses underestimate the loss persistence of these firms. In contrast, the expectations embedded in the stock prices of firms with predicted transitory losses correctly reflect the loss persistence. Overall, the results in Table 4 support the prediction of H1(a).

6.4.2 *The association between forecast earnings and future stock returns*

Table 5 Panel A presents equal-weighted and value-weighted portfolio size-adjusted returns over the 90-day window ($BHAR90_{t+1}$), 180-day window ($BHAR180_{t+1}$), and one-year window ($BHAR365_{t+1}$) starting two trading days after the earnings announcement date of quarter t. Results are similar if the return windows start one month or 45 calendar days after the end of quarter t. The first three columns report the equal-weighted portfolio returns. The mean size-adjusted returns of the predicted persistent loss portfolio are significantly negative in all return windows. For example, the mean portfolio return is -3.10% (t=-2.82) over the 90-day period and -12.0% (t=-5.15) over the one-year period. Portfolio returns increase monotonically in forecast

earnings, with the predicted transitory loss portfolio having a mean return of -0.9% ($t=-2.55$) over the 90-day period and -1.5% ($t=-1.81$) over the one-year period. The abnormal return to a hedge portfolio that takes a long position in firms with predicted transitory losses and a short position in firms with predicted persistent losses is 10.4% ($t=4.15$) over the one-year period.¹⁶

The remaining three columns of Table 5 Panel A report the value-weighted portfolio returns, where returns are weighted by the market value of equity at the end of the quarter t . The mean size-adjusted returns for the predicted persistent loss portfolio are consistently negative, ranging from -2.6% ($t=-1.78$) over the 90-day period to -11.6% ($t=-3.95$) over the one-year period. The positive association between forecast earnings and future returns is evident in all return windows. The mean size-adjusted return for the predicted transitory loss portfolio is -0.7% ($t=-1.42$) over the 90-day period and -1.2% ($t=-0.94$) over the one-year period. The mean returns of the predicted transitory loss portfolio are statistically insignificant in all return windows. The hedge return over the one-year period is identical to the equal-weighted return, suggesting that the results are not driven by small firms.

Table 5 Panel B reports equal-weighted $BHAR_{365,t+1}$ for predicted persistent and transitory loss portfolios by calendar quarters. The mean size-adjusted returns for predicted persistent loss portfolio are significantly negative in all calendar quarters, ranging from -10.6% to -14.6%. The small variations in the abnormal returns suggest that the results are not driven by loss firms in a particular quarter.

¹⁶ The results show that firms with predicted persistent losses experience significantly negative abnormal returns over the following four quarters. This is consistent with the results in Table 3, which show that the future earnings of firms with predicted persistent losses have high serial correlations. Consequently, $FEARN_t$ provides relevant information about these firms' expected earnings in the following four quarters, although the forecast model only predicts the earnings in the next quarter.

Figure 4 provides evidence on the stability of the abnormal returns to the trading strategy. It plots the hedge portfolio return over the one-year window ($BHAR365_{t+1}$) for the entire sample period from 1984 to 2006. Figure 4 shows that the strategy is consistently profitable and yields positive returns in 20 of the 23 years in the sample.

In summary, the results in Table 5 and Figure 4 are consistent with the prediction of H1(b). Firms with predicted persistent losses experience significantly negative abnormal returns over the following four quarters, while future abnormal returns of firms with predicted transitory losses are close to zero.

6.5 *The cluster of the abnormal returns around future earnings announcement dates*

Hypothesis 2 predicts that the abnormal returns associated with forecast earnings will be clustered around future earnings announcement dates. The quarterly announcement period is defined as the four-trading-day window starting two trading days prior to the earnings announcement date. Total announcement period over the one-year measurement window of $BHAR365_{t+1}$ includes four subsequent quarterly announcement periods, or 16 trading days.

Table 6 presents equal-weighted and value-weighted size-adjusted returns over the announcement and non-announcement periods. Total return is $BHAR365_{t+1}$ from Table 5 Panel A. The first three columns report the equal-weighted portfolio returns. The positive association between forecast earnings and future stock returns is evident in both the announcement and non-announcement periods. In the announcement period, the mean return is -2.7% ($t=-9.50$) for firms with predicted persistent losses and 1.1% ($t=5.38$) for firms with predicted transitory losses. The hedge return in the announcement period is 3.8% ($t=10.39$). Hence, 37% of the total hedge return (10.4%) is realized in the announcement period, which accounts for only 6% of the total trading

days in a year. In the non-announcement period, the mean return is -9.4% ($t=-4.20$) for firms with predicted persistent losses and -2.6% ($t=-3.25$) for firms with predicted transitory losses. The hedge return in the non-announcement period is 6.8% ($t=2.85$). The results based on the value-weighted returns are similar.

Figure 5 plots the hedge return in the announcement period for the entire sample from 1984 to 2006. The figure shows that the hedge returns in the announcement period are consistently positive for all of the 23 years in the sample period. In addition, the strategy becomes more profitable as the proportion of loss firms increases over time. Overall, the results in Table 6 and Figure 5 are consistent with the prediction of H2. The abnormal returns predicted by the forecast earnings are clustered around future earnings announcement dates.

6.6 *Effects of analyst coverage and institutional ownership on the overvaluation of firms with predicted persistent losses*

6.6.1 *Effects of analyst coverage on the overvaluation of firms with predicted persistent losses*

I use the first available mean forecast for quarter $t+1$ (I/B/E/S FPI=6) after the earnings announcement for quarter t as the consensus analyst forecast ($FEPS_t$). A firm with analyst coverage means there is a consensus forecast for this firm's earnings in quarter $t+1$. The first column in Table 7 Panel A shows that approximately half of the 62,370 loss observations in the sample have analyst coverage, with predicted transitory losses having the most coverage (61%) and predicted persistent losses having the least coverage (46%). The next three columns in Table 7 Panel A report equal-weighted $BHAR365_{t+1}$ for firms in each tercile formed on $NUMEST_t$, which is the number of analysts providing forecasts for the firms' earnings of quarter $t+1$. Observations in each $FEARN_t$ portfolio are sorted into terciles based on $NUMEST_t$ by quarter.

The mean size-adjusted returns for predicted persistent loss portfolio are -8.9% ($t=-2.30$) when the firms' analyst coverage is in the bottom tercile and -5.9% ($t=-1.67$) when the firms' analyst coverage is in the top tercile. Consistent with findings in prior studies, e.g., Lang and Lundholm (1996), the results suggest that larger analyst coverage is associated with better information environment. The last column in Table 7 Panel A reports portfolio returns for loss firms with no analyst following. Compared to firms with analyst coverage, firms without analyst coverage have lower future returns in each level of $FEARN_t$. In particular, the mean size-adjusted return of the predicted persistent loss portfolio is -17.1% ($t=-7.62$) for firms without analyst coverage. The results suggest that investors may benefit from the information provided by analyst forecasts and that the overvaluation of firms with predicted persistent losses is less severe when these firms are followed by analysts.

To investigate whether analyst forecasts reflect more accurate expectations of loss persistence, I estimate the following two equations:

$$\text{Fundamental regression: } EPS_{t+1} = \alpha_0 + \alpha_1 EPS_t + \tau_{t+1} \quad (6)$$

$$\text{Analyst forecast regression: } FEPS_t = \alpha_0^* + \alpha_1^* EPS_t + \omega_t \quad (7)$$

where α_1^* represents analysts' expectations of loss persistence. If analysts correctly anticipate loss persistence, then α_1^* will be equal to α_1 , the true loss persistence. Alternatively, if analysts underestimate loss persistence, then α_1^* will be smaller than α_1 .

Table 7 Panel B reports regression results of equation (6) and (7) using quintile rankings of the actual and forecast pro forma EPS for firms in the predicted persistent and transitory loss portfolios. The sample in this test is restricted to firms with negative pro forma EPS in quarter t .

The results show that α_I^* is smaller than the corresponding α_I and the likelihood tests reject the null hypothesis of $\alpha_I^* = \alpha_I$ in both predicted persistent and transitory loss portfolios, suggesting that analysts underestimate loss persistence in both portfolios. However, α_I^* in the predicted persistent loss portfolio is significantly bigger than the one in the predicted transitory loss portfolio (0.726 vs. -0.052). This is in sharp contrast to the Mishkin test results in Table 4, which show that α_I^* is similar in both portfolios. This evidence indicates that analyst forecasts, albeit optimistic, largely capture the differences in loss persistence.

Table 7 Panel C reports Mishkin test results for observations in Panel B's sample. For firms with predicted persistent losses, α_I^* is 0.308 ($t=2.02$), and the corresponding α_I is 0.388 ($t=30.41$). The likelihood test is 2.93 and the null hypothesis of $\alpha_I^* = \alpha_I$ is rejected with a marginal significance level of 0.087. Although investors still underestimate the persistence of predicted persistent losses, they no longer treat these losses as transitory (α_I^* is significantly positive). The results suggest that investors do benefit from analyst forecasts and that the overvaluation of firms with predicted persistent losses is less severe when these firms have analyst coverage. However, it is possible that analysts choose to follow loss firms that are easier to forecast, or they may change coverage due to other exogenous reasons. Table 7 Panel A shows that firms with predicted persistent losses have much lower analyst coverage than firms with predicted transitory losses, indicating that there could be a selection bias problem.

6.6.2 Effects of institutional ownership on the overvaluation of firms with predicted persistent losses

I collect institutional holdings in each company from Thomson-Reuters Mutual Fund Holdings database (S12). In particular, I aggregate the shares of each stock (identified by CUSIP)

held by all mutual funds in each quarter.¹⁷ The first column in Table 8 shows that institutional investors are more likely to invest in firms with predicted transitory losses: 73% of firms with predicted transitory losses have positive institutional ownership, comparing to the 56% for firms with predicted persistent losses. The second column of Table 8 reports the mean of the percentage of outstanding shares held by institutional investors ($PCTHELD_t$) for firms with non-missing mutual fund data. $PCTHELD_t$ increases monotonically with $FEARN_t$. On average, 7.95% of outstanding shares are held by institutional investors for firms with predicted persistent losses, and 11.41% for firms with predicted transitory losses.

The next four columns in Table 8 report equal-weighted $BHAR365_{t+1}$ for firms in each quartile formed on $PCTHELD_t$. Observations with positive $PCTHELD_t$ in each $FEARN_t$ portfolio are sorted into quartiles based on $PCTHELD_t$ by quarter. The abnormal returns of the predicted persistent loss portfolio increase significantly as institutional holdings increase. The mean size-adjusted return is -12.2% ($t=-3.74$) for observations in the bottom quartile of $PCTHELD_t$ and -2.4% ($t=-0.64$) for observations in the top quartile of $PCTHELD_t$. The hedge returns become insignificant for firms in the third and fourth quartiles of $PCTHELD_t$. The last column reports portfolio returns for firms with no institutional ownership. The mean size-adjusted return is -20.1% ($t=-8.30$) for firms with predicted persistent losses and -9.5% ($t=-7.27$) for firms with predicted transitory losses, resulting in a 10.6% ($t=3.84$) hedge return. The significant decrease in stock returns across all $FEARN_t$ portfolios suggests that, in addition to the bias about loss persistence, retail investors may have optimistic bias about other aspects of loss firms' future performance.

The results in Table 8 suggest that the optimistic bias about loss persistence is concentrated in retail investors and that the negative abnormal returns for firms with predicted

¹⁷ The primary source for the mutual fund holdings data is SEC N-30D filings. These filings are required to be filed with the SEC twice a year by mutual fund companies. To a lesser extent, Thomson Financial also searches fund prospectus and contacts mutual fund management companies to increase update frequency.

persistent losses are smaller in magnitude when these firms have higher institutional holdings. However, similar to the results for analyst coverage, the results for institutional ownership may also have the selection bias problem.

Chapter 7

Robustness Tests

7.1 *The overvaluation of predicted persistent losses in firms with positive short interest*

The results in Table 7 and Table 8 show that the overvaluation of predicted persistent losses is more pronounced in firms with smaller analyst coverage or lower institutional ownership, suggesting that the results could be driven by short sales constraints. To assess this alternative explanation, I examine the results in firms with positive short interest ratio (SIR_t), as these firms are less likely subject to short sales constraints. SIR_t is obtained from Bloomberg and is defined as the number of shares sold short divided by the monthly average trading volume in the last month of quarter t . Due to data availability, the sample in this test starts from the first quarter of 1991 and includes 30,669 firm-quarter observations with positive SIR_t . The first two columns of Table 9 show that the observations are evenly distributed across $FEARN_t$ portfolios and that the mean SIR_t is slightly higher for firms with predicted persistent losses. The next four columns in Table 9 report equal-weighted $BHAR365_{t+1}$ for firms in each quartile formed on SIR_t . The mean size-adjusted return for predicted persistent loss portfolio is -11.1% ($t=-2.66$) for observations in the top quartile of SIR_t and -4.3% ($t=-0.83$) for observations in the bottom quartile of SIR_t . The evidence does not support short sales constraints explanation, which predicts that the results should be stronger in firms with lower short interest ratio.

7.2 *Hedge returns after controlling for other return predictors*

The results in Table 5 suggest that forecast earnings are associated with future stock returns. In this chapter, I examine whether the predictive power of forecast earnings is correlated

and subsumed by other commonly known return predictors. These predictors include book-to-market ratio (BTM_t) (Fama and French, 1992), accruals (ACC_t) (e.g., Sloan, 1996; Richardson et al., 2005), price momentum (MOM_t) (e.g., Jegadeesh and Titman, 1993; Chan et al., 1996; Lee and Swaminathan, 2000), return volatility (VOL_t) (Ang et al., 2006), standardized unexpected earnings (SUE_t) (e.g., Bernard and Thomas, 1990; Ball and Bartov, 1996; Rangan and Sloan, 1998; Narayanamoorthy, 2006), earnings-to-price ratio (ETP_t) (e.g., Basu, 1977; Basu, 1983; Lakonishok et al., 1994), and return on assets ($EARN_t$) (Balakrishnan et al., 2010). I use a regression framework to simultaneously control for the effects of all these return predictors:

$$BHAR365_{t+1} = \gamma_0 + \gamma_1 FEARN_t + \gamma_2 EARN_t + \gamma_3 ETP_t + \gamma_4 SUE_t + \gamma_5 BTM_t + \gamma_6 ACC_t + \gamma_7 MOM_t + \gamma_8 VOL_t + \eta_{t+1} \quad (8)$$

I transform all independent variables into quintile rankings and then scale the rankings so that they have a range of one and a mean of zero. The regression coefficients can be interpreted as hedge portfolio returns (Bernard and Thomas, 1990). Table 10 Panel A reports Pearson (above diagonal) and Spearman (below diagonal) correlations. On the univariate base, $BHAR365_{t+1}$ is positively correlated with $FEARN_t$ (Pearson=0.066). In addition, $FEARN_t$ has strong correlations with $EARN_t$ (Pearson=0.791), BTM_t (Pearson=0.313) and VOL_t (Pearson=-0.388).

Table 10 Panel B reports the ordinary least squares regression results of equation (8) using the quintile rankings of the independent variables. The t-statistics are adjusted for two-way cluster-robust standard errors (clustered by firm and quarter), which are robust to both time-series and cross-sectional correlations (Petersen, 2008). Model 1 reports regression results of $BHAR365_{t+1}$ on $FEARN_t$ alone. The coefficient estimate on $FEARN_t$ is 0.104 (t=2.72), identical to the hedge return obtained from the less restrictive portfolio approach in Table 5 Panel A.

Model 2 reports regression results of $BHAR365_{t+1}$ on $EARN_t$, which has the highest correlation with $FEARN_t$. The hedge portfolio return on $EARN_t$ is 8.7%. Balakrishnan et al. (2010) report a semi-annual hedge return of 6.5% based on $EARN_t$ for loss firms.

Model 3 reports regression results of $BHAR365_{t+1}$ on $FEARN_t$ and other predictors excluding $EARN_t$. The hedge return on $FEARN_t$ drops slightly to 8.4% ($t=2.83$) due to the correlations between $FEARN_t$ and other return predictors. The trading strategies based on SUE_t , BTM_t , and ACC_t yield highly significant hedge returns of 8.1%, 7.4% and 6.7%, respectively. The trading strategy based on VOL_t yields a weakly significant hedge return of 4.7%. After controlling for other factors, hedge returns based on ETP_t and MOM_t are statistically insignificant.

Model 4 replaces $FEARN_t$ in Model 3 with $EARN_t$. The coefficient on $EARN_t$ is 0.052 and statistically insignificant ($t=1.59$), suggesting that the predictive power of current earnings is not incremental to other well-known return predictors. The results of Model 3 and Model 4 show that although $FEARN_t$ and $EARN_t$ are highly correlated, $FEARN_t$ contains additional information about loss firms' future prospects due to the other variables included in equation (2). Moreover, it appears that this additional information contained in $FEARN_t$ has minimal correlation with the information contained in other return predictors.

Finally, Model 5 includes $FEARN_t$ and $EARN_t$ in the same regression to directly test the incremental effect of one variable after controlling for the other. Because of the positive correlation between $FEARN_t$ and $EARN_t$, the hedge return on $FEARN_t$ drops slightly to 7.4% ($t=2.98$) while the coefficient on $EARN_t$ drops to 0.033 ($t=0.87$).

7.3 *Two-pass portfolio construction approach to examine the incremental predictive power of $FEARN_t$ and $EARN_t$*

Given the strong correlation between $FEARN_t$ and $EARN_t$, the regression results in Table 10 may suffer the multicollinearity problem. Therefore I adopt the two-pass portfolio construction approach in Dechow and Dichev (2002) to examine the incremental predictive power of one variable while holding the other variable constant. This approach requires less assumptions and restrictions than regression analysis. Table 11 Panel A reports equal-weighted and value-weighted $BHAR365_{t+1}$ of portfolios formed on $FEARN_t$ while holding $EARN_t$ constant. To hold $EARN_t$ constant, I first sort the observations in each quarter into quintile portfolios based on $EARN_t$. Within each $EARN_t$ quintile, I further sort the observations into five portfolios based on $FEARN_t$ (subportfolios 1 to 5). Finally, I pool all five subportfolios 1 together into one portfolio, all subportfolios 2 together into another portfolio, and so on. The result is five portfolios, with substantial variations of $FEARN_t$ but minimum variations of $EARN_t$.

The results in Table 11 Panel A show that this two-pass portfolio construction controls quite well for level of current earnings, with mean $EARN_t$ ranging from -0.069 to -0.039 across portfolios 1 to 5. Although $FEARN_t$ and $EARN_t$ are highly correlated, the two-pass approach still retains large variations in $FEARN_t$ across portfolios. The conditional range between mean $FEARN_t$ of portfolios 1 and 5 is 0.082, compared to the unconditional range of 0.124 in Table 2 Panel B. The last two columns of Panel A report equal-weighted and value-weighted portfolio returns. The positive association between forecast earnings and future returns is evident in both columns. The strategy that takes a long position in portfolio 5 (highest $FEARN_t$) and a short position in portfolio 1 (lowest $FEARN_t$) yields significantly positive abnormal returns: 4.9% (t=2.84) when returns are equal-weighted or 5.0% (t=2.44) when returns are value-weighted.

This evidence indicates that forecast earnings still strongly predict future returns after controlling for the level of current earnings.

Table 11 Panel B reports equal-weighted and value-weighted $BHAR365_{t+1}$ of portfolios formed on $EARN_t$ while holding $FEARN_t$ constant. The portfolios are constructed by first sorting sample into quintiles of $FEARN_t$, then within each quintile sorting observations into five subportfolios based on $EARN_t$, and finally pooling together all subportfolios with the same rank. As shown in Panel B, mean $FEARN_t$ ranges from -0.048 in portfolio 1 to -0.027 in portfolio 5, while mean $EARN_t$ ranges from -0.111 to -0.013. The conditional range of mean $EARN_t$ is 0.098 and is larger than the conditional range of mean $FEARN_t$ in Panel A. Despite the larger variations, $EARN_t$ can no longer predict future returns. There is no positive association between $EARN_t$ and stock returns in both equal-weighted and value-weighted portfolio returns. The strategy that takes a long position in portfolio 5 (highest $EARN_t$) and a short position in portfolio 1 (lowest $EARN_t$) does not yield any hedge returns with meaningful economic or statistical significance.

Overall, the results in Table 11 reinforce the results in Table 10 and show that forecast earnings are strongly associated with future stock returns after controlling for the level of current earnings. In contrast, current earnings have no predictability for future returns after controlling for the level of forecast earnings.

7.4 Hedge returns after risk adjustments

To mitigate the concern that the abnormal hedge returns are caused by different exposures to systematic risks between the predicted persistent and transitory loss portfolios, I examine the hedge returns based on $FEARN_t$ after controlling for the four risk factors in Carhart (1997). Specifically, I run the following time-series regression using monthly portfolio returns:

$$(r_i - r_f) = a_i + b_i(r_m - r_f) + s_iSMB + h_iHML + u_iUMD + e_i \quad (9)$$

where r_i is the monthly raw return for portfolio i ; r_f is the monthly return on one-month T-bill; r_m is the return on the NYSE/AMEX/NASDAQ market index; SMB is the Fama-French (1993) small firm factor; HML is the Fama-French book-to-market factor; UMD is the Carhart (1997) momentum factor; b_i , s_i , h_i and u_i are the corresponding factor loadings; and a_i is the intercept or the alpha of the portfolio.¹⁸ Because this approach assumes that the returns in each portfolio are aligned in calendar time, the sample of this test is restricted to firms with December fiscal year-ends and consists of 37,730 firm-quarter observations.

The estimated intercept from these regressions (a_i) can be interpreted as the risk-adjusted return of the portfolio relative to the four-factor model. The evidence in Table 12 shows that the hedge return to the trading strategy based on forecast earnings cannot be explained by the four risk factors. In particular, the intercept corresponding to the trading strategy (transitory-persistent) indicates that the monthly abnormal return to the hedge portfolio is 0.7%, which is equivalent to 8.1% per annum. The abnormal return is statistically significant at 5% level, with White (1980) heteroskedasticity corrected t-statistic of 1.97.

The loadings on the four risk factors reveal some characteristics of the firms in the predicted transitory and persistent loss portfolios. First, the estimated factor loadings on $r_m - r_f$ (i.e. b_i) in the hedge portfolio is -0.102 ($t = -1.21$). The insignificant b_i of the hedge portfolio indicates that firms with predicted persistent losses have similar exposure to market risk as firms with predicted transitory losses. Second, the estimated factor loading on SMB (i.e. s_i) in the hedge

¹⁸ The factors and risk free rate are obtained from Professor Kenneth French's website:
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

portfolio is -0.669 (t=-4.41), suggesting that firms with predicted persistent losses are smaller than firms with predicted transitory losses. Third, the estimated factor loading on HML (i.e. h_i) in the hedge portfolio is 0.928 (t=5.90), indicating that predicted transitory loss portfolios hold more “value” stocks and predicted persistent loss portfolios hold more “growth” stocks. Finally, the estimated factor loading on UMD (i.e. u_i) in the hedge portfolio is 0.095 (t=0.85), suggesting that both portfolios have similar exposure to momentum factor.

7.5 *The predictability of forecast earnings for future returns in the absence of special items*

As shown in Table 2, special items are important predictors of loss firms' future earnings. To mitigate the concern that the predictive power of $FEARN_t$ is driven by investors' failure to price the implications of special items for future earnings (e.g., Bartov et al., 1998; Burgstahler et al., 2002; Dechow and Ge, 2006), I examine the association between $FEARN_t$ and future returns in a subsample of loss observations with zero special items. There are 43,217 loss observations with zero special items from 1983 to 2006. I exclude special items from the earnings forecast model:

$$EARN_{t+1} = \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALESQ_t + \beta_5 FIRSTLOSS_t + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 Q3_t + \beta_9 Q4_t + \varepsilon_{t+1} \quad (10)$$

Table 13 Panel A reports Fama-MacBeth regression results of equation (10). The coefficient on $FIRSTLOSS_t$ is marginally significant (t=1.57). The magnitude and statistical significance of other coefficients in the revised forecast model are similar to those reported in Table 2 Panel A. The resulting sample with non-missing forecast earnings includes 41,401 firm-quarter observations from 1984 to 2006.

Table 13 Panel B reports equal-weighted and value-weighted $BHAR365_{t+1}$. The hedge return of taking a long position in firms with predicted transitory losses and a short position in firms with predicted persistent losses is 9.9% ($t=3.89$) when returns are equal-weighted and 12.2% ($t=4.51$) when returns are value-weighted. These results compare well to the full sample results reported in Table 5 Panel A, suggesting that the predictability of forecast earnings for stock returns is not driven by the effects of special items. Note that excluding observations with special items leads to a downward shift of future abnormal returns across all portfolios. For example, the future abnormal returns of predicted transitory loss portfolio is significantly negative. This is consistent with the findings in Burgstahler et al. (2002) and Dechow and Ge (2006) that negative special items lead to higher future returns.

7.6 *The overvaluation of firms with predicted persistent losses in traditional and new economy industries*

The increase of loss firms in the U.S. economy since the 1980s coincides with the rise of the new economy. To mitigate the concern that the overvaluation of firms with predicted persistent losses is driven by factors related to the new economy, such as the market's failure to price the implications of R&D expenses for future earnings (e.g., Lev and Sougiannis, 1996; Chan et al., 2001), I examine the association between $FEARN_t$ and future returns in subsamples of loss firms from traditional and new economy industries. The new economy industries include pharmaceutical products, telecommunications, computers and electronic equipment. There are 46,136 (18,403) loss observations from traditional (new) economy industries for the sample period from 1983 to 2006. Forecast earnings are re-estimated in each subsample.

Table 14 Panel A reports Fama-MacBeth regression results of equation (2) in new economy industries. The magnitude and statistical significance of the coefficients estimated in this subsample are similar to those reported in Table 2 Panel A. The resulting sample with non-missing forecast earnings includes 18,098 firm-quarter observations from 1984 to 2006. Table 14 Panel B reports portfolio returns in the new economy subsample. Over the one-year window, the hedge return based on $FEARN_t$ is 13.2% ($t=5.44$) when returns are equal-weighted and 18.8% ($t=5.24$) when returns are value-weighted. Both numbers are higher than their counterparts in the full sample results.

Table 15 Panel A reports Fama-MacBeth regression results of the earnings forecast model in traditional economy industries. The coefficient on $FIRSTLOSS_t$ is marginally significant ($t=1.57$). The remaining coefficient estimates compare well to the full sample results reported in Table 2 Panel A. The resulting sample with non-missing forecast earnings includes 44,272 firm-quarter observations from 1984 to 2006. Table 15 Panel B reports portfolio returns in the traditional economy subsample. Over the one-year window, the hedge return based on $FEARN_t$ is 12.3% ($t=5.33$) when returns are equal-weighted and 11.9% ($t=3.93$) when returns are value-weighted. These results compare well to the full sample results reported in Table 5 Panel A, suggesting that the overvaluation of firms with predicted persistent losses is not driven by factors related to the new economy.

7.7 *Excluding the most influential observations*

Kraft et al. (2006) argue that when testing the *cause* of an accounting-related anomaly, researchers need to ensure that the proposed relation is not driven by a small number of observations. To examine whether the results are robust to the exclusion of influential

observations, I implement the least trimmed squares (LTS) procedure introduced by Rousseeuw (1984). Specifically, I estimate the following regression:

$$BHAR365_{t+1} = \eta_0 + \eta_1 RD5_t + \eta_2 RD4_t + \eta_3 RD3_t + \eta_4 RD2_t + \mathcal{E}_{t+1} \quad (11)$$

where $RD5_t$, $RD4_t$, $RD3_t$, and $RD2_t$ are dummy variables indicating observations in the fifth, fourth, third, or second quintile of $FEARN_t$, respectively. The intercept (η_0) represents the mean abnormal return of the predicted persistent loss portfolio. η_1 , η_2 , η_3 , and η_4 are differences in returns between other portfolios and the predicted persistent loss portfolio. In particular, η_1 represents the mean hedge return of taking a long position in predicted transitory losses and a short position in predicted persistent losses.

Column 1 of Table 16 reports OLS estimation of equation (11) using the full sample. Mean abnormal return of the predicted persistent loss portfolio, η_0 , is -12.9% ($t=-17.24$), and the hedge return, η_1 , is 11.6% ($t=11.38$). The results are very close to those reported in Table 5 Panel A. Column 2 of Table 16 reports LTS estimation of equation (11) by excluding 1% of the sample with the largest squared residuals. Dropping 1% of the sample leads to a downward shift of abnormal returns across all portfolios. In particular, the mean abnormal return of the predicted persistent loss portfolio is -26.4% ($t=-55.08$). Nevertheless, forecast earnings are still positively associated with future returns as shown by the progressively smaller coefficients on $RD5_t$, $RD4_t$, $RD3_t$, and $RD2_t$. The hedge return increases to 19.9% ($t=30.66$). Column 3 of Table 16 reports LTS estimation by excluding 10% of the sample with the largest squared residuals. The results are similar to those reported in column 2, suggesting that further elimination of influential observations does not change the results significantly.

In summary, the results in Table 16 show that the positive association between forecast earnings and future abnormal returns is not driven by a small set of influential observations. Instead, this relation applies to the majority of the sample.

7.8 Results using annual data

Compustat (Xpressfeed) quarterly data are restated financial information, which introduces a peak-ahead bias in the test. To ensure that the results are not driven by this peak-ahead bias, I re-examine the results using Compustat annual data. The tenor of the results (untabulated) does not change when using annual instead of quarterly financial information.

Chapter 8

Conclusions and Discussions

As loss firms become prevalent in the U.S. economy, it is important to understand the characteristics of losses and how investors value them. This study examines investors' expectations of loss persistence. The results show that investors do not fully distinguish the differences in loss persistence, and instead appear to assume that all losses are transitory. Consequently, investors are surprised by future announcements of negative earnings for firms with predicted persistent losses, and these firms experience significantly negative future abnormal returns.

Two behavioral heuristics documented by prior studies could potentially explain why loss firms' investors exhibit such an optimistic bias about loss persistence. The first behavioral heuristic is that investors tend to be overconfident, e.g., Odean (1998), Daniel et al. (1998, 2001). Investors of loss firms, especially those firms with predicted persistent losses, are more likely to display overconfidence bias than investors of profit firms. This is because negative earnings are less relevant to firms' future performance than positive earnings, and therefore investors often need to gather information through other channels to help them gauge the future prospects of loss firms, such as interviewing management, verifying rumors, and analyzing the demand of the company's products. This kind of information is not readily available and requires significant personal effort to obtain and analyze. Daniel et al. (1998) argue that an overconfident investor tends to overestimate the accuracy of his private signals, especially when this private information requires great personal involvement. As a result, loss firms' investors may overweight their

private signals and underweight public signals like earnings, leading to stock prices' underreaction to loss persistence.

The second behavioral heuristic is the disposition effect introduced into the finance literature by Shefrin and Statman (1985). Disposition effect is the tendency of investors to sell assets whose price has increased, while keeping assets that have dropped in value. Frazzini (2006) argues that the presence of a large subset of investors who display disposition effect can hamper the transmission of information and induce underreaction to news. I show that the optimistic bias about loss persistence is more pronounced in individual investors, who are more likely to display disposition effect. Due to this behavioral heuristic, investors are reluctant to sell the stocks of firms with predicted persistent losses whose value has dropped significantly. This induces the drift in these firms' stock returns.

This study raises additional issues for future research. For instance, I do not find evidence indicating that investors misunderstand the persistence of profits. This could be either due to the low power of the earnings forecast model for profit firms or because investors have a better sense of the persistence of profits. To investigate whether investors correctly anticipate the persistence of profits requires a better model that can capture the differences in profit persistence. It may also be worthwhile to examine the role of pro forma earnings and management forecasts. Bhattacharya et al. (2007) find that less sophisticated individual investors are more likely to trade on pro forma earnings. Because pro forma earnings are likely to portray better future performance than GAAP earnings, the finding of Bhattacharya et al. (2007) may potentially explain why investors underestimate loss persistence.

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Figure 1: The proportion of loss firms during the period 1976-2007

The figure plots the percentage of firms on Compustat (Xpressfeed) that report quarterly losses (*left axis*) during the period from 1976 to 2007. Loss is defined as negative income before extraordinary items (IBQ). Observations are aggregated by calendar year. The sample includes 767,549 firm-quarter observations, among which 222,377 are loss observations and 499,929 are profit observations. The figure also plots the percentage of Compustat firms in the new economy industries (*right axis*) and the percentage of loss firms in the new economy industries (*left axis*). New economy industries include pharmaceutical products, telecommunications, computers and electronic equipment. Industry classification is based on Fama and French (1997) 48 industry groups.

Figure 2: The distribution of changes in quarterly earnings for loss and profit firms

Panel A: The distribution of changes in earnings from quarter t to $t+1$ for firms reporting losses in quarter t

The figure plots the distribution of changes in income before extraordinary items (IBQ) from quarter t to quarter $t+1$, divided by total assets (ATQ) at the end of quarter t for firms reporting losses in quarter t . The sample period is from 1983 to 2006. The loss sample includes 64,539 firm-quarter observations. Chapter 5 discusses the sample selection criteria. The highlighted two columns represent observations with earnings changes within 1% of total assets.

Figure 2: continued

Panel B: The distribution of changes in earnings from quarter t to $t+1$ for firms reporting profits in quarter t

The figure plots the distribution of changes in income before extraordinary items (IBQ) from quarter t to quarter $t+1$, divided by total assets (ATQ) at the end of quarter t for firms reporting profits in quarter t . The sample period is from 1983 to 2006. The profit sample includes 221,591 firm-quarter observations. Chapter 5 discusses the sample selection criteria. The highlighted two columns represent observations with earnings changes within 1% of total assets.

Figure 3: Time-series plots of the mean earnings of firms with predicted persistent and transitory losses

The figure plots the mean earnings of firms with predicted persistent and transitory losses. Quarter t represents the quarter in which forecast earnings are estimated. Earnings are income before extraordinary items (IBQ) divided by total assets (ATQ) at the beginning of the quarter. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of forecast earnings ($FEARN_t$).

Figure 4: Hedge returns to the strategy that takes a long position in predicted transitory losses and a short position in predicted persistent losses

The figure plots the hedge portfolio returns measured over the one-year period starting two trading days after the earnings announcement date (RDQ) for the strategy that takes a long position in predicted transitory losses and a short position in predicted persistent losses for the sample period from 1984 to 2006. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of forecast earnings. Portfolio returns are calculated as the equal-weighted returns of the observations in each portfolio. Observations are reclassified into different portfolios each quarter.

Figure 5: Hedge returns in the earnings announcement period to the strategy that takes a long position in predicted transitory losses and a short position in predicted persistent losses

The figure plots the hedge returns measured over the four future earnings announcement periods for the strategy that takes a long position in predicted transitory losses and a short position in predicted persistent losses for the sample period from 1984 to 2006. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of forecast earnings. Portfolio returns are calculated as the equal-weighted returns of the observations in each portfolio. Observations are reclassified into different portfolios each quarter. The announcement period is defined as the four-trading-day period starting two trading days prior to the earnings announcement date (RDQ). Total announcement period over the one-year measurement window of $BHAR365_{t+1}$ includes four subsequent quarterly announcement periods, or 16 trading days.

Table 1: Descriptive statistics for the 64,539 firm-quarter loss observations for the period 1983- 2006

Panel A: Mean loss reversal and future earnings by the length of loss sequence

Length of loss sequence	No. of obs.	% of total	Mean REVERSAL _{t+1} (Joos and Plesko 2005)	Mean EARN _{t+1}
1 quarter	23,256	36	0.525	-0.009
2 quarters	10,283	16	0.402	-0.018
3 quarters	5,785	9	0.343	-0.024
4 quarters	5,097	8	0.155	-0.059
5 quarters	3,899	6	0.160	-0.062
6 quarters	2,931	5	0.135	-0.064
7 quarters	2,244	3	0.134	-0.070
8 quarters	1,743	3	0.115	-0.072
9 quarters - 16 quarters	6,252	10	0.105	-0.077
17 quarters or more	3,049	5	0.051	-0.084
Total	64,539	100	0.332	-0.035

Loss is defined as negative income before extraordinary items (IBQ). REVERSAL_{t+1} is an indicator variable that is equal to one if the loss firm becomes profitable in the quarter t+1, and zero otherwise. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. Loss sequence counts the number of sequential quarterly losses in the past and includes the loss in the current quarter.

Table 1: continued*Panel B: Descriptive statistics of variables in the earnings forecast model*

Variable	N	Mean	Median	Std Dev	25%	75%
EARN _{t+1}	64,539	-0.035	-0.011	0.073	-0.050	0.003
EARN _t	64,539	-0.048	-0.021	0.067	-0.059	-0.007
EARN _{t-3}	64,539	-0.025	-0.004	0.068	-0.038	0.010
SIZE _t	64,539	4.824	4.692	1.712	3.659	5.922
SALESG _t	64,539	0.032	-0.007	0.410	-0.140	0.114
FIRSTLOSS _t	64,539	0.360	0.000	0.480	0.000	1.000
LOSS_SEQ _t	64,539	1.822	1.000	1.701	0.000	4.000
DIVDUM _t	64,539	0.153	0.000	0.360	0.000	0.000
SPI _t	64,539	-0.010	0.000	0.028	-0.003	0.000
SPI _{t-3}	64,539	-0.003	0.000	0.017	0.000	0.000
Q3 _t	64,539	0.230	0.000	0.421	0.000	0.000
Q4 _t	64,539	0.284	0.000	0.451	0.000	1.000

EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. SIZE_t is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. SALESG_t is the percentage growth in sales (SALEQ) during quarter t. FIRSTLOSS_t is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise. LOSS_SEQ_t is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. DIVDUM_t is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise. SPI_t is special items (SPIQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. Q3_t (Q4_t) is a dummy variable indicating the third (fourth) fiscal quarter.

Table 1: continued*Panel C: Pearson (above diagonal) / Spearman (below diagonal) correlations*

Variable	EARN _{t+1}	EARN _t	EARN _{t-3}	SIZE _t	SALESG _t	FIRSTLOSS _t	LOSS_SEQ	DIVDUM _t	SPI _t	SPI _{t-3}	Q3 _t	Q4 _t
EARN _{t+1}	1.000	0.546	0.540	0.062	-0.096	0.272	-0.374	0.197	-0.063	0.077	-0.114	0.089
EARN _t	0.481	1.000	0.503	0.046	-0.113	0.228	-0.325	0.184	0.379	0.054	0.009	-0.083
EARN _{t-3}	0.534	0.403	1.000	0.011	-0.160	0.315	-0.511	0.195	-0.064	0.380	-0.073	0.052
SIZE _t	0.054	0.058	0.000	1.000	0.034	0.033	0.015	0.216	-0.140	-0.059	0.004	0.022
SALESG _t	-0.041	-0.044	-0.124	0.087	1.000	-0.219	0.224	-0.073	-0.028	-0.011	0.000	0.041
FIRSTLOSS _t	0.360	0.293	0.413	0.018	-0.268	1.000	-0.804	0.227	-0.134	0.049	-0.010	0.101
LOSS_SEQ _t	-0.460	-0.388	-0.625	0.028	0.261	-0.868	1.000	-0.275	0.121	-0.090	0.032	-0.081
DIVDUM _t	0.263	0.254	0.245	0.198	-0.069	0.227	-0.273	1.000	-0.037	0.052	-0.014	0.053
SPI _t	-0.159	0.165	-0.147	-0.209	-0.060	-0.156	0.157	-0.084	1.000	0.051	0.008	-0.156
SPI _{t-3}	0.029	0.011	0.213	-0.119	-0.016	0.035	-0.070	0.028	0.123	1.000	-0.100	0.069
Q3 _t	-0.100	0.004	-0.051	0.006	0.004	-0.010	0.028	-0.014	0.007	-0.086	1.000	-0.343
Q4 _t	0.098	-0.090	0.038	0.016	0.068	0.101	-0.089	0.053	-0.161	0.055	-0.343	1.000

EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. SIZE_t is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. SALESG_t is the percentage growth in sales (SALEQ) during quarter t. FIRSTLOSS_t is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise. LOSS_SEQ_t is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. DIVDUM_t is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise. SPI_t is special items (SPIQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. Q3_t (Q4_t) is a dummy variable indicating the third (fourth) fiscal quarter.

Table 2: The earnings forecast model, descriptive statistics for portfolios formed on forecast earnings and forecast accuracy

Panel A: Fama-MacBeth regression results of the earnings forecast model

$$EARN_{t+1} = \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALES_t + \beta_5 FIRSTLOSS_t + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 SPI_t + \beta_9 SPI_{t-3} + \beta_{10} Q3_t + \beta_{11} Q4_t + \varepsilon_{t+1}$$

Variable	Predicted sign	Fama-MacBeth regression (No. of regressions: 96)		
		Coefficient	t-statistic	p value
EARN _t	+	0.500	37.35	0.000
EARN _{t-3}	+	0.324	25.86	0.000
SIZE _t	+	0.001	3.00	0.004
SALES _t	?	0.001	0.89	0.376
FIRSTLOSS _t	+	0.002	2.09	0.039
LOSS_SEQ _t	-	-0.001	-3.66	0.000
DIVDUM _t	+	0.006	10.93	0.000
SPI _t	-	-0.604	-27.93	0.000
SPI _{t-3}	-	-0.344	-11.33	0.000
Q3 _t	-	-0.014	-14.16	0.000
Q4 _t	+	0.009	13.69	0.000
INTERCEPT		-0.011	-8.08	0.000
Adjusted R-square		45.5%		

EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. SIZE_t is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. SALES_t is the percentage growth in sales (SALEQ) during quarter t. FIRSTLOSS_t is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise. LOSS_SEQ_t is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. DIVDUM_t is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise. SPI_t is special items (SPIQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. Q3_t (Q4_t) is a dummy variable indicating the third (fourth) fiscal quarter. The estimation period is from 1983 to 2006. There are 96 quarterly regressions. Reported coefficients, t-statistic and p values are derived using the Fama and MacBeth (1973) procedure.

Table 2: continued*Panel B: Descriptive statistics for portfolios formed on $FEARN_t$*

Portfolio ranking on $FEARN_t$	No. of obs.	No. of firms	$FEARN_t$	$EARN_t$	$EARN_{t+1}$	$EARN_{t+4}$	$REVERSAL_{t+1}$ (Joos and Plesko 2005)	$SIZE_t$
Predicted persistent loss	12,438	3,094	-0.113	-0.117	-0.114	-0.100	0.085	4.540
2	12,491	4,038	-0.043	-0.046	-0.041	-0.039	0.169	4.668
3	12,496	4,422	-0.022	-0.022	-0.019	-0.020	0.290	4.748
4	12,491	4,749	-0.008	-0.015	-0.008	-0.012	0.440	4.895
Predicted transitory loss	12,454	5,023	0.011	-0.020	0.004	0.003	0.674	5.490
Transitory-Persistent			0.124***	0.097***	0.117***	0.103***	0.589***	0.950***

$FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $EARN_t$ is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. $EARN_{t+1}$ and $EARN_{t+4}$ are earnings in quarter t+1 and t+4, respectively. $REVERSAL_{t+1}$ is an indicator variable that is equal to one if the loss firm becomes profitable in the quarter t+1, and zero otherwise. $SIZE_t$ is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. The reported numbers are the mean of each variable. ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 2: continued

Panel C: Forecast errors for different earnings forecast models

Portfolio ranking on $FEARN_t$	Model 1 $FE_1=EARN_{t+1}-FEARN_t$	Model 2 $FE_2=EARN_{t+1}-EARN_t$	Model 3 $FE_3=EARN_{t+1}-EARN_{t-3}$	Model 4 $FE_3=EARN_{t+1}-0$
Predicted persistent loss	-0.001	0.003***	-0.001	-0.114***
2	0.002***	0.005***	-0.010***	-0.041***
3	0.002***	0.003***	-0.014***	-0.019***
4	0.001	0.007***	-0.014***	-0.008***
Predicted transitory loss	-0.007***	0.024***	-0.013***	0.004***

$FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $EARN_t$ is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t . Model 1 is the earnings forecast model in equation (2). Model 2 is the random walk model. Model 3 is the seasonal random walk model. Model 4 assume losses are transitory, i.e., the expected earnings for quarter $t+1$ are zero. Forecast errors (FE) are the differences between the actual earnings in quarter $t+1$ ($EARN_{t+1}$) and the expected earnings derived from each model. The reported numbers are the mean of each variable. ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 2: continued*Panel D: Compare forecast accuracy for different earnings forecast models*

Portfolio ranking on $FEARN_t$	Model 1 vs. Model 2 $DIFF_1 = FE_2 - FE_1 $	Model 1 vs. Model 3 $DIFF_2 = FE_3 - FE_1 $	Model 1 vs. Model 4 $DIFF_3 = FE_4 - FE_1 $
Predicted persistent loss	0.014***	0.018***	0.059***
2	0.004***	0.009***	0.012***
3	0.002***	0.003***	0.001***
4	0.004***	0.003***	-0.001***
Predicted transitory loss	0.013***	0.002***	-0.001***

$FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. Model 1 is the earnings forecast model in equation (2). Model 2 is the random walk model. Model 3 is the seasonal random walk model. Model 4 assume losses are transitory, i.e., the expected earnings for quarter $t+1$ are zero. Forecast errors (FE) are the differences between the actual earnings in quarter $t+1$ ($EARN_{t+1}$) and the expected earnings derived from each model. DIFF is the difference between the absolute value of the forecast errors of the other three models and the absolute value of the forecast errors of model 1. The reported numbers are the mean of each variable. ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 3: The persistence of the predicted persistent losses

Panel A: Quintile classifications based on forecast earnings of quarter $t+1$ ($FEARN_t$) and forecast earnings of quarter $t+4$ ($FYOYEARN_t$)

		Portfolio ranking on FYOYEARN _t					Missing	
		1	2	3	4	5	FYOYEARN _t	
Portfolio ranking on FEARN _t	Predicted persistent loss	12,438	9,371	1,496	247	85	23	1,216
		100%	75%	12%	2%	1%	0%	10%
	2	12,491	1,774	6,658	2,112	701	191	1,055
		100%	14%	53%	17%	6%	2%	8%
	3	12,496	155	2,496	5,389	2,723	730	1,003
		100%	1%	20%	43%	22%	6%	8%
	4	12,491	63	580	2,829	5,370	2,602	1,047
		100%	1%	5%	23%	43%	21%	8%
	Predicted transitory loss	12,454	23	211	863	2,562	7,857	938
		100%	0%	2%	7%	21%	63%	8%

$FEARN_t$ is the forecast earnings of quarter $t+1$ based on equation (2). $FYOYEARN_t$ is the forecast earnings of quarter $t+4$ based on equation (3). Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. Bolded cells represent observations with identical rankings based on both $FEARN_t$ and $FYOYEARN_t$.

Table 3: continued*Panel B: Pearson correlations of future earnings*

Portfolio ranking on $FEARN_t$	Corr ($EARN_{t+1}, EARN_{t+2}$)	Corr ($EARN_{t+1}, EARN_{t+3}$)	Corr ($EARN_{t+1}, EARN_{t+4}$)
Predicted persistent loss	0.565***	0.513***	0.445***
2	0.351***	0.290***	0.236***
3	0.240***	0.193***	0.185***
4	0.262***	0.177***	0.157***
Predicted transitory loss	0.316***	0.210***	0.182***

$FEARN_t$ is the forecast earnings of quarter $t+1$ based on equation (2). Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $EARN_{t+1}$ is income before extraordinary items (IBQ) in quarter $t+1$ divided by total assets (ATQ) at the beginning of quarter $t+1$. ***, **, * denote significance at 0.01, 0.05 and 0.10 level.

Table 4: Mishkin (1983) tests of investors' expectations of loss persistence

$$EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + \delta_{t+1}$$

$$BHAR_{t+1} = \beta(EARN_{t+1} - \alpha_0 - \alpha_1^* EARN_t) + \mu_{t+1}$$

Panel A: Predicted persistent losses (N=12,438)

<i>Forecast equation</i>			<i>Pricing equation</i>		
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.409	42.38	α_1^*	0.020	0.16
			β	0.349	8.45
<i>Test of investors' expectations of loss persistence:</i>					
Null hypothesis		Likelihood ratio statistic		Marginal significance level	
$\alpha_1 = \alpha_1^*$		11.14		0.001	

Panel B: Predicted transitory losses (N=12,454)

<i>Forecast equation</i>			<i>Pricing equation</i>		
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.007	0.69	α_1^*	0.034	0.49
			β	1.056	15.87
<i>Test of investors' expectations of loss persistence:</i>					
Null hypothesis		Likelihood ratio statistic		Marginal significance level	
$\alpha_1 = \alpha_1^*$		0.15		0.700	

FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of FEARN_t. There are 12,438 firm-quarter observations in the portfolio of predicted persistent losses and 12,454 firm-quarter observations in the portfolio of predicted transitory losses. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. BHAR_{t+1} is buy-hold size-adjusted return over the period starting two trading days after earnings announcement date (RDQ) of quarter t and ending one trading day after earnings announcement date of quarter t+1. Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The two equations are jointly estimated using iterative weighted non-linear least squares.

Table 5: Size-adjusted returns of portfolios formed on $FEARN_t$

Panel A: Size-adjusted portfolio returns over different measurement windows

Portfolio ranking on $FEARN_t$	Equal-weighted size-adjusted returns			Value-weighted size-adjusted returns		
	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$
Predicted persistent loss	-0.031*** (-2.82)	-0.064*** (-4.15)	-0.120*** (-5.15)	-0.026* (-1.78)	-0.040 (-1.57)	-0.116*** (-3.95)
2	-0.031*** (-3.78)	-0.052*** (-4.35)	-0.073*** (-3.45)	-0.024** (-2.21)	-0.036** (-2.22)	-0.056** (-2.06)
3	-0.028*** (-5.75)	-0.048*** (-5.83)	-0.060*** (-5.18)	-0.018** (-2.08)	-0.027* (-1.87)	-0.036* (-1.78)
4	-0.017*** (-4.40)	-0.039*** (-6.57)	-0.042*** (-4.93)	-0.003 (-0.37)	-0.011 (-0.95)	0.000 (-0.00)
Predicted transitory loss	-0.009** (-2.55)	-0.020*** (-3.59)	-0.015* (-1.81)	-0.007 (-1.42)	-0.005 (-0.55)	-0.012 (-0.94)
Transitory-Persistent	0.022* (1.77)	0.044** (2.52)	0.104*** (4.15)	0.018 (1.21)	0.035 (1.52)	0.104*** (4.01)

$FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR90_{t+1}$, $BHAR180_{t+1}$, and $BHAR365_{t+1}$ are buy-hold size-adjusted returns over the 90-day, 180-day and one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The weights in value-weighted returns are market value of equity (PRCCQ*CSHOQ) at the end of quarter t . The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 5: continued

Panel B: Size-adjusted portfolio returns by calendar quarters

	Equal-weighted BHAR365 _{t+1}			
	1st quarter	2nd quarter	3rd quarter	4th quarter
Predicted persistent loss	-0.114** (-2.31)	-0.106** (-2.36)	-0.146*** (-3.64)	-0.112** (-2.12)
Predicted transitory loss	-0.011 (-0.64)	-0.028 (-1.52)	-0.019 (-1.05)	-0.004 (-0.28)
Transitory-Persistent	0.103** (2.13)	0.078* (2.01)	0.127*** (3.04)	0.108** (2.42)

FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of FEARN_t. BHAR365_{t+1} is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 6: Announcement period and non-announcement period portfolio returns

Portfolio ranking on $FEARN_t$	Equal-weighted size-adjusted returns			Value-weighted size-adjusted returns		
	Total period return ($BHAR365_{t+1}$)	Announcement period return	Non-announcement period return	Total period return ($BHAR365_{t+1}$)	Announcement period return	Non-announcement period return
Predicted persistent loss	-0.120*** (-5.15)	-0.027*** (-9.50)	-0.094*** (-4.20)	-0.116*** (-3.95)	-0.030*** (-5.30)	-0.087*** (-3.07)
2	-0.073*** (-3.45)	-0.004 (-1.26)	-0.070*** (-3.44)	-0.056** (-2.06)	-0.008 (-1.37)	-0.048* (-1.94)
3	-0.060*** (-5.18)	0.004* (1.89)	-0.065*** (-5.97)	-0.036* (-1.78)	0.004 (0.70)	-0.040** (-2.26)
4	-0.042*** (-4.93)	0.008*** (3.86)	-0.049*** (-5.94)	0.000 (-0.00)	0.006 (1.32)	-0.006 (-0.38)
Predicted transitory loss	-0.015* (-1.81)	0.011*** (5.38)	-0.026*** (-3.25)	-0.012 (-0.94)	0.006 (1.53)	-0.019 (-1.61)
Transitory-Persistent	0.104*** (4.15)	0.038*** (10.39)	0.068*** (2.85)	0.104*** (4.01)	0.036*** (5.57)	0.068*** (2.64)

$FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR365_{t+1}$ is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . The announcement period is defined as the four-trading-day period starting two trading days prior to the earnings announcement date. Total announcement period over the one-year measurement window of $BHAR365_{t+1}$ includes four subsequent quarterly announcement periods, or 16 trading days. Non-announcement period starts two trading days after the earnings announcement date of quarter t and ends three trading days prior to the earnings announcement date of quarter $t+4$, exclusive of the three intervening quarterly earnings announcement periods. The weights in value-weighted returns are market value of equity ($PRCCQ \times CSHOQ$) at the end of quarter t . The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 7: Effects of analyst coverage on the overvaluation of firms with predicted persistent losses

Panel A: Equal-weighted portfolio returns ($BHAR365_{t+1}$) for loss firms with and without analyst coverage

Portfolio ranking on $FEARN_t$	% with analyst coverage	NUMEST _t T1 N=11,474	NUMEST _t T2 N=10,378	NUMEST _t T3 N=10,536	No analyst coverage N=29,982
Predicted persistent loss	46%	-0.089** (-2.30)	-0.061** (-1.98)	-0.059* (-1.67)	-0.171*** (-7.62)
2	51%	-0.046* (-1.66)	-0.043 (-1.40)	-0.017 (-0.54)	-0.110*** (-5.67)
3	50%	-0.048** (-2.41)	-0.067*** (-3.26)	-0.032 (-1.16)	-0.083*** (-6.13)
4	52%	-0.059*** (-3.90)	-0.063*** (-2.84)	0.002 (0.08)	-0.064*** (-4.37)
Predicted transitory loss	61%	-0.012 (-0.77)	-0.006 (-0.38)	-0.011 (-0.66)	-0.035*** (-3.00)
Transitory-Persistent		0.067* (1.82)	0.055 (1.61)	0.052 (1.46)	0.136*** (4.82)

A firm with analyst coverage means there are analyst forecasts for the firm's earnings of quarter $t+1$. NUMEST_t is the number of analysts providing forecasts for the firm's earnings of quarter $t+1$. FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of FEARN_t. BHAR365_{t+1} is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . Observations in each FEARN_t portfolio are ranked into terciles based on NUMEST_t by quarter. The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 7: continued*Panel B: Analysts' expectations of loss persistence*

$$EPS_{t+1} = \alpha_0 + \alpha_1 EPS_t + \tau_{t+1}$$

$$FEPS_t = \alpha_0^* + \alpha_1^* EPS_t + \omega_t$$

Predicted persistent loss with pro forma $EPS_t < 0$ ($N=5,399$)

<i>Fundamental regression</i>			<i>Analyst forecast regression</i>		
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.743	81.96	α_1^*	0.726	77.71
<i>Test of analysts' expectations of loss persistence:</i>					
Null hypothesis		Likelihood ratio statistic		Marginal significance level	
$\alpha_1 = \alpha_1^*$		3.71		0.054	

Predicted transitory loss with pro forma $EPS_t < 0$ ($N=3,453$)

<i>Fundamental regression</i>			<i>Analyst forecast regression</i>		
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.012	0.71	α_1^*	-0.052	-3.05
<i>Test of analysts' expectations of loss persistence:</i>					
Null hypothesis		Likelihood ratio statistic		Marginal significance level	
$\alpha_1 = \alpha_1^*$		22.61		0.000	

EPS_t is actual earnings per share of quarter t in I/B/E/S database. Consensus forecast of EPS for quarter $t+1$ ($FEPS_t$) is the first available mean forecast for quarter $t+1$ (I/B/E/S FPI=6) after the earnings announcement date of quarter t . The regressions use quintile rankings instead of the actual values of the variables.

Table 7: continued*Panel C: Mishkin tests for loss firms with analyst coverage*

$$EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + \delta_{t+1}$$

$$BHAR_{t+1} = \beta(EARN_{t+1} - \alpha_0 - \alpha_1^* EARN_t) + \mu_{t+1}$$

Predicted persistent loss with pro forma $EPS_t < 0$ ($N=5,399$)

<i>Forecast equation</i>			<i>Pricing equation</i>		
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.388	30.41	α_1^*	0.308	2.02
			β	0.027	6.06
<i>Test of investors' expectations of loss persistence:</i>					
Null hypothesis		Likelihood ratio statistic		Marginal significance level	
$\alpha_1 = \alpha_1^*$		2.93		0.087	

Predicted transitory loss with pro forma $EPS_t < 0$ ($N=3,453$)

<i>Forecast equation</i>			<i>Pricing equation</i>		
Parameter	Coefficient	t-statistic	Parameter	Coefficient	t-statistic
α_1	0.043	2.51	α_1^*	0.008	0.96
			β	0.020	7.01
<i>Test of investors' expectations of loss persistence:</i>					
Null hypothesis		Likelihood ratio statistic		Marginal significance level	
$\alpha_1 = \alpha_1^*$		0.70		0.403	

$EARN_t$ is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t . $BHAR_{t+1}$ is buy-hold size-adjusted return over the period starting two trading days after earnings announcement date (RDQ) of quarter t and ending one trading day after earnings announcement date of quarter $t+1$. Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The regressions use quintile rankings instead of the actual values of the variables.

Table 8: Effects of institutional ownership on the overvaluation of firms with predicted persistent losses

Portfolio ranking on $FEARN_t$	% with institutional ownership	Mean $PCTHELD_t$	Equal-weighted $BHAR365_{t+1}$				
			$PCTHELD_t$ Q1 N=10,050	$PCTHELD_t$ Q2 N= 10,267	$PCTHELD_t$ Q3 N=10,384	$PCTHELD_t$ Q4 N=10,163	No institutional ownership N=21,506
Predicted persistent loss	56%	7.95%	-0.122*** (-3.74)	-0.099*** (-3.24)	-0.039 (-1.29)	-0.024 (-0.64)	-0.201*** (-8.30)
2	64%	8.76%	-0.118*** (-4.98)	-0.011 (-0.46)	-0.029 (-1.11)	-0.008 (-0.26)	-0.159*** (-5.80)
3	66%	9.05%	-0.066*** (-2.66)	0.000 (0.01)	-0.032* (-1.66)	-0.027 (-1.23)	-0.137*** (-9.83)
4	69%	9.95%	-0.017 (-0.73)	-0.025* (-1.73)	-0.025 (-1.57)	-0.011 (-0.76)	-0.094*** (-6.61)
Predicted transitory loss	73%	11.41%	-0.001 (-0.08)	0.002 (0.60)	-0.017 (-1.33)	0.000 (0.03)	-0.095*** (-7.27)
Transitory-Persistent			0.120*** (3.58)	0.101*** (4.23)	0.022 (0.63)	0.024 (0.66)	0.106*** (3.84)

$PCTHELD_t$ is the shares held by institutional investors divided by total shares outstanding at the end of quarter t. Shares held by institutional investors and shares outstanding are obtained from Thomson-Reuters Mutual Fund Holdings database (S12). $FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR365_{t+1}$ is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. Observations with positive $PCTHELD_t$ in each $FEARN_t$ portfolio are sorted into quartiles based on $PCTHELD_t$ by quarter. The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 9: Overvaluation of predicted persistent losses in firms with positive short interest

Portfolio ranking on $FEARN_t$	N	Mean SIR_t	Equal-weighted $BHAR365_{t+1}$			
			SIR_t Q1 N=7,642	SIR_t Q2 N= 7,677	SIR_t Q3 N=7,692	SIR_t Q4 N=7,658
Predicted persistent loss	6,238	6.28%	-0.043 (-0.83)	-0.047 (-0.91)	-0.099*** (-2.96)	-0.111*** (-2.66)
2	6,237	5.66%	0.009 (0.23)	-0.006 (-0.17)	-0.030 (-0.89)	-0.077*** (-2.67)
3	5,937	5.82%	-0.034* (-1.66)	0.009 (0.28)	-0.009 (-0.33)	-0.063** (-2.49)
4	5,989	5.50%	-0.012 (-0.57)	0.014 (0.53)	-0.021 (-1.11)	-0.031 (-1.59)
Predicted transitory loss	6,268	5.30%	-0.027 (-1.46)	0.029 (1.43)	0.036 (1.49)	-0.002 (-0.01)
Transitory-Persistent			0.016 (0.28)	0.076 (1.57)	0.135*** (3.48)	0.109*** (2.72)

SIR_t is the number of shares sold short divided by the monthly average trading volume in the last month of quarter t. SIR_t is collected from Bloomberg. $FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR365_{t+1}$ is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. Observations with positive SIR_t are sorted into quartiles based on SIR_t by quarter. The time period is from the first quarter of 1991 to the fourth quarter of 2006 (64 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 10: Abnormal returns based on $FEARN_t$ after controlling for other return predictors*Panel A: Pearson (above diagonal) / Spearman (below diagonal) correlations*

Variable	BHAR365 _{t+1}	FEARN _t	EARN _t	ETP _t	SUE _t	BTM _t	ACC _t	MOM _t	VOL _t
BHAR365 _{t+1}	1.000	0.066	0.050	0.006	0.011	0.032	-0.014	-0.042	-0.064
FEARN _t	0.157	1.000	0.791	0.122	0.002	0.313	0.075	-0.130	-0.388
EARN _t	0.129	0.632	1.000	0.361	0.244	0.304	0.186	-0.101	-0.300
ETP _t	0.046	0.291	0.643	1.000	0.580	-0.066	0.169	0.144	-0.068
SUE _t	0.015	-0.117	0.223	0.479	1.000	-0.103	0.128	0.110	0.033
BTM _t	0.112	0.390	0.412	-0.138	-0.227	1.000	0.016	-0.257	-0.170
ACC _t	-0.026	0.037	0.166	0.213	0.174	0.000	1.000	0.033	-0.046
MOM _t	0.007	-0.002	0.013	0.285	0.228	-0.322	0.066	1.000	0.173
VOL _t	-0.170	-0.439	-0.358	-0.121	0.060	-0.230	-0.035	-0.092	1.000

BHAR365_{t+1} is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. ETP_t is income before extraordinary items (IBQ) in quarter t divided by market value of equity (PRCCQ*CSHOQ) at the end of quarter t. BTM_t is book value of equity (CEQQ) divided by market value of equity (PRCCQ*CSHOQ) at the end of quarter t. ACC_t is Δ Current Assets- Δ Current Liabilities-Depreciation, or in terms of Xpressfeed quarterly data items: $\Delta(\text{ACTQ}-\text{CHEQ})-\Delta(\text{LCTQ}-\text{DLCQ})-\text{DPQ}$, divided by total assets (ATQ) at the beginning of quarter t, where Δ denotes change from quarter t-1 to t. SUE_t is the seasonal difference in income before extraordinary items (IBQ), i.e., quarter t minus quarter t-4, divided by market value of equity (PRCCQ*CSHOQ) at the beginning of quarter t. MOM_t is cumulative return over the 12-month period prior to the end of quarter t. VOL_t is return volatility over the 12-month period prior to the end of quarter t.

Table 10: continued*Panel B: Ordinary least square regression results*

$$BHAR365_{t+1} = \gamma_0 + \gamma_1 FEARN_t + \gamma_2 EARN_t + \gamma_3 ETP_t + \gamma_4 SUE_t + \gamma_5 BTM_t + \gamma_6 ACC_t + \gamma_7 MOM_t + \gamma_8 VOL_t + \eta_{t+1}$$

Variable	Predicted Sign	Equal-weighted BHAR365 _{t+1}				
		Model 1	Model 2	Model 3	Model 4	Model 5
INTERCEPT		-0.065*** (-4.28)	-0.065*** (-4.29)	-0.065*** (-4.24)	-0.064*** (-4.24)	-0.065*** (-4.24)
FEARN_t	+	0.104*** (2.72)		0.084*** (2.83)		0.074*** (2.98)
<i>Control variables</i>						
EARN _t	+		0.087*** (2.63)		0.052 (1.59)	0.033 (0.87)
ETP _t	+			-0.015 (-0.89)	-0.027 (-0.86)	-0.032 (-1.03)
SUE _t	+			0.081*** (4.02)	0.060*** (2.75)	0.078*** (3.57)
BTM _t	+			0.074*** (3.00)	0.070*** (2.82)	0.063*** (2.63)
ACC _t	-			-0.067*** (-5.64)	-0.069*** (-5.79)	-0.067*** (-5.69)
MOM _t	+			0.009 (0.34)	0.013 (0.49)	0.010 (0.39)
VOL _t	-			-0.047* (-1.67)	-0.057** (-1.97)	-0.044 (-1.62)
Firm clustering		Yes	Yes	Yes	Yes	Yes
Quarter clustering		Yes	Yes	Yes	Yes	Yes
Adjusted R-square		0.2%	0.2%	0.6%	0.6%	0.6%

BHAR365_{t+1} is buy-hold size-adjusted return over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. ETP_t is income before extraordinary items (IBQ) in quarter t divided by market value of equity (PRCCQ*CSHOQ) at the end of quarter t. BTM_t is book value of equity (CEQQ) divided by market value of equity (PRCCQ*CSHOQ) at the end of quarter t. ACC_t is Δ Current Assets- Δ Current Liabilities-Depreciation, or in terms of Xpressfeed quarterly data items: $\Delta(\text{ACTQ}-\text{CHEQ})-\Delta(\text{LCTQ}-\text{DLCQ})-\text{DPQ}$, divided by total assets (ATQ) at the beginning of quarter t, where Δ denotes change from quarter t-1 to t. SUE_t is the seasonal difference in income before extraordinary items (IBQ), i.e., quarter t minus quarter t-4, divided by market value of equity (PRCCQ*CSHOQ) at the beginning of quarter t. MOM_t is cumulative return over the 12-month period prior to the end of quarter t. VOL_t is return volatility over the 12-month period prior to the end of quarter t. All independent variables are sorted into quintiles each quarter. The quintile rankings are scaled to have a range of one and a mean of zero. The numbers in parentheses are t-statistic calculated using two-way cluster-robust standard errors. ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 11: Incremental predictive power of forecast earnings and current earnings for future stock returns

Panel A: Portfolios formed on forecast earnings (FEARN_t), controlling for current earnings (EARN_t)

Portfolio	Mean FEARN _t	Mean EARN _t	Equal-weighted BHAR365 _{t+1}	Value-weighted BHAR365 _{t+1}
1	-0.077	-0.069	-0.074*** (-4.10)	-0.058** (-2.35)
2	-0.048	-0.050	-0.079*** (-5.53)	-0.045** (-2.10)
3	-0.034	-0.043	-0.073*** (-5.89)	-0.037* (-1.79)
4	-0.021	-0.039	-0.054*** (-4.31)	-0.029 (-1.63)
5	0.005	-0.039	-0.025*** (-3.31)	-0.008 (-0.58)
5-1	0.082	0.029	0.049*** (2.84)	0.050** (2.44)

EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. The portfolios are constructed by first sorting sample into quintiles of EARN_t, then within each quintile sorting observations into five subportfolios based on FEARN_t, and finally pooling together all subportfolios with the same rank. BHAR365_{t+1} is buy-hold size-adjusted returns over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. The weights in value weighted returns are market value of equity (PRCCQ*CSHOQ) at the end of quarter t. The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 11: continued*Panel B: Portfolios formed on current EARN ($EARN_t$), controlling for forecast EARN ($FEARN_t$)*

Portfolio	Mean $EARN_t$	Mean $FEARN_t$	Equal-weighted $BHAR365_{t+1}$	Value-weighted $BHAR365_{t+1}$
1	-0.111	-0.048	-0.065*** (-4.81)	-0.015 (-0.70)
2	-0.056	-0.039	-0.073*** (-5.43)	-0.044*** (-2.64)
3	-0.037	-0.033	-0.071*** (-5.39)	-0.013 (-0.64)
4	-0.025	-0.029	-0.045*** (-3.61)	-0.030* (-1.92)
5	-0.013	-0.027	-0.048*** (-4.64)	-0.037*** (-2.71)
5-1	0.098	0.021	0.017 (1.50)	-0.022 (-1.20)

$EARN_t$ is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t . $FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . The portfolios are constructed by first sorting sample into quintiles of $FEARN_t$, then within each quintile sorting observations into five subportfolios based on $EARN_t$, and finally pooling together all subportfolios with the same rank. $BHAR365_{t+1}$ is buy-hold size-adjusted returns over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . The weights in value weighted returns are market value of equity (PRCCQ*CSHOQ) at the end of quarter t . The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 12: Carhart (1997) four-factor regressions of monthly returns on predicted transitory and persistent loss portfolios

$$(r_i - r_f) = a_i + b_i(r_m - r_f) + s_iSMB + h_iHML + u_iUMD + e_i$$

Portfolio	Intercept a	$r_m - r_f$ b	SMB s	HML h	UMD u	Adjusted R-square
Predicted persistent loss	-0.009*** (-2.98)	1.167*** (16.27)	1.461*** (11.90)	-0.601*** (-4.54)	-0.355*** (-3.12)	0.797
Predicted transitory loss	-0.003* (-1.89)	1.066*** (30.62)	0.791*** (15.89)	0.327*** (4.95)	-0.260*** (-6.69)	0.853
Transitory - Persistent	0.007** (1.97)	-0.102 (-1.21)	-0.669*** (-4.41)	0.928*** (5.90)	0.095 (0.85)	0.428

The sample in this table is restricted to firms with December fiscal year-end and includes 37,730 firm-quarter observations. Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of forecast earnings ($FEARN_i$). r_i is the monthly return on portfolio i . r_f is the monthly return on one-month T-bill. r_m is the value-weighted return on the NYSE/AMEX/NASDAQ market index. SMB is the Fama-French (1993) small firm factor. HML is the Fama-French book-to-market factor. UMD is the Carhart (1997) momentum factor. The numbers in parentheses are White (1980) heteroskedasticity corrected t-statistics. ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 13: Overvaluation of predicted persistent losses in firms with zero special items*Panel A: Fama-MacBeth regression results of the revised earnings forecast model*

$$EARN_{t+1} = \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALESG_t + \beta_5 FIRSTLOSS_t \\ + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 Q3_t + \beta_9 Q4_t + \varepsilon_{t+1}$$

Variable	Predicted sign	Fama-MacBeth regression (No. of regressions: 96)		
		Coefficient	t-statistic	p value
EARN _t	+	0.587	37.97	0.000
EARN _{t-3}	+	0.269	22.23	0.000
SIZE _t	+	0.001	3.64	0.000
SALESG _t	?	0.000	0.46	0.649
FIRSTLOSS _t	+	0.002	1.57	0.119
LOSS_SEQ _t	-	-0.001	-4.15	0.000
DIVDUM _t	+	0.007	10.27	0.000
Q3 _t	-	-0.014	-11.51	0.000
Q4 _t	+	0.010	11.12	0.000
INTERCEPT		-0.008	-5.25	0.000
Adjusted R-square		48.4%		

The sample in this table is restricted to observations with zero special items and includes 43,217 firm-quarter observations. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. SIZE_t is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. SALESG_t is the percentage growth in sales (SALEQ) during quarter t. FIRSTLOSS_t is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise. LOSS_SEQ_t is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. DIVDUM_t is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise. Q3_t (Q4_t) is a dummy variable indicating the third (fourth) fiscal quarter. The estimation period is from 1983 to 2006. There are 96 quarterly regressions. Reported coefficients, t-statistic and p values are derived using the Fama and MacBeth (1973) procedure.

Table 13: continued*Panel B: Size-adjusted portfolio returns over different measurement windows*

Portfolio ranking on $FEARN_t$	Equal-weighted size-adjusted returns			Value-weighted size-adjusted returns		
	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$
Predicted persistent loss	-0.036*** (-3.45)	-0.075*** (-4.92)	-0.144*** (-6.61)	-0.033** (-2.38)	-0.060** (-2.30)	-0.153*** (-5.67)
2	-0.027** (-2.58)	-0.050*** (-3.36)	-0.069*** (-2.63)	-0.017 (-1.17)	-0.025 (-1.21)	-0.035 (-1.02)
3	-0.032*** (-4.57)	-0.052*** (-4.50)	-0.068*** (-3.71)	-0.017* (-1.68)	-0.032* (-1.87)	-0.035 (-1.29)
4	-0.025*** (-6.83)	-0.055*** (-8.98)	-0.060*** (-5.91)	-0.017** (-2.49)	-0.035*** (-3.43)	-0.042*** (-2.66)
Predicted transitory loss	-0.018*** (-4.43)	-0.041*** (-6.72)	-0.045*** (-5.13)	-0.011 (-1.53)	-0.025** (-2.23)	-0.030** (-2.13)
Transitory-Persistent	0.018 (1.44)	0.035* (1.84)	0.099*** (3.89)	0.023* (1.75)	0.035 (1.43)	0.122*** (4.51)

The sample in this table is restricted to observations with zero special items and includes 41,401 firm-quarter observations with non-missing forecast earnings ($FEARN_t$). $FEARN_t$ is computed using the average of quarterly estimated coefficients of revised equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR90_{t+1}$, $BHAR180_{t+1}$, and $BHAR365_{t+1}$ are buy-hold size-adjusted returns over the 90-day, 180-day and one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The weights in value-weighted returns are market value of equity (PRCCQ*CSHOQ) at the end of quarter t . The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 14: Overvaluation of predicted persistent losses in new economy industries*Panel A: Fama-MacBeth regression results of the earnings forecast model in new economy*

$$EARN_{t+1} = \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALES_t + \beta_5 FIRSTLOSS_t + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 SPI_t + \beta_9 SPI_{t-3} + \beta_{10} Q3_t + \beta_{11} Q4_t + \varepsilon_{t+1}$$

Variable	Predicted sign	Fama-MacBeth regression (No. of regressions: 96)		
		Coefficient	t-statistic	p value
EARN _t	+	0.598	33.34	0.000
EARN _{t-3}	+	0.231	13.34	0.000
SIZE _t	+	0.001	4.19	0.011
SALES _t	?	-0.001	-0.54	0.593
FIRSTLOSS _t	+	0.007	3.31	0.001
LOSS_SEQ _t	-	-0.002	-6.22	0.000
DIVDUM _t	+	0.006	3.13	0.002
SPI _t	-	-0.813	-17.80	0.000
SPI _{t-3}	-	-0.254	-4.25	0.000
Q3 _t	-	-0.014	-7.75	0.000
Q4 _t	+	0.013	9.34	0.000
INTERCEPT		-0.024	-8.64	0.000
Adjusted R-square		48.4%		

The sample in this table includes observations in pharmaceutical products, telecommunications, computers and electronic equipments. Industry classification is based on Fama and French (1997) 48 industry groups. The sample includes 18,403 firm-quarter observations. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. SIZE_t is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. SALES_t is the percentage growth in sales (SALEQ) during quarter t. FIRSTLOSS_t is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise. LOSS_SEQ_t is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. DIVDUM_t is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise. Q3_t (Q4_t) is a dummy variable indicating the third (fourth) fiscal quarter. The estimation period is from 1983 to 2006. There are 96 quarterly regressions. Reported coefficients, t-statistic and p values are derived using the Fama and MacBeth (1973) procedure.

Table 14: continued*Panel B: Size-adjusted portfolio returns in new economy*

Portfolio ranking on $FEARN_t$	Equal-weighted size-adjusted returns			Value-weighted size-adjusted returns		
	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$
Predicted persistent loss	-0.024* (-1.65)	-0.057*** (-2.92)	-0.112*** (-3.48)	-0.030* (-1.73)	-0.058* (-1.71)	-0.139*** (-3.43)
2	-0.008 (-0.62)	-0.013 (-0.58)	-0.008 (-0.20)	-0.016 (-1.21)	-0.022 (-1.00)	-0.045 (-1.22)
3	-0.013 (-1.25)	-0.020 (-1.14)	-0.005 (-0.16)	-0.014 (-1.13)	-0.016 (-0.80)	-0.001 (-0.03)
4	-0.004 (-0.42)	-0.010 (-0.59)	0.022 (0.84)	-0.008 (-0.62)	-0.001 (-0.04)	0.022 (0.70)
Predicted transitory loss	0.000 (0.06)	0.000 (0.01)	0.020 (0.88)	0.005 (0.49)	0.019 (1.23)	0.049* (1.83)
Transitory-Persistent	0.024* (1.88)	0.057*** (3.09)	0.132*** (5.44)	0.035* (1.96)	0.076*** (2.62)	0.188*** (5.24)

The sample in this table includes observations in pharmaceutical products, telecommunications, computers and electronic equipments. Industry classification is based on Fama and French (1997) 48 industry groups. The sample includes 18,098 firm-quarter observations with non-missing forecast earnings ($FEARN_t$). $FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR90_{t+1}$, $BHAR180_{t+1}$, and $BHAR365_{t+1}$ are buy-hold size-adjusted returns over the 90-day, 180-day and one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The weights in value-weighted returns are market value of equity ($PRCCQ \times CSHOQ$) at the end of quarter t . The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 15: Overvaluation of predicted persistent losses in traditional economy industries*Panel A: Fama-MacBeth regression results of the earnings forecast model in traditional economy*

$$EARN_{t+1} = \alpha + \beta_1 EARN_t + \beta_2 EARN_{t-3} + \beta_3 SIZE_t + \beta_4 SALES_t + \beta_5 FIRSTLOSS_t + \beta_6 LOSS_SEQ_t + \beta_7 DIVDUM_t + \beta_8 SPI_t + \beta_9 SPI_{t-3} + \beta_{10} Q3_t + \beta_{11} Q4_t + \varepsilon_{t+1}$$

Variable	Predicted sign	Fama-MacBeth regression (No. of regressions: 96)		
		Coefficient	t-statistic	p value
EARN _t	+	0.451	29.04	0.000
EARN _{t-3}	+	0.360	25.12	0.000
SIZE _t	+	0.000	2.61	0.011
SALES _t	?	0.002	1.47	0.144
FIRSTLOSS _t	+	0.001	1.57	0.119
LOSS_SEQ _t	-	-0.001	-4.13	0.000
DIVDUM _t	+	0.005	9.83	0.000
SPI _t	-	-0.511	-21.68	0.000
SPI _{t-3}	-	-0.353	-9.57	0.000
Q3 _t	-	-0.014	-13.37	0.000
Q4 _t	+	0.008	11.07	0.000
INTERCEPT		-0.009	-6.92	0.000
Adjusted R-square		41.6%		

The sample in this table excludes observations in pharmaceutical products, telecommunications, computers and electronic equipments. Industry classification is based on Fama and French (1997) 48 industry groups. The sample includes 46,136 firm-quarter observations. EARN_t is income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t. SIZE_t is the logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t. SALES_t is the percentage growth in sales (SALEQ) during quarter t. FIRSTLOSS_t is an indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise. LOSS_SEQ_t is an ordinal variable that counts the number of sequential losses over the four quarters before the current loss. DIVDUM_t is an indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise. Q3_t (Q4_t) is a dummy variable indicating the third (fourth) fiscal quarter. The estimation period is from 1983 to 2006. There are 96 quarterly regressions. Reported coefficients, t-statistic and p values are derived using the Fama and MacBeth (1973) procedure.

Table 15: continued*Panel B: Size-adjusted portfolio returns in traditional economy*

Portfolio ranking on $FEARN_t$	Equal-weighted size-adjusted returns			Value-weighted size-adjusted returns		
	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$	$BHAR90_{t+1}$	$BHAR180_{t+1}$	$BHAR365_{t+1}$
Predicted persistent loss	-0.044*** (-4.73)	-0.085*** (-6.70)	-0.151*** (-8.74)	-0.041*** (-2.90)	-0.066*** (-2.62)	-0.138*** (-5.38)
2	-0.041*** (-5.99)	-0.067*** (-6.61)	-0.098*** (-6.30)	-0.029*** (-2.79)	-0.044*** (-2.75)	-0.083*** (-3.78)
3	-0.027*** (-6.51)	-0.051*** (-7.25)	-0.072*** (-7.28)	-0.018** (-2.37)	-0.038*** (-2.77)	-0.044** (-2.23)
4	-0.017*** (-3.97)	-0.041*** (-5.81)	-0.046*** (-4.62)	-0.008 (-1.16)	-0.023** (-2.15)	-0.029* (-1.87)
Predicted transitory loss	-0.012*** (-3.09)	-0.027*** (-3.95)	-0.028*** (-2.76)	-0.008 (-1.39)	-0.002 (-0.19)	-0.018 (-1.34)
Transitory-Persistent	0.032*** (2.88)	0.058*** (3.51)	0.123*** (5.33)	0.033** (2.15)	0.064** (2.37)	0.119*** (3.93)

The sample in this table excludes observations in pharmaceutical products, telecommunications, computers and electronic equipments. Industry classification is based on Fama and French (1997) 48 industry groups. The sample includes 44,272 firm-quarter observations with non-missing forecast earnings ($FEARN_t$). $FEARN_t$ is computed using the average of quarterly estimated coefficients of equation (2) over quarter $t-4$ to $t-1$ and predicting variables measured in quarter t . Predicted persistent (transitory) losses are loss observations in the first (fifth) quintile of the quarterly distribution of $FEARN_t$. $BHAR90_{t+1}$, $BHAR180_{t+1}$, and $BHAR365_{t+1}$ are buy-hold size-adjusted returns over the 90-day, 180-day and one-year period starting two trading days after earnings announcement date (RDQ) of quarter t . Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio. The weights in value-weighted returns are market value of equity ($PRCCQ \times CSHOQ$) at the end of quarter t . The time period is from the first quarter of 1984 to the fourth quarter of 2006 (92 quarters). Reported portfolio returns and t-statistic (in parentheses) are calculated over the time-series of cross-sectional mean returns on each portfolio (Fama-MacBeth procedure). ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Table 16: The relation between forecast earnings and future abnormal returns with and without truncation

$$BHAR365_{t+1} = \eta_0 + \eta_1 RD5_t + \eta_2 RD4_t + \eta_3 RD3_t + \eta_4 RD2_t + \mathcal{E}_{t+1}$$

Variable	Predicted	Equal-weighted BHAR365 _{t+1}		
	Sign	OLS	LTS $\alpha = 1\%$	LTS $\alpha = 10\%$
INTERCEPT	-	-0.129*** (-17.24)	-0.264*** (-55.08)	-0.290*** (-63.07)
RD5_t	+	0.116*** (11.38)	0.199*** (30.66)	0.217*** (34.49)
RD4 _t	+	0.083*** (8.13)	0.152*** (23.03)	0.167*** (26.56)
RD3 _t	+	0.061*** (5.91)	0.113*** (17.17)	0.124*** (19.63)
RD2 _t	+	0.054*** (5.26)	0.073*** (11.02)	0.080*** (12.42)
Adjusted R-square		0.2%	0.9%	3.9%

FEARN_t is computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t. RD5_t, RD4_t, RD3_t, and RD2_t are dummy variables indicating observations in the fifth, fourth, third, or second quintile of FEARN_t, respectively. BHAR365_{t+1} is buy-hold size-adjusted returns over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t. ***, **, * denote significance at 0.01, 0.05 and 0.10 level using a two-tailed t-test.

Appendix A

Definition of Variables

All accounting variables are from Compustat (Xpressfeed) Quarterly database. The mnemonics in parentheses are Xpressfeed Quarterly variable names.

Variable	Definition
ACC_t	Δ Current Assets- Δ Current Liabilities-Depreciation, or in terms of Xpressfeed quarterly data items: Δ (ACTQ-CHEQ)- Δ (LCTQ-DLCQ)-DPQ, divided by total assets (ATQ) at the beginning of quarter t, where Δ denotes change from quarter t-1 to t.
Analyst coverage	A firm with analyst coverage means there are analyst forecasts for the firm's earnings of quarter t+1.
Announcement period	The four-trading-day period starting two trading days prior to the earnings announcement date (RDQ). Total announcement period over the one-year measurement window of $BHAR_{365,t+1}$ includes four subsequent quarterly announcement periods, or 16 trading days.
$BHAR_{t+1}$	Buy-hold size-adjusted return over the period starting two trading days after earnings announcement date (RDQ) of quarter t and ending one trading day after earnings announcement date of quarter t+1. Buy-hold size-adjusted return is computed by measuring the buy-hold return in excess of the buy-hold return on the CRSP size-matched decile portfolio.
$BHAR_{90,t+1}$	Buy-hold size-adjusted returns over the 90-day period starting two trading days after earnings announcement date (RDQ) of quarter t.
$BHAR_{180,t+1}$	Buy-hold size-adjusted returns over the 180-day period starting two trading days after earnings announcement date (RDQ) of quarter t.
$BHAR_{365,t+1}$	Buy-hold size-adjusted returns over the one-year period starting two trading days after earnings announcement date (RDQ) of quarter t.
BTM_t	Book value of equity (CEQQ) divided by market value of equity (PRCCQ*CSHOQ) at the end of quarter t.
DIFF	The difference between the absolute value of the forecast errors of the other three models and the absolute value of the forecast errors of equation (2).
$DIVDUM_t$	Indicator variable that is equal to one if the firm pays dividends (DVPSXQ) in quarter t, and zero otherwise.
$EARN_t$	Income before extraordinary items (IBQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t.
EPS_t	Actual earnings per share of quarter t in I/B/E/S database.
ETP_t	Income before extraordinary items (IBQ) in quarter t divided by market value of equity (PRCCQ*CSHOQ) at the end of quarter t.
$FEARN_t$	Forecast earnings are computed using the average of quarterly estimated coefficients of equation (2) over quarter t-4 to t-1 and predicting variables measured in quarter t.

FE	Forecast errors are the differences between the actual earnings in quarter t+1 ($EARN_{t+1}$) and the expected earnings derived from each earnings forecast model.
FEPS _t	The first available mean forecast for quarter t+1 (I/B/E/S FPI=6) after the earnings announcement date of quarter t.
FIRSTLOSS _t	Indicator variable that is equal to one if the loss in quarter t is the first loss in a sequence (i.e., the firm was profitable in quarter t-1), and zero otherwise.
FYOYEARN _t	The forecast earnings of quarter t+4 based on equation (3).
HML	Fama-French (1993) book-to-market factor.
Loss firm	Firm-quarter observations with negative income before extraordinary items (IBQ).
Loss sequence	The number of sequential quarterly losses in the past including the loss in the current quarter.
LOSS_SEQ _t	Ordinal variable that counts the number of sequential losses over the four quarters before the current loss.
MOM _t	Cumulative return over the 12-month period prior to the end of quarter t.
New economy industries	Pharmaceutical products, telecommunications, computers and electronic equipment. Industry classification is based on Fama and French (1997) 48 industry groups.
Non-announcement period	Starts two trading days after the earnings announcement date of quarter t and ends three trading days prior to the earnings announcement date of quarter t+4, exclusive of the three intervening quarterly earnings announcement periods.
NUMEST _t	The number of analysts providing forecasts for the firm's earnings of quarter t+1.
PCTHELD _t	The shares held by institutional investors divided by total shares outstanding at the end of quarter t.
Predicted persistent loss	Loss observations in the first quintile of the quarterly distribution of $FEARN_t$.
Predicted transitory loss	Loss observations in the fifth quintile of the quarterly distribution of $FEARN_t$.
Q3 _t	Dummy variable indicating the third fiscal quarter.
Q4 _t	Dummy variable indicating the fourth fiscal quarter.
RD2 _t	Dummy variable indicating observations in the second quintile of $FEARN_t$.
RD3 _t	Dummy variable indicating observations in the third quintile of $FEARN_t$.
RD4 _t	Dummy variable indicating observations in the fourth quintile of $FEARN_t$.
RD5 _t	Dummy variable indicating observations in the fifth quintile of $FEARN_t$.
REVERSAL _{t+1}	Indicator variable that is equal to one if the loss firm becomes profitable in the quarter t+1, and zero otherwise.
r_f	Monthly return on one-month T-bill.
r_i	Monthly return on portfolio i.
r_m	Value-weighted return on the NYSE/AMEX/NASDAQ market index.
SALESG _t	The percentage growth in sales (SALEQ) during quarter t.

SIR_t	The number of shares sold short divided by the monthly average trading volume in the last month of quarter t.
$SIZE_t$	The logarithm of market value of equity (PRCCQ*CSHOQ) at the end of the quarter t.
SMB	Fama-French (1993) small firm factor.
SPI_t	Special items (SPIQ) in quarter t divided by total assets (ATQ) at the beginning of quarter t.
SUE_t	The seasonal difference in income before extraordinary items (IBQ), i.e., quarter t minus quarter t-4, divided by market value of equity (PRCCQ*CSHOQ) at the beginning of quarter t.
UMD	Carhart (1997) momentum factor.
VOL_t	Return volatility over the 12-month period prior to the end of quarter t.