POST LOSS/PROFIT ANNOUNCEMENT DRIFT

Karthik Balakrishnan
New York University
Stern School of Business
44 West 4th St., New York NY 10012

Eli Bartov
New York University
Stern School of Business
44 West 4th St., New York NY 10012

Lucile Faurel
University of California, Irvine
Paul Merage School of Business
Irvine, CA 92697-3125

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Abstract

We document a failure of the market to price the implications of a current loss (profit) for a future loss (profit). In a 120-day window following the quarterly earnings announcement date, a portfolio of firms with extreme losses (profits) exhibits a -6.58 percent (3.55 percent) abnormal return. These patterns in stock returns translate into an annualized return of approximately 21 percent on a hedge portfolio that takes a long position in an extreme profit firm quintile and a short position in an extreme loss firm quintile. The results also demonstrate that this loss/profit anomaly is incremental to, and more pronounced than previously documented accounting-related anomalies. In an effort to explain this finding, we show that this mispricing is related to differences between conditional and unconditional probabilities of losses/profits, as if stock prices do not fully reflect conditional probabilities in a timely fashion. A battery of sensitivity tests shows that this loss/profit anomaly is robust to alternative risk adjustments, distress risk, short sales constraints, transaction costs, and sample periods.

JEL classification: M41; G14.

Keywords: Loss/profit mispricing; loss/profit predictability; accounting losses; accounting profits; earnings-based anomalies.

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1. Introduction

Market observers, academics, and regulators seem to agree that investors consider earnings releases important corporate events. Consistent with this view, empirical studies have found that earnings, particularly when measured over long periods of time, explain the cross-sectional variation in stock returns better than any other variable including cash flows and dividends. Notwithstanding the significant attention investors pay to earnings releases, academic studies have found, somewhat surprisingly, that investors fail to *fully* incorporate the implications of earnings news into stock prices in a timely fashion.

One strand of this literature (e.g., Bernard and Thomas 1990; Ball and Bartov 1996; Brown and Han 2000), has documented predictable stock price changes around future earnings announcements (up to four quarters ahead), and attributed this finding to investors' misperception of the time series process underlying standardized unexpected earnings (SUE). While the time-series process of earnings is best described by the Brown-Rozeff (1979) model (i.e., an ARMA [1, 1] model in seasonal differences), modified to include a trend term, investors appear to rely on a naïve seasonal random walk model, where expected earnings are simply earnings for the corresponding quarter from the previous year (see, Bernard and Thomas 1990).[1] Another strand of this literature (e.g., Sloan 1996) has documented accrual mispricing due to investors' misperception of the time-series process underlying the cash flows and accruals components of earnings. Sloan (1996, p. 305), for example, concludes, "The earnings expectations embedded in stock prices consistently deviate from rational expectations in the direction predicted by naïve fixation on earnings."

[1] Evidence of investors' misperception of the earnings process has also been documented in an experimental setting (see, Maines and Hand 1996).

Although these two types of earnings-related anomalies are distinct from each other (Collins and Hribar 2000), the explanations provided are quite similar. The common storyline is that investors appear to use simplified time-series models to forecast earnings.

The idea that humans, who are endowed with limited processing capacity, rely on simplified models, or imperfect decision making procedures (i.e., heuristics), to solve complex problems is rooted in the field of social cognition (e.g., Kahneman and Tversky 1973a, 1973b). Because individuals trade off correct inference and efficiency, they make decisions based on only a subset of the information available to them. The partial use of information may lead, in turn, to a cognitive bias, a phenomenon that has become recently an important area of inquiry in behavioral finance (see, e.g., Daniel et al. 1998; Barberis et al. 1998; Hirshleifer and Teoh 2003). According to this literature, the behavior of stock market indexes, the cross-section of average returns, and individual investors is inconsistent with the assumption that agents rationally apply Bayes' law in their decision-making; rather, predictions underweight or even overlook distributional information. For example, in Mullainathan's (2002) model, investors categorize securities ignoring important differences, and they change categories only when they see enough data to suggest that an alternative category better fits the data, rather than updating continuously as implied by Bayesian thinking. One prediction of his model is that a single earnings announcement will lead to under-reaction. That is, after a positive (negative) earnings announcement, a strategy of buying the stock will yield abnormal positive (negative) returns. Recent articles surveying the finance and accounting literature suggest the importance of these behavioral explanations to theories of systematic stock mispricing (see, Daniel et al. 2002).

The premise that investors make decisions based on normatively inappropriate simplifications, as well as findings in prior research showing mispricing of earnings information, motivates us to further investigate investors' assessment of quarterly earnings releases. However, unlike prior research that has focused on the pricing of earnings surprises (SUE) or earnings components (accruals and cash flows), we focus on the pricing of earnings signs, a loss versus a profit, and their magnitudes.

Our motivation to examine the market valuation of earnings signs and particularly losses follows from three literatures. First, prior studies (e.g., Basu et al. 1996; Brown 2001) document that annual and quarterly earnings surprises (measured as reported earnings minus the most recent individual analyst forecast thereof) of loss firms are substantially larger than those of profit firms, concluding that earnings forecasts for loss firms are biased upward. Second, the accounting literature and the financial press assert that when firms report losses, traditional valuation models, such as the discounted residual earnings model, do not yield reliable estimates of firm value and widely-used heuristics, such as the price-earnings ratio, are not useful. Third, Hayn (1995) and Collins et al. (1999) find that the inclusion of losses dampens the earnings response coefficient and the R^2 of the return-earnings regression. Based on this evidence, Hayn (1995), for example, concludes that losses are less informative than profits about firms' future prospects. Overall, these literatures suggest that losses are less informative and more difficult to value than profits, which may create considerable price uncertainty and therefore more opportunities for potential mispricing.[2]

[2] Basu (1997) argues that losses are timelier than profits due to accounting conservatism, whereas Hong et al. (2000), among others, show that firm-specific bad news are less timely due to managerial incentives to hide bad news from investors. We interpret the findings in Hayn (1995) and Collins et al. (1999) as indicating that regardless of whether losses are more or less timely, they are more difficult to map into stock prices (see, e.g., Lakonishok et al. 1994, p. 1546), and the evidence in Basu et al. (1996) and Brown (2001) as indicating that losses provide less information about future earnings realizations. We also note that our approach is not at odds with findings in Burgstahler and Dichev (1997), Collins et al. (1997), and Barth et al. (1998), as the need to rely on book values rather than earnings may add complexity to the analysis and thus more opportunities for confusion. In other words, while these studies show that investors resort to book values when earnings are negative, the book value is unlikely to be a perfect substitute for earnings.

Employing a broad sample of 358,634 firm-quarters (11,667 distinct firms) that spans three decades, 1976-2005, we find that over the 120-trading-day window following the earnings announcement day, firms in an extreme loss quintile portfolio exhibit a significantly negative drift (buy-and-hold size-adjusted return) of nearly seven percent, whereas firms in an extreme profit quintile portfolio exhibit a significantly positive drift of over three percent. Further, a hedge portfolio that takes a long position in the extreme profit firms and a short position in the extreme loss firms generates approximately 10 percent abnormal return, which translates into an annualized return of approximately 21 percent. Supplementary tests show that this superior abnormal return is more substantial than, and incremental to the returns generated by previously documented accounting-based trading strategies, most notably the post-earnings announcement drift, the book-to-market, and the accruals. Further, sensitivity tests show that this loss/profit effect is robust to alternative risk adjustments (size-adjusted returns and Carhart's 1997 four factor model returns), distress risk, short sales constraints, and transaction costs. Finally, the results hold for the entire 30-year sample period, 1976-2005, as well as for three 10-year subperiods: 1976-1985, 1986-1995, and 1996-2005.

What may explain this mispricing? If investors rely on simplified models to assess a firm's future prospects, as findings in behavioral finance literature suggest, they may be assessing the probability of a loss/profit to be released in quarter q based on its unconditional probability rather than the more complex and hard to calibrate conditional probability. This type of behavior would result in an underestimation of the probability of a loss/profit in quarter q for firms with a previous loss/profit if, as we assert, conditional probabilities are higher than unconditional probabilities. Consequently, a post loss/profit announcement drift in stock returns would be observed as investors revise upward their priors of a loss/profit in the period leading up to the earnings release of the subsequent quarter. Further, if the drift (partially) represents a market failure to fully reflect conditional probabilities in a timely fashion in stock prices, there should be a positive relation between the magnitude of the drift (the stock-price valuation error) and the difference between conditional and unconditional probabilities (our proxy for investor misperception of the probability of a future loss/profit).

In support of this behavioral explanation for the stock price underreaction to loss/profit announcements, we find that conditional probabilities indeed exceed unconditional probabilities. For example, while the frequency of quarterly losses in our sample period is less than 20 percent on average, the conditional probability of a loss given a loss in the previous quarter is higher (approximately 63 percent on average), and the conditional probability of a loss given a profit in the previous quarter is lower (approximately 9 percent on average). Moreover, once the magnitude of the loss/profit is considered, differences between conditional and unconditional probabilities are even more pronounced. For example, conditional on a high loss (extreme loss quintile) in quarter q-1, the probability of a loss in quarter q is 79 percent. Finally, differences between conditional and unconditional probabilities are significantly correlated with future abnormal portfolio returns. That is, the higher the difference between conditional and unconditional probabilities, the higher the future abnormal returns.

Our findings contribute to two literatures: the literature on mispricing of earnings and the literature on the time-series properties of earnings in general, and losses in particular. Our contribution to the literature on mispricing of earnings concerns uncovering a new stock return anomaly that is incremental to, and more pronounced than previously documented earnings-related anomalies. Our findings also offer a behavioral explanation for this anomaly, which is consistent with an assertion in behavioral finance theories that due to their limited processing ability investors rely on partial information when pricing stocks, and consequently make systematic valuation errors.

Our second contribution, the one related to the literature on the time-series properties of earnings, concerns documenting the predictability of losses/profits by studying their conditional probabilities. This new focus on conditional probabilities and the predictability of earnings *signs*, rather than earnings *changes*, provides important new insights. For example, the conditional probability of a loss is higher than its unconditional probability, and is increasing, not decreasing, in the magnitude of the previous quarterly loss. Consequently, assessing the persistence of quarterly losses based on their unconditional probability, or on serial correlation coefficients of earnings changes, may lead to the conclusion that they are transitory (i.e., they mean revert quickly). Conversely, considering their conditional probability leads to the opposite conclusion that losses are unlikely to reverse quickly, particularly when they are large.

The next section describes the data. Section 3 outlines the methodology, and Section 4 reports our primary empirical findings. Section 5 delineates the results from supplementary tests assessing the relation between the superior returns from the loss/profit strategy and those of previously documented accounting-based trading strategies. Section 6 offers a behavioral explanation for the post loss/profit announcement drift, and Section 7 considers the effect of distress risk and transaction costs on our primary findings. The final section, Section 8, offers concluding remarks.

2. Data

2.1. Sample selection

The data are obtained from the Compustat quarterly database and the CRSP daily returns database. Our analyses include a set of primary tests followed by a set of three supplementary tests. The sample selection procedures for both sets of tests are summarized in Table 1.[3]

For our primary tests, those documenting the post loss/profit announcement drift, the sample period spans from fiscal years 1976 through 2005 (120 fiscal quarters). To be included in the primary tests' sample, a firm-quarter must satisfy the following three requirements. First, it must have the following data available on the Compustat quarterly database: earnings before extraordinary items and discontinued operations (Compustat Quarterly data8), and beginning-of-quarter total assets (Compustat Quarterly data44). This requirement yields 474,547 firm-quarters covering 14,398 distinct firms. Second, each firm-quarter must have return data available in the CRSP daily returns database. This requirement further reduces our sample size to 391,278 firm-quarters covering 11,939 distinct firms. Third, in order to eliminate thinly traded stocks, we exclude all firms with stock prices five days prior to the quarterly earnings announcement date below $5 in year 2005. This threshold is decreased by eight percent annually for earlier years to account for stock market appreciation.[4] This final data requirement further decreases the final sample for our primary tests to 358,634 firm-quarters, from 11,667 distinct firms.

The first set of supplementary tests uses the primary tests' sample and imposes additional data requirements to compute standardized unexpected earnings (SUE), i.e., a firm-quarter must have 13 consecutive quarters of data for earnings per share excluding extraordinary and discontinued operations (Compustat Quarterly data9), as an estimation period spanning the most recent 12 quarters is required. These additional data requirements result in a sample of 281,267 firm-quarters (9,782 distinct firms).

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[3] In addition, we perform a battery of sensitivity tests. The data requirements for these tests are discussed later.

[4] To test the sensitivity of our results to this choice, we alternatively exclude (1) firms with a stock price below $5 in our entire sample period, or (2) firms in the lowest share turnover decile (computed by fiscal year). We obtained nearly indistinguishable results (not tabulated for parsimony) for either of these two alternative specifications.

The second set of supplementary tests uses the primary tests' sample and imposes additional data requirements to compute the book-to-market value of equity ratio. The required data are: common equity (Compustat Quarterly data59), common shares outstanding (Compustat Quarterly data61), and end-of-quarter closing stock price (Compustat Quarterly data14). These additional data requirements result in a sample of 351,463 firm-quarters (11,636 distinct firms).

The third set of supplementary tests uses the primary tests' sample and imposes additional data constraints to compute quarterly accruals, measured directly from the cash flow statement. The required data to compute accruals are: earnings before extraordinary items and discontinued operations (Compustat Quarterly data76), net cash flow from operating activities (Compustat Quarterly data108), extraordinary income and discontinued operations (Compustat Quarterly data78), and average total assets (Compustat Quarterly data44). Due to the unavailability of cash flow statement information prior to 1988, this sample spans the 18-year period, 1988-2005. These additional data constraints result in a sample of 191,328 firm-quarters (7,746 distinct firms).

2.2. Variable definitions

We consider three alternative definitions for our earnings variable. The first definition is earnings before extraordinary items and discontinued operations (Compustat Quarterly data8). The second definition is earnings before extraordinary items, discontinued operations, and special items (Compustat Quarterly data8 – Compustat Quarterly data32), and the third definition is net income (Compustat Quarterly data69).[5] All three measures are scaled by beginning-of-quarter total assets (Compustat Quarterly data44) to alleviate a potential heteroscedasticity

[5] Since the results from the tests that follow were robust to the earnings definition, we tabulate in the paper the results based on earnings before extraordinary items and discontinued operations (the first definition). This choice is standard in the earnings-related anomalies literature (e.g., Bernard and Thomas 1990; Sloan 1996), and thus allows comparisons with previous research.

problem that may arise when earnings data are pooled across firms and over time.[6]

We measure buy-and-hold abnormal returns, for firm *i* over *n* trading days, as follows:

$$\prod_{t=1,n} (1 + R_{it}) - \prod_{t=1,n} (1 + ER_{it}) \quad (1)$$

where, R_{it} is the daily return for firm *i* in day *t*, inclusive of dividends and other distributions, and ER_{it} is the expected return in day *t* for that firm. If a firm delists during the return accumulation window, we compute the remaining return by using the CRSP daily delisting return, reinvesting any remaining proceeds in the appropriate benchmark portfolio, and adjusting the corresponding market return to reflect the effect of the delisting return on our measures of expected returns (see, Shumway 1997; Beaver et al. 2007).[7] Only a small number of sample firms delist, which is not surprising given our relatively short return windows.[8] Still, we replicate our tests excluding delisting returns. The results, not tabulated for parsimony, were indistinguishable from the tabulated results.

We use two alternative measures to estimate expected returns. The first measure is based on firm size (market capitalization) and the second measure is based on Carhart's (1997) four factor model. Our first measure of daily expected return for firm *i* in day *t*, the one based on firm size, is defined as the value-weighted return for all available firms in firm *i*'s size-matched decile on day *t*, where size is measured using market capitalization at the beginning of the most recent calendar year. Using size-adjusted returns is common in prior research on earnings-related

[6] The results (not tabulated for parsimony) remained virtually unchanged when we used beginning-of-quarter market value of equity as a scalar.

[7] Poor performance-related delistings (delisting codes 500 and 520–584) often have missing delisting returns in the CRSP database (Shumway 1997). To correct for this bias, we set missing performance-related delisting returns to –100 percent as recommended by Shumway (1997).

[8] In the return window [1, 60], 220 out of 13,929 firm-quarter observations of the extreme loss quintile, and 394 out of 59,380 firm-quarter observations of the extreme profit quintile, delist. In the return window [1, 120], 468 out of 13,929 firm-quarter observations of the extreme loss quintile, and 999 out of 59,380 firm-quarter observations of the extreme profit quintile, delist. For the sample as a whole, out of 358,634 firm-quarter observations, 3,189 and 7,648 observations delist in the return windows [1, 60] and [1, 120], respectively.

anomalies (e.g., Bernard and Thomas 1990; Ball and Bartov 1996; Sloan 1996; Dechow et al. 2008), and thus allows comparisons of our results with the findings of this research.

To assess the sensitivity of our findings to alternative risk adjustments, we also compute daily expected returns based on Carhart's (1997) four factor model. Along the lines of prior research, we first estimate the following model using a 40-trading-day hold-out period, starting 55 trading days prior to the earnings announcement date:

$$R_{it} - RF_t = a_i + b_i(RMRF_t) + s_i(SMB_t) + h_i(HML_t) + p_i(UMD_t) + e_{it} \quad (2)$$

where R_{it} is defined as before, RF_t is the one-month T-bill daily return, $RMRF_t$ is the daily excess return on a value-weighted aggregate equity market proxy, SMB_t is the return on a zero-investment factor mimicking portfolio for size, HML_t is the return on a zero-investment factor mimicking portfolio for book-to-market value of equity; and UMD_t is the return on a zero-investment factor mimicking portfolio for momentum factor.[9]

We then use the estimated slope coefficients from Equation (2), b_i, s_i, h_i, and p_i, to compute the expected return for firm *i* in day *t* as follows:

$$ER_{it} = RF_t + b_i(RMRF_t) + s_i(SMB_t) + h_i(HML_t) + p_i(UMD_t) \quad (3)$$

As in previous research (e.g., Bernard and Thomas 1989, 1990), standardized unexpected earnings (SUE) are generated via a seasonal random walk with a drift model. More specifically, for firm *i* in quarter *q*, we first estimate the model by using the most recent 12 quarters of data (i.e., quarters *q*-12 through *q*-1). We compute $SUE_{i,q}$ by taking the difference between the reported quarterly earnings per share and expected quarterly earnings per share generated by the model, scaled by the standard deviation of forecast errors over the estimation period.

A firm's book-to-market ratio is defined as book value of equity divided by firm size,

[9] *RF*, *RMRF*, *SMB*, *HML*, and *UMD* are obtained from Professor Kenneth French's web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

where firm size is the product of the number of shares outstanding and the closing stock price as reported in Compustat. Operating accruals are measured directly from the cash flow statement, as in prior research (e.g., Hribar and Collins 2002), where they are defined as the difference between earnings before extraordinary items and discontinued operations, and net operating cash flows from continuing operations, scaled by average total assets.

Finally, in testing the sensitivity of our findings to distress risk, we use Altman's (1968) Z score, which has been used as a proxy for firm financial distress by prior research (see, e.g., Dichev 1998; Khan 2008). Altman's (1968) Z score is calculated as follows:[10]

$$\begin{aligned} Z = {} & 1.2 \text{ (working capital / total assets)} + 1.4 \text{ (retained earnings / total assets)} \\ & + 3.3 \text{ (earnings before extraordinary items and discontinued operations / total assets)} \\ & + 0.6 \text{ (market value of equity / total liabilities)} + 1 \text{ (sales / total assets)} \end{aligned} \quad (4)$$

A Z score below 1.81 indicates that bankruptcy is likely and above 2.99 that bankruptcy is unlikely. A Z score between 1.81 and 2.99 is in the "zone of ignorance" or "gray area."

3. Methodology

3.1. Primary tests: Do stock prices fully react to loss/profit announcements?

Our primary tests concern whether stock prices fully react in a timely fashion to loss/profit announcements. For our first test, we partition all firm-quarter observations into two portfolios: a loss portfolio containing all firms with negative earnings and a profit portfolio containing all firms with positive earnings.[11] For each of the two portfolios, we compute buy-and-hold abnormal returns over two windows, [1, 60] and [1, 120], where day 0 is the quarterly

[10] In terms of Compustat's quarterly data items, Altman's (1968) Z score is computed as: Z = 1.2 (data40-data49)/data44 + 1.4 (data58/data44) + 3.3 (data8/data44) + 0.6 (data61*data14/data54) + 1 (data2/data44).

[11] A negligible number of observations (110 observations, i.e., less than one tenth of a percent of total number of observations) with zero earnings are included in the profit sample. The exclusion of these observations, or their inclusion in the loss sample, does not change the results.

earnings announcement date.[12] If investors underreact to loss/profit announcements, the stock return in these post announcement periods for the loss (profit) portfolio should be negative (positive), and the spread between the profit portfolio and the loss portfolio should be significantly positive.

Next, loss firms and profit firms are separately ranked into five quintiles from smallest earnings, i.e., "High Loss" and "Low Profit" for loss firms and profit firms, respectively, to largest earnings, i.e., "Low Loss" and "High Profit" for loss firms and profit firms, respectively.[13] As before, we compute, for each portfolio, buy-and-hold abnormal returns over two windows, [1, 60] and [1, 120], where day 0 is the quarterly earnings announcement date.[14] If the mispricing relates to loss/profit announcements, we expect the post announcement returns to vary systematically across the earnings quintiles, being most negative for the High Loss portfolio and most positive for the High Profit portfolio. We also expect the return spread between High Profit and High Loss portfolios to be greater than that between Profit and Loss portfolios.

3.2. *Supplementary tests: Relation between post loss/profit announcement drift and previously documented anomalies*

In this section, we explore the relation between the stock return performances of the loss/profit strategy and previously documented accounting-based trading strategies. Specifically,

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[12] As a sensitivity analysis, we replicate our tests using the return windows [2, 60] and [2, 120], as well as [3, 60] and [3, 120], where day 0 is the quarterly earnings announcement date. The results, not tabulated for parsimony, are indistinguishable from the tabulated results.

[13] Prior research on earnings-based anomalies (e.g., Bernard and Thomas 1990; Ball and Bartov 1996) sort firms into earnings quintiles every fiscal quarter based on the distribution of reported earnings in that quarter. This choice involves a look-ahead bias, as for firms that announce quarterly earnings early the distribution of reported earnings is not known at the time the portfolio is formed. To address this problem, we compute cut-off points based on the previous fiscal quarter's earnings distribution.

[14] To ensure meaningful sorting, we require a minimum of 300 observations per portfolio. This requirement is not binding for any of our portfolios throughout the study.

we test whether the loss/profit strategy is different from, and incremental to the post-earnings announcement drift, the book-to-market (value-glamour) anomaly, and the accruals anomaly.

To test whether the loss/profit strategy is incremental to the post-earnings announcement drift, we examine the loss/profit strategy after controlling for the SUE effect. This examination involves forming portfolios based on the intersection of the two independent rankings of earnings and SUE for each quarter, for loss and profit firms separately. More specifically, for loss (profit) firms, we rank all firm-quarter observations into five quintiles from smallest earnings, High Loss (Low Profit), to largest earnings, Low Loss (High Profit). We also independently classify all firm-quarter observations into five quintiles from smallest SUE ("Low SUE") to largest SUE ("High SUE"). We then compute the difference in buy-and-hold abnormal returns between the two most extreme loss/profit portfolios, the highest loss quintile (High Loss) and the highest profit quintile (High Profit), for each SUE quintile separately. In other words, we test for the loss/profit effect after controlling for the SUE effect. Next, we employ a similar methodology to examine the relation between the loss/profit strategy and the value-glamour and accrual anomalies, using book-to-market value of equity and accruals as classification variables, respectively, instead of SUE.

Finally, to assess the incremental effect of the loss/profit strategy *simultaneously* over the post-earnings announcement drift (SUE) strategy, the value-glamour strategy, and the accruals strategy, we use a multivariate regression setting. More formally, we estimate the following regression:

$$BHSAR_{i,q,[1,120]} = a_0 + a_1*Loss\_Profit_{i,q} + a_2*SUE_{i,q} + a_3*BM_{i,q} + a_4*Accruals_{i,q} + e_{i,q} \quad (5)$$

where $BHSAR_{i,q,[1,120]}$ is the buy-and-hold size-adjusted returns for the window [1, 120], where 0 is the earnings announcement date of quarter q, $Loss\_Profit_{i,q}$ is the quintile ranking of firm i

based on earnings before extraordinary items and discontinued operations in quarter q scaled by total assets in quarter q-1, $SUE_{i,q}$ is the quintile ranking of firm i based on standardized unexpected earnings in quarter q (generated using a seasonal random walk with drift model), $BM_{i,q}$ is the quintile ranking of firm i based on the ratio of book-to-market value of equity at the end of quarter q, and $Accruals_{i,q}$ is the quintile ranking of firm i based on accruals scaled by average total assets in quarter q. The quintile rankings for all rank variables are determined every quarter q based on the distribution of the underlying variables in quarter q-1. Each rank variable is scaled to range between zero and one. We estimate Equation (5) using two alternative methods: one based on pooled data across firms and over the sample period, and the other on the Fama and MacBeth (1973) procedure, i.e., we estimate Equation (5) separately for each quarter, and then report the time-series means and t-statistics of the coefficients from the quarterly cross-sectional regressions.

3.3. Conditional and unconditional probabilities and post loss/profit announcement drift

Our first set of tests, which consists of two tests, concerns investigating our assertion that the conditional probability of a loss/profit exceeds the corresponding unconditional probability. For our first test, we employ a chi-square test on a two-by-two contingency table, in which the rows correspond to the frequency of a loss/profit in the previous quarter, quarter q-1, and the columns correspond to the frequency of a loss/profit in the current quarter, quarter q. Since our test is one-sided, we compute a z-statistic, which is defined as the signed square root of the chi-square statistic. The distribution of this z-statistic is approximately standard normal (see Conover 1980, pp. 145-146).

Our second test examines whether the conditional probability of a current quarterly loss/profit is increasing in the magnitude of the previous quarterly loss/profit. This test also employs a chi-square statistic. We design a five-by-two contingency table with quintiles of loss/profit in the previous fiscal quarter as rows and the frequency of a loss/profit in the current quarter as columns. We calculate a chi-square statistic to test independence (Conover 1980, pp. 153-156).

Next, we directly test for a relation between future abnormal returns, our measure of the valuation errors, and the difference between conditional and unconditional probabilities of a loss/profit, our measure of investor misperception of the likelihood of a future loss/profit underlying the error in the valuation of losses/profits. To test for this relation, we compute for each portfolio the difference between conditional and unconditional probabilities of a loss (profit), for the loss (profit) subsample. Then, for each subsample we compute the correlation between the two measures: the portfolio returns and the differences in probabilities. If stock prices fail to fully reflect the implications of losses/profits for future losses/profits because investors do not fully rely on conditional probabilities, these two measures should be statistically significantly correlated.[15]

4. Tests for Post Loss/Profit Announcement Drift

Table 2 reports the results on buy-and-hold abnormal stock returns for the two portfolios formed on the sign of earnings. The results show that losses/profits are bad/good news as earnings announcement returns (returns in the [-2, 0] window) are significantly negative for the loss portfolio, -0.91 percent, and significantly positive for the profit portfolio, 0.64 percent.[16]

[15] For these sets of tests, we also use an alternative intertemporal approach to correct for cross-sectional dependence across observations. The results, not tabulated for parsimony, are indistinguishable from the tabulated results.

[16] While we present in the tables the results for both size-adjusted returns and Carhart's (1997) four factor model returns, for brevity we discuss only the former as both sets of results are qualitatively similar and lead to similar inferences. We note that using Carhart's (1997) four factor model results in a shift to the left of the return distribution for our strategy, as well as for the previously documented earnings-based anomalies. This shift should

However, the stock price responses to the loss/profit announcements are incomplete as substantial drift in the post loss/profit announcement periods is observed. For example, in the window [1, 120] the loss firms exhibit a significantly negative return of -5.07 percent and the profit firms exhibit a significantly positive return of 1.46 percent. A hedge portfolio that takes a short position in the loss portfolio and a long position in the profit portfolio generates a significantly positive buy-and-hold return of 6.52 percent, which is approximately a 13 percent annualized return. Together, these results suggest investors misprice loss/profit firms at the earnings announcement date. To further examine the mispricing of loss/profit firms, we turn to the results in Table 3.

Table 3 reports the results on buy-and-hold size-adjusted returns for a finer earnings partition of loss (profit) firms into five loss (profit) quintiles based on the magnitude of the loss (profit). Interestingly, for all five loss quintiles the stock returns are significantly negative for the three-day window [-2, 0], suggesting that losses *per se* are bad news dominating other news that may be released simultaneously. More important, there is a monotonic decline in the magnitude of the post-announcement returns (in absolute values) across the five loss quintiles, from -3.68 percent and -6.58 percent in the windows [1, 60] and [1, 120] respectively, for the High Loss portfolio, to -1.53 percent and -2.44 percent, respectively, for the Low Loss portfolio. Likewise, there is a monotonic increase in the post-announcement returns of profit firms across the five profit quintiles. For example, in the window [1, 120], the return of the Low Profit portfolio is statistically insignificant (-0.12 percent), whereas the return of the High Profit

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not be overemphasized, as it only affects the individual portfolio return in a few cases, and in particular has little effect on the hedge portfolio return. For example, for the period [1, 120], using size-adjusted returns and Carhart's (1997) four factor model returns, the return spreads between the Profit and Loss portfolios are 6.52 percent and 7.97 percent, respectively (see Table 2), and the return spreads between the High Profit and High Loss portfolios are 10.13 percent and 13.18 percent, respectively (see Table 3).

portfolio is 3.55 percent and is highly statistically significant. These findings further support that investors underreact to loss/profit announcements.

Table 3 also reports the stock return performance of a hedge portfolio that takes a short position in the High Loss portfolio and a long position in the High Profit portfolio. The results show significantly positive buy-and-hold returns of 5.87 percent and 10.13 percent for the windows [1, 60] and [1, 120], respectively. Further, as expected, the finer partition in Table 3 relative to Table 2 results in an increase of the hedge portfolio returns. Specifically, for the windows [1, 60] and [1, 120] the return spreads between the High Profit and High Loss portfolios, 5.87 percent and 10.13 percent, respectively, in Table 3, are substantially higher than the return spreads between the profit and loss portfolios of 3.57 percent and 6.52 percent, respectively, in Table 2. The corresponding differences in spreads of 2.30 percent (5.87 percent minus 3.57 percent) for the window [1, 60], and 3.61 percent (10.13 percent minus 6.52 percent) for the window [1, 120] are highly statistically significant.[17]

Figure 1 portrays the yearly buy-and-hold abnormal returns of our loss/profit trading strategy for the entire sample period, 1976-2005. This strategy concerns taking a long position in the High Profit portfolio and a short position in the High Loss portfolio for the [1, 120] window (portfolios rebalanced quarterly). The picture that emerges from Figure 1 is that the loss/profit strategy is consistently profitable: it yields positive size-adjusted returns in 29 years (26 years based on Carhart's 1997 four factor model) out of our 30-year sample period. The average portfolio return over the 30 calendar years is 8.3 percent using size-adjusted returns and

[17] By construction, the extreme loss and extreme profit portfolios in Table 3 do not have the same number of observations (13,929 and 59,380 observations, respectively) as there are four times more profit observations than loss observations in the sample, 291,377 and 67,257 observations, respectively (see Table 2). We performed two sensitivity analyses regarding this issue. First, we replicated our tests by sorting all observations into quintiles based on earnings levels (without partitioning between loss and profit firms). The results (not tabulated) indicate that our inferences remain unchanged. Second, we replicated our tests by selecting the same number of extreme earnings observations for both loss and profit firms (i.e., 13,929 observations in each portfolio). The results (not tabulated) are unchanged.

5.6 percent using Carhart's (1997) four factor model, both highly statistically significant.[18] Perhaps even more important, our strategy is successful in generating superior returns in both the 23 up market years and the seven down market years.[19] Specifically, in up (down) markets our strategy yields, on average, 7.0 (12.6) percent using size-adjusted returns, and 5.0 (7.6) percent using Carhart's (1997) four factor model.

To further assess whether the loss/profit strategy is robust to the sample period analyzed, we replicate our tests after partitioning our 30-year sample period into three 10-year subperiods: 1976-1985, 1986-1995, and 1996-2005. Panels A, B, and C of Table 4 display the return results for the three subperiods for the High Loss, High Profit, and hedge (High Profit minus High Loss) portfolios. Consider the results for the hedge portfolio for the window [1, 120] for the three subperiods. The hedge portfolio size-adjusted returns in the first subperiod (12.31 percent), second subperiod (8.27 percent) and third subperiod (10.97 percent) are all positive and highly statistically significant. Similarly, the returns of the High Loss portfolios and the High Profit portfolios have the predicted sign and are highly statistically significant in all three subperiods. Thus, while as expected some variation in the returns across the three subperiods is observed, this variation is relatively small, and overall these findings alleviate concerns that our results may be period-specific.

Collectively, the results presented in Table 2, Table 3, Table 4, and Figure 1 indicate a substantial stock mispricing related to loss/profit announcements that is robust to alternative risk

[18] In Table 3, the mean return of the hedge portfolio is higher, 10.13 percent using size-adjusted returns and 13.48 percent using Carhart's (1997) four factor model. The discrepancy between the results presented in Figure 1 and those in Table 3 follows because in Table 3 we average the 120-day returns across all sample fiscal quarters, whereas in Figure 1 we average these returns across all calendar years.

[19] A down (up) market is defined as a negative (positive) value-weighted annual market return.

adjustments and time periods. A natural question arises at this point: is this loss/profit effect incremental to previously documented accounting-based anomalies?

The first anomaly that might come to mind concerns stock mispricing based on E/P multiples studied by Basu (1977, 1983), and Lakonishok et al. (1994). However, the objective of these studies is to test whether stock prices are biased due to inflated investor expectations regarding growth in earnings and dividends (see, e.g., Basu 1977, p. 663; Lakonishok et al. 1994, p. 1547). This objective, which is distinctly different from ours, leads to different research designs and findings. In particular, these studies use annual, not quarterly data, and more importantly exclude loss firms from their samples (see, Basu 1983, p. 133; Lakonishok et al. 1994, p. 1546) because E/P multiples and earnings growth of loss firms are difficult to interpret.[20] In addition, since they focus on profit firms, their hedge portfolio results are also considerably different. For example, while we find an annualized size-adjusted return of approximately 21 percent to a hedge portfolio that takes a long position in extreme profit firms and a short position in extreme loss firms, Lakonishok et al. (1994, p. 1550) report a hedge portfolio size-adjusted return of only 5.4 percent per annum. As may be expected, this 5.4 percent return is very similar to the annualized return of a hedge portfolio that takes a long position in our highest quintile profit firms and a short position in our lowest quintile profit firms (see Table 3). Thus, the findings of prior E/P multiples studies have little bearing on our findings.

Other accounting-based anomalies, however, may be related to our findings. As a first

[20] Basu (1977) mentions that the inclusion of loss firms in his sample makes little difference for his findings, which is opposite to what we find. The reason for the difference in findings is that Basu's (1977) carefully selected sample of only 753 NYSE industrial firms with December fiscal year end in the period 1957-1971 contains a negligible number of loss firms. Our findings—which indicate that the inclusion of loss firms and the partition of the sample into loss and profit firms have a substantial effect on the results—may thus be viewed as another contribution relative to Basu's (1977) study.

step in assessing potentially related anomalies, we examine the overlap between the loss/profit strategy and three variables—SUE, book-to-market (BM), and accruals—shown by prior research to be related to stock-price performance in broad samples. Panel A of Table 5 displays the number of observations in the High Loss portfolio (i.e., the short portfolio) and in the High Profit portfolio (i.e., the long portfolio) by quintiles of each of the three variables SUE, BM, and accruals. Consider, for example, the breakdown of the High Loss portfolio by SUE quintiles. Out of 9,258 (4,453 + 3,725 + 1,080) observations in the High Loss portfolio, only 4,453 observations (48 percent) also belong in the Low SUE portfolio (i.e., the short portfolio of the SUE strategy). Out of the other 4,805 observations (52 percent), 1,080 observations (12 percent) belong in the High SUE portfolio (i.e., the long portfolio of the SUE strategy), and 3,725 observations (40 percent) are not included in the portfolios used in the SUE strategy, as they correspond to the second, third, or fourth SUE quintiles. Likewise, only 14,558 observations (31 percent) in the High Profit portfolio (i.e., the long portfolio) also belong in the High SUE portfolio (i.e., the long portfolio of the SUE strategy). In contrast, 32,764 observations (69 percent) are nonoverlapping: 7,505 observations (16 percent) belong in the Low SUE portfolio (i.e., short portfolio of the SUE strategy), and 25,259 observations (53 percent) are in the second, third, or fourth SUE quintiles. Furthermore, the overlap between the loss/profit strategy and the BM and accruals strategies also seems small. For example, only 6,271 observations (46 percent) of the High Loss portfolio (i.e., the short portfolio) overlap with the Low BM portfolio (i.e., the short portfolio of the BM strategy), and only 1,157 observations (12 percent) overlap with the High Accruals portfolio (i.e., the short portfolio of the accruals strategy). These findings provide little support for the possibility that the loss/profit announcement drift is another manifestation of the previously documented post-earnings-announcement drift (SUE), BM, or accruals effect.

Panel B of Table 5 reports characteristics for loss/profit portfolios by the degree of overlap with each of the other three strategies. Three of the reported characteristics, market value of equity (MVE), total assets, and sales are alternative proxies for firm size, and the other two characteristics, return volatility and Altman's (1968) Z scores, are measures of firm risk. It is attention worthy that no clear pattern emerges from comparisons of these characteristics across portfolios. While in some cases overlapping portfolios contain larger and less volatile firms than nonoverlapping portfolios, in other cases we find the opposite. For example, in terms of total assets the portfolio consisting of the intersection of the High Loss and High SUE portfolios (a nonoverlapping portfolio) contains smaller firms than that of the High Loss and Low SUE portfolios (an overlapping portfolio): average total assets of 98.2 vis-à-vis 364.4 ($million), respectively. This finding may indicate that the former is riskier than the latter. However, the average Z score for the High Loss and High SUE portfolio is higher than that of the High Loss and Low SUE portfolio, indicating the former is less risky than the latter.

Overall, the findings in Table 5 may be viewed as *prima facie* evidence that the post loss/profit announcement drift is not another manifestation of the previously documented post-earnings-announcement drift (SUE), BM, or accruals effects, and that it is not driven by an omitted variable. Still, in the sections below we further assess these possibilities by directly testing the relation between the loss/profit strategy and other accounting-based anomalies, as well as by performing a battery of sensitivity tests.

5. Relation between Post Loss/Profit Announcement Drift and Previously Documented Anomalies

5.1. Losses/profits, SUE, and future stock returns

Panel A of Table 6 displays the results from tests of the relation between the post loss/profit announcement drift and the SUE effect (post-earnings-announcement drift). This panel presents 120-day buy-and-hold size-adjusted returns for portfolios formed based on a two-way classification in which observations are sorted independently into five SUE quintiles and five loss/profit quintiles (i.e., earnings quintiles for loss and profit firms). The top five lines contain the results for the loss quintiles, the next five lines for the profit quintiles, and the bottom line for the hedge portfolio returns to the loss/profit strategy after controlling for the SUE effect. Two salient findings emerge from reviewing the results in Panel A. First, the loss/profit effect dominates the SUE effect. To illustrate, consider portfolio returns of extreme loss firms (High Loss) in the High SUE quintile, and extreme profit firms (High Profit) in the Low SUE quintile. Consistent with the predictions of the loss/profit strategy, and contrary to the predictions of the SUE strategy, the return on the first portfolio is negative, -4.30 percent, and the return on the second portfolio is positive, 0.49 percent. Second, the loss/profit strategy is incremental to the SUE strategy, as the superior return of the loss/profit strategy is observed even after controlling for the SUE strategy. For example, the return on the hedge portfolio, High Profit minus High Loss, is significantly positive for all SUE quintiles, yielding 4.35 percent, 9.02 percent, 7.38 percent, 9.17 percent, and 10.68 percent for portfolios consisting of firms in SUE quintiles 1, 2, 3, 4, and 5, respectively. Thus, the return of the loss/profit strategy remains substantial for all hedge portfolios even after controlling for the SUE effect. Further, combining the two strategies does not improve the hedge portfolio performance relative to its performance based on loss/profit alone. The 120-day hedge portfolio return of the loss/profit strategy is 10.13 percent (see Table 3), and the return of the hedge portfolio based on the joint classification (High Profit and High SUE minus High Loss and Low SUE) is 10.24 percent.[21] Overall, the findings provide evidence

[21] The 120-day return of a SUE-based hedge portfolio is only 6.06 percent. This result is not tabulated.

that the loss/profit effect is incremental to, and more pronounced than the SUE effect.

Comparing our results with those of Narayanamoorthy (2006) highlights new insights produced by our approach. Narayanamoorthy (2006) uses regression analysis to study differential post-earnings-announcement drift between loss firms and profit firms. His regression results imply SUE-based hedge portfolio returns of 6.79 percent for profit firms and 5.07 percent (= 6.79 minus 1.72) for loss firms (p. 779, Table 5).[22] He attributes these findings to the lower serial correlation coefficient of SUE for loss firms than profit firms. Using portfolio analysis rather than regression analysis and focusing on the tails of the distributions of losses and profits rather than on the total sample of SUE, our results displayed in Panel A of Table 6 offer two new insights. First, losses dominate SUE, as nearly all SUE quintiles generate negative post-announcement returns for loss firms. Second, for loss firms the SUE-based strategy is inefficient, as the long portfolio generates negative returns, which reduces overall hedge portfolio returns. Consequently, our findings suggest that the SUE-based strategy can be improved substantially (by more than 50 percent) relative to Narayanamoorthy's (2006), by taking a short position in the subset of lowest SUE quintile firms that report a loss and a long position in the subset of firms in the highest SUE quintile that report a profit.

5.2 Losses/profits, book-to-market, and future stock returns

Panel B of Table 6 presents the results from tests of the relation between the loss/profit effect and the book-to-market (value-glamour) effect.[23] This panel reports 120-day buy-and-hold size-adjusted returns for portfolios formed based on a two-way classification in which

[22] As Narayanamoorthy (2006, p. 772) notes, given the way he defines the SUE variable, the regression coefficients in his Table 5 may be interpreted as: "the average abnormal return from a zero investment portfolio formed by going long in the top SUE decile and short in the bottom SUE decile."

[23] Along the lines of prior studies, we replicate our tests in this section using, in addition to book-to-market ratios, three alternative proxies for the value-glamour effect: cash flow from operation-to-price ratios, earnings-to-price ratios, and sales growth. The results, which are not tabulated for parsimony, were qualitatively similar.

observations are sorted independently every quarter into five book-to-market quintiles and five loss/profit quintiles. The top five lines contain the results for the loss quintiles and the next five lines for the profit quintiles. For example, the top left corner of the table reports a return of -8.74 percent for a portfolio consisting of firms in the highest loss quintile (High Loss) and lowest book-to-market quintile (Low BM, known as "glamour" firms), and the bottom right corner of the table reports a return of 7.67 percent for a portfolio consisting of firms in the highest profit quintile (High Profit) and highest book-to-market quintile (High BM, known as "value" firms). Taking a long position in the latter and a short position in the former generates a return of 16.41 percent, which amounts to nearly 35 percent annualized return. This return is superior to both the return of the hedge portfolio formed based on loss/profit alone, 10.13 percent, reported in Table 3 and the one based on book-to-market alone, 3.15 percent (not tabulated). In fact, the return from the two-way classification is approximately 25 percent higher than the sum of the returns from the two strategies alone, which indicates that combining the loss/profit strategy and the book-to-market strategy improves substantially the performance of the hedge portfolio.

The results also demonstrate that the loss/profit strategy dominates the book-to-market strategy. For example, for all book-to-market quintiles the returns are negative for the High Loss portfolio and positive for the High Profit portfolio. In other words, when the book-to-market variable and the loss/profit variable disagree about the sign of a future return, the latter is correct. To see that, consider the portfolio returns of the highest book-to-market quintile (High BM) and highest loss quintile (High Loss), where the book-to-market (loss/profit) strategy predicts positive (negative) future returns, respectively. Inconsistent with the prediction of the book-to-market strategy, the returns of this portfolio is significantly negative, -3.73 percent. Likewise, the return of the High Profit and Low BM portfolio is significantly positive, 1.88 percent, which is consistent with the prediction of loss/profit strategy and contradictory to the prediction of the book-to-market strategy.

The bottom line of Panel B displays the returns of five hedge portfolios formed based on the loss/profit strategy after controlling for the book-to-market effect. These results indicate that the loss/profit strategy yields 10.62 percent, 9.37 percent, 10.00 percent, 11.06 percent, and 11.40 percent for portfolios consisting of firms in book-to-market quintiles 1, 2, 3, 4, and 5, respectively. That is, the return to the loss/profit strategy is unchanged after controlling for the book-to-market effect. Collectively, the results in Panel B demonstrate that the loss/profit effect is incremental to, and more pronounced than the book-to-market effect.

5.3. Losses/profits, accruals, and future stock returns

Panel C of Table 6 examines the relation between the loss/profit strategy and the accruals strategy. This panel presents 120-day buy-and-hold size-adjusted returns for portfolios formed based on a two-way classification in which observations are sorted independently into five accruals quintiles and five loss/profit quintiles. The top five lines contain the results for the loss quintiles and the next five lines for the profit quintiles. For example, the top right corner of the table reports a return of -9.86 percent for a portfolio consisting of firms in the highest loss quintile (High Loss) and highest accruals quintile (High Accruals), and the bottom left corner of the table reports a return of 5.33 percent for a portfolio consisting of firms in the highest profit quintile (High Profit) and lowest accruals quintile (Low Accruals). Taking a long position in the latter and a short position in the former generates a return of 15.19 percent, which is superior to both the return of the hedge portfolio formed based on loss/profit alone, 10.13 percent, reported in Table 3, and the one based on accruals alone, 3.18 percent (not tabulated). In fact, the return from the two-way classification is approximately the sum of returns from the two strategies alone, which provides additional evidence that the loss/profit effect is independent from the accruals anomaly.

The bottom line of Panel C displays the returns of five hedge portfolios formed based on the loss/profit strategy after controlling for the accruals anomaly. These results indicate that the loss/profit strategy yields 9.49 percent, 10.88 percent, 4.95 percent, 7.87 percent, and 10.82 percent for portfolios consisting of firms with accruals quintiles 1, 2, 3, 4, and 5, respectively. That is, the return to the loss/profit strategy is significantly positive even after controlling for the accruals effect. In summary, the results in Panels A, B, and C of Table 6 show that the post loss/profit announcement drift is more pronounced than, and incremental to the SUE, book-to-market, and accruals effects.[24]

5.4. Losses/profits, SUE, accruals, book-to-market ratios, and future stock returns

So far, we examine the ability of the loss/profit effect to predict future returns after controlling for each of the possible alternative explanations considered. In this section, we assess the ability of the loss/profit effect to predict future returns after controlling for all three alternative explanations simultaneously by using multivariate regression analysis as specified by Equation (5). Note that since Equation (5) includes an intercept, a_0, and since all variables are scaled to range from zero to one, the least square values of a_1, a_2, a_3, and a_4 represent abnormal returns on zero-investment (hedge) portfolios, that is, portfolios where the sum of the weights assigned to individual securities is zero.[25]

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[24] We also consider the relation between the loss/profit effect and institutional ownership, analyst coverage, and firm size by replicating the tests reported in Table 6. The results, which are not tabulated for parsimony, clearly indicate that the loss/profit effect remains unchanged even after controlling for these three variables.

[25] See Fama (1976, pp. 323-331) or Bernard and Thomas (1990, pp. 325-326) for more details on the use of least squares coefficients as portfolio returns.

Table 7 displays coefficient estimates for Equation (5), as well as for three models nested within this equation. The results in Panel A are based on pooled data and in Panel B on the Fama-MacBeth (1973) procedure. The findings in Table 7 are robust to alternative estimation methods and model specifications, as the results within each panel and across the two panels are similar.[26] Consider the results in Panel B for the full model (Model IV). As predicted, a_1, a_2, and a_3 are significantly positive, 0.0796, 0.0462, and 0.0380, respectively, and a_4 is significantly negative, -0.0496. Since each estimated coefficient indicates the hedge portfolio return for one of the four strategies, and since the estimated coefficient on the loss/profit variable is almost twice as high (in absolute value) as any of the other three estimated coefficients, these findings further demonstrate that the loss/profit effect is incremental to, and more pronounced than the three previously documented accounting-related anomalies.[27]

6. Conditional Probabilities, Unconditional Probabilities, and Post Loss/Profit Announcement Drift

In this section we consider a behavioral explanation for the post loss/profit announcement drift. Briefly, recall that findings in the behavioral finance literature indicate that investors appear to rely on simplified models to assess a firm's future prospects. If so, investors may be relying on unconditional probabilities for a loss/profit rather than their conditional probabilities when predicting a future loss/profit. This type of behavior would result in an underestimation of the probability of a loss (profit) in quarter q for firms with a loss (profit) in quarter q-1 if, as we assert, conditional probabilities are higher than unconditional probabilities. Consequently, a drift

[26] We also estimate the models using actual values of the explanatory variables rather than their ranks. All estimated coefficients are highly statistically significant in the predicted direction.

[27] For the regression analysis, we sort the earnings variable into quintiles, without first separating loss firms from profit firms, for comparability across explanatory variables. However, by construction, the lowest earnings quintile is dominated by loss firms (median earnings scaled by lagged total assets, -0.0156), and the highest earnings quintile is dominated by high profit firms (median earnings scaled by lagged total assets, 0.0354).

would be observed after the earnings announcement date, as news arrives to the market and investors correct their errors.

6.1. Tests of the relation between conditional and unconditional probabilities

We begin the empirical analysis by testing our conjecture that the conditional probability of a loss/profit exceeds the unconditional probability of a loss/profit. Table 8 reports the results from conditioning the earnings sign in quarter *q* on the earnings sign in the previous quarter *q*-1, using a one-sided two-by-two contingency table test. We conjecture that the conditional probability of a loss is greater than its unconditional probability and, equivalently, that the conditional probability of a profit is greater than its unconditional probability. More formally, this conjecture may be stated, in the alternative form, as follows:

Conjecture 1a: $P(Loss_q) < P(Loss_q \mid Loss_{q-1})$

Conjecture 1b: $P(Profit_q) < P(Profit_q \mid Profit_{q-1})$

Before discussing the results from the two-by-two contingency table test, there are three statistical points to notice. First, the contingency table statistic tests whether $P(Loss_q \mid Loss_{q-1}) > P(Loss_q \mid Profit_{q-1})$, and $P(Profit_q \mid Profit_{q-1}) > P(Profit_q \mid Loss_{q-1})$, which is logically equivalent to testing *Conjecture 1a* and *Conjecture 1b*, respectively.[28] Second, since our test is one-sided, it employs a z-statistic, which is defined as the signed square root of a chi-square statistic. The distribution of this z-statistic is approximately standard normal (see Conover 1980, pp. 145-146). Third, *Conjecture 1a* implies *Conjecture 1b* and vice versa, so the

[28] Note, for example, that:

$$P(Loss_q \mid Loss_{q-1}) > P(Loss_q) = P(Loss_q) * P(Loss_q \mid Loss_{q-1}) + P(Profit_q) * P(Loss_q \mid Profit_{q-1}) \quad (6)$$

$$P(Loss_q \mid Loss_{q-1}) * (1 - P(Loss_q)) > P(Profit_q) * P(Loss_q \mid Profit_{q-1}) \quad (7)$$

$$P(Loss_q \mid Loss_{q-1}) > P(Loss_q \mid Profit_{q-1}) \quad (8)$$

two conjectures are tested simultaneously.[29]

Reading across Table 8, three salient points emerge.[30] First, conditional probabilities exceed unconditional probabilities. For example, while the unconditional probability of a loss is 18 percent (61,171 divided by 337,733), the probability of a loss in the current quarter conditional on a loss in the previous quarter is 63 percent (37,080 divided by 59,250). Likewise, the unconditional probability of a profit is 82 percent (276,562 divided by 337,733), whereas the probability of a profit in the current quarter conditional on a profit in the previous quarter is 91 percent (254,392 divided by 278,483). Second, the one-sided statistical test for differences in these conditional and unconditional probabilities yields a z-statistic of 309.53, which is highly statistically significant.[31] Third, the difference between conditional and unconditional probabilities of losses, 0.45 (0.63 minus 0.18), is greater than that of profits, 0.09 (0.91 minus 0.82). This finding is interesting because it implies that the post *loss* announcement drift would be more pronounced than the post *profit* announcement drift if, as we hypothesize, stock prices do not fully reflect conditional probabilities.[32]

Next, we test whether the conditional probability of a loss/profit in quarter q is increasing in the magnitude of the loss/profit in quarter q-1. In the contingency tables reported in Panel A

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[29] This follows because: $P(Loss_q) + P(Profit_q) = 1$, $P(Loss_q \mid Loss_{q-1}) + P(Profit_q \mid Loss_{q-1}) = 1$, *and* $P(Loss_q \mid Profit_{q-1}) + P(Profit_q \mid Profit_{q-1}) = 1$.

[30] The total number of observations in Tables 8 and 9 (337,733 observations) is lower than that in Tables 2 and 3 (358,634 observations), due to the additional data requirement that earnings of both quarter q and quarter q-1 is available, as opposed to quarter q only.

[31] We have replicated our conditional and unconditional probabilities tests (Tables 8 and 9) using an alternative intertemporal approach to correct for cross-sectional dependence across observations (as in Elgers and Lo 1994, or Ball et al. 2000). The results from these tests were indistinguishable from the tabulated results.

[32] We note that the difference between conditional and unconditional probabilities of losses/profits remains rather constant across subperiods. For instance, the difference between conditional and unconditional probabilities of losses is 0.46 (0.59 minus 0.13) in 1976-1985, 0.42 (0.61 minus 0.19) in 1986-1995, and 0.45 (0.65 minus 0.20) in 1996-2005. Similarly, the difference between conditional and unconditional probabilities of profits is 0.07 (0.94 minus 0.87) in 1976-1985, 0.09 (0.90 minus 0.81) in 1986-1995, and 0.09 (0.91 minus 0.80) in 1996-2005.

and Panel B of Table 9, we test whether: *P(Row i, Column j)* $\neq$ *P(Row i)*P(Column j)* $\forall$ *i and j*. The test employs a chi-square statistic with four degrees of freedom, $\chi^2(4)$.[33]

Consider, first, the results displayed in Panel A of Table 9, which focuses on the loss subsample, i.e., sample firms with a loss in quarter *q*-1. The results indicate a clear pattern: the higher the loss in quarter *q*-1, the higher (lower) the probability of a loss (profit) in quarter *q*. For example, out of 11,547 firms in the highest loss quintile in quarter *q*-1, 9,102 (79 percent) report a loss in quarter *q*. In contrast, out of 12,603 firms in the lowest loss quintile in quarter *q*-1, only 5,641 (45 percent) report a loss in quarter *q*. A $\chi^2(4)$ test of independence rejects the null that a loss in quarter *q* is independent of the magnitude of a loss/profit in quarter *q*-1; the $\chi^2(4)$ statistic is statistically significant at the 0.01 level.

Panel B of Table 9 displays the results for the profit subsample, i.e., sample firms with a profit in quarter *q*-1. Similar to the pattern observed in Panel A, the number of firms with a profit in quarter *q* increases nearly monotonically in the magnitude of the profit in quarter *q*-1, from 47,373 (85 percent) for the lowest quarter *q*-1 profit quintile to 53,754 (94 percent) for the highest quarter *q*-1 profit quintile.

6.1.1. Discussion of the results

Recent findings have demonstrated market participants face difficulty valuing loss firms (e.g., Hayn 1995; Collins et al. 1999) as well as predicting their future earnings (e.g., Brown 2001). This motivates us to examine the predictability of losses/profits, which is distinct from the focus of prior research on the predictability of earnings changes. Specifically, prior studies (e.g., Foster 1977) find that generally quarterly earnings in seasonal differences follow a

[33] For a discussion of this test, see Conover (1980, pp. 158-159).

stationary AR(1) process with a positive autoregressive coefficient.[34] However, these studies do not consider the likelihood that firms reporting losses in one period report profits in the next period, or vice versa. For example, while a large negative seasonal earnings *change* in one quarter which switches the firm's earnings from a profit to a loss tends to be followed by a large positive earnings *change* in the same quarter next year, the loss may persist over two consecutive quarters.

In contrast, we study the probability of a loss/profit conditional on the sign and magnitude of earnings in the previous quarter, and consequently provide insights on the predictability of a loss/profit. Specifically, while the frequency of losses is low (18 percent), its conditional frequency is substantially higher (as high as 79 percent depending on the level of the conditioning variable). Focusing on the 18 percent unconditional frequency, or for that matter on serial correlation coefficients indicating that negative earnings changes reverse quickly, may lead to the (erroneous) conclusion that losses revert quickly to their (positive) mean (i.e., they are transitory). Conversely, considering the 79 percent conditional frequency of a loss leads to an opposite conclusion. Unlike conditional probabilities, serial correlation coefficients may not help in predicting future losses/profits because the negative serial correlation coefficient of earnings *changes* means that a positive earnings change tends to follow a negative earnings change. At the same time, the earnings *levels* tend to follow a stationary AR(1) process with a positive autoregressive coefficient, which means that positive earnings tend to follow positive earnings, and negative earnings tend to follow negative earnings (i.e., earnings persist).

[34] Bathke and Lorek (1984) and Brown and Han (2000) find that for a subset of firms (approximately 20 percent), quarterly earnings *levels* tend to follow a stationary AR(1) process. In addition, the AR(1) process has also been shown to be descriptive of annual earnings. For example, Brooks and Buckmaster (1976) and Fama and French (2000), among others, show that changes in earnings tend to reverse from year to year and that large changes reverse faster, particularly if they are negative. Based on these findings, they conclude that annual earnings tend to partially revert to an earlier reported earnings level. However, earlier studies (e.g., Ball and Watts 1972; Watts and Leftwich 1977) conclude that annual earnings follow a random walk.

Consequently, a large negative (positive) earnings change that switches a firm's earnings from a profit (loss) to a loss (profit) in one year may be followed by a large positive (negative) earnings change in the next year, while at the same time the loss (profit) persists over the two periods.[35]

Having demonstrated a substantial difference between conditional and unconditional probabilities of losses/profits, the next section examines whether stock prices behave as if they fail to fully reflect conditional probabilities.

6.2 Probabilities for loss/profit and post loss/profit announcement drift

Notwithstanding the similarity in the correlation between previous and current earnings signs for the loss and profit subsamples, there are two conspicuous dissimilarities between the results presented in Panel A and Panel B of Table 9. First, the difference between conditional and unconditional probabilities of a loss for the High Loss portfolio, 0.61 (0.79 minus 0.18), is more pronounced than the difference between conditional and unconditional probabilities of a profit for the High Profit portfolio, 0.12 (0.94 minus 0.82). If, as we hypothesize, investors do not fully rely on conditional probabilities, the mispricing should be more pronounced for the High Loss portfolio than the High Profit portfolio. Second, the variation among portfolios in the conditional probability is more pronounced for the loss subsample (Panel A) than for the profit subsample (Panel B). For example, for the loss subsample (Panel A) the difference in conditional probability of a loss in quarter *q* between the two extreme quarter *q*-1 loss quintiles is 0.34 (0.79 minus 0.45), whereas for the profit subsample (Panel B) the difference in conditional probability for a profit in quarter *q* between the two extreme quarter *q*-1 profit quintiles is only 0.09 (0.94 minus 0.85). This, of course, implies that the stock return spread between the two

[35] Bernard and Thomas (1990) find positive serial correlation coefficients for seasonally differenced quarterly earnings. Again, correlation among seasonally differenced earnings tells little about the correlation between consecutive earnings realizations.

extreme loss portfolios would exceed the one between the two extreme profit portfolios, if stock prices do not fully reflect conditional probabilities in a timely fashion.

Table 10 reports the results from correlation tests between the difference in conditional and unconditional probabilities and the post-announcement returns of the loss/profit quintiles. The results show that for both loss and profit subsamples the correlation coefficients between the two measures are statistically significant in the predicted direction. Specifically, the correlation coefficients for the loss subsample are -0.96 and -0.95 for the windows [1, 60] and [1, 120], respectively, and are highly statistically significant for both Pearson product moment correlations and Spearman rank correlations. Consider, for example, the results for the [1, 120] window. The 120-day abnormal returns for the five loss quintiles are: -6.58 percent, -6.19 percent, -6.08 percent, -4.08 percent, and -2.44 percent (see Table 3). The differences between conditional and unconditional probabilities demonstrate a similar pattern: 0.6071, 0.5481, 0.4508, 0.3725, and 0.2665 (untabulated results). That is, the larger the valuation error (the absolute value of the abnormal return), the larger the misperception about the probability of a future loss (the difference between conditional and unconditional probabilities). In addition, the correlation coefficient for the profit subsample is 0.86 and 0.85 for the windows [1, 60] and [1, 120], respectively, and are statistically significant for both Pearson product moment correlations and Spearman rank correlations. These results support our behavioral explanation for the post loss/profit announcement drift in two ways. First, they show that the loss/profit mispricing is related to differences between conditional and unconditional probabilities of losses/profits, as if stock prices do not fully reflect conditional probabilities in a timely fashion. Second, the smaller correlation for the profit subsample may explain the smaller return spread between the extreme earnings quintiles for the profit subsample relative to that for the loss subsample.

7. Distress Risk, Short Sales Constraints, Transaction Costs, and Post Loss/Profit Announcement Drift

In this section we perform sensitivity tests examining the extent to which distress risk, short sales constraints, or transaction costs, three often cited alternative explanations for market anomalies, explain the post loss/profit announcement drift.

We begin by examining the daily buy-and-hold abnormal returns for smallest and largest earnings quintile portfolios for loss firms (i.e., High Loss and Low Loss) and for profit firms (i.e., Low Profit and High Profit) over the window [-30, 120], as portrayed in Figure 2. The figure shows that the (absolute) values of the daily abnormal returns diminish over time. Consider the High Loss portfolio, it exhibits approximately 5 percent return in the first 60-day window, [1, 60], vis-a-vis less than 2.5 percent in the second 60-day window, [61, 120]. Likewise, the return on the High Profit portfolio is approximately 3 percent in the first 60-day window and less than 2 percent in the second 60-day window. This apparent concavity in daily abnormal return patterns may alleviate concerns that our findings are driven by an unidentified risk factor (i.e., mismeasured abnormal returns).

Still, the role of distress risk in explaining the cross-section of expected returns appears to remain an open question. While several studies (e.g., Chan and Chen 1991; Fama and French 1992, 1993) argue that default risk explains the cross-section of expected returns, others (e.g., Dichev 1998) arrive at an opposite conclusion. To assess the possibility that distress risk underlies our findings, we perform two tests. Our first test examines the stock price performance of the High Loss portfolio, the High Profit portfolio, and the hedge portfolio (High Profit minus High Loss) after partitioning each into three subportfolios based on their distress risk. Our measure of distress risk is Altman's (1968) Z score, a commonly-used proxy for distress risk in the literature (see, Dichev 1998; Khan 2008). The cut-off points are Z scores equal to or less than 1.81 (i.e., bankruptcy is likely), Z scores greater than 1.81 yet equal to or less than 2.99 (i.e., the "gray area"), and Z scores greater than 2.99 (i.e., bankruptcy is unlikely). The results, presented in Table 11, indicate that distress risk is unable to explain our findings, as the post loss/profit announcement drift is observed in all subportfolios, and there is no evidence that this drift is related to distress risk. For example, the hedge portfolio consisting of firms most susceptible to distress risk, those with Z scores equal to or less than 1.81, and the hedge portfolio consisting of firms least susceptible to distress risk, those with Z scores greater than 2.99, yield quite similar returns, 12.44 percent and 10.70 percent, respectively. Further, when the predictions of the loss/profit effect and the distress risk effect contradict each other, the prediction of the former holds. For example, the return on the High Loss and Low Z score (equal to or less than 1.81) portfolio is significantly negative, -6.09 percent, as predicted by the loss/profit effect and in contradiction to the prediction of the distress risk effect.

Our second test replicates our primary tests after excluding small firms to assess whether our results are driven by small firms. This analysis is important for two reasons. First, if the post loss/profit announcement drift is observed only in small firms that tend to be less liquid, it is likely that our strategy is not implementable because of short sales constraints and/or high transaction costs. Second, it is important to know whether the loss/profit anomaly is market-wide or limited to only a subset of small firms that represent a small portion of market wealth. From comparing the results in Table 3 for the full sample with those in Table 12 for the subsample excluding the firms in the lowest size decile, we conclude that the inclusion of small firms in our sample is unable to explain the post loss/profit announcement drift. Thus, to the extent that small firms serve as a proxy for distress risk, short sales constraints, high transaction costs, and/or an unidentified risk factor, these explanations are unlikely to explain our findings.

Still, to further test whether the post loss/profit announcement drift is an implementable strategy and not subject to short sales constraints, we replicate our primary tests after removing from our sample all firms with no traded options. To implement this additional sample selection criterion we require that all sample firm-quarter observations in a given quarter have options traded as reported in the database Optionmetrics over the window [0, 5], where 0 is the quarterly earnings announcement date. The idea underlying this research design choice is that stocks with no traded option may be hard to borrow. This requirement results in a sample of 58,647 observations covering the ten-year period 1996-2005, compared with 358,634 observations for our full sample covering the entire sample period 1976-2005. The results in Panel A of Table 13 report the percentage of firm-quarter observations with traded options. Clearly, the percentage increases monotonically over time for firms in both the High Profit and the High Loss portfolios. For example, 27.29 percent (37.54 percent) of High Loss (High Profit) firms have traded options in 1996 vis-à-vis 59.19 percent (61.06 percent) of High Loss (High Profit) firms in 2005. More important, the results presented in Panel B of Table 13 show that our findings are robust to the exclusion of firms with no traded options (i.e., potentially hard-to-borrow stocks). For example, the size-adjusted hedge portfolio returns for the windows [1, 60] and [1, 120] are both significantly positive, 5.01 percent and 7.47 percent, respectively.

Finally, it is arguable that the loss/profit strategy may not be implementable because transaction costs are not explicitly considered. To explore further whether the loss/profit strategy is implementable, we assess its profitability after accounting for the impact of transaction costs. Along the lines of prior research (e.g., Tetlock et al. 2008), we recalculate the returns of the High Loss portfolio, the High Profit portfolio, and the hedge portfolio for five alternative assumptions about a trader's transaction costs: 20, 40, 60, 80 and 100 basis points (bps) per round-trip trade.[36] As expected, the results in Table 14 indicate that the loss/profit strategy remains profitable even after accounting for round-trip transaction costs as high as 100 bps, as indicated by the significantly positive returns for the High Loss portfolio (5.65 percent), the High Profit portfolio (2.51 percent), and the hedge portfolio (8.16 percent).[37]

8. Conclusion

Over the last two decades, a large volume of empirical work has documented a variety of ways in which stock returns can be predicted based on publicly available information, in particular based on earnings information. In this study, we examine whether investors fully price the implications of current losses/profits for future losses/profits. Employing a broad sample spanning 30 years, from 1976 through 2005, we find evidence of loss/profit mispricing. Briefly, over the 120-trading-day window following the earnings announcement, firms in an extreme loss quintile portfolio exhibit a negative drift of nearly 7 percent, whereas firms in an extreme profit quintile portfolio exhibit a positive drift of over 3 percent. A hedge portfolio that takes a long position in the extreme profit portfolio and a short position in the extreme loss portfolio generates approximately 10 percent abnormal return, which translates into an annualized return of approximately 21 percent. Further, using both univariate and multivariate tests we show that the mispricing associated with our loss/profit strategy is distinct from, and incremental to three previously documented accounting-based anomalies: the post-earnings-announcement drift, the

[36] This is a conservative approach, as Tetlock et al. (2008, Table 4) set the maximum round-trip transaction costs at 10 bps.

[37] Approximately 75 percent of the hedge portfolio size-adjusted returns originates from the short positions. This may raise a concern that 100 bps may not fully cover transaction costs of short sales. However, Geczy et al. (2002), who investigate short sales costs in the late 1990s, find that most borrowed stocks receive rebates, rather than pay fees. In addition, they find that trading strategies using even expensive-to-borrow short sales remain profitable after accounting for borrowing costs.

value-glamour anomaly, and the accruals anomaly. Finally, a battery of sensitivity tests shows that this loss/profit anomaly is robust to alternative risk adjustments, distress risk, short sales constraints, transaction costs, and time periods.

What may explain this mispricing? If investors rely on simplified models to assess a firm's future prospects, as behavioral finance theories suggest, this mispricing may follow because investors fail to fully assess the probability of a loss/profit based on its conditional, rather than unconditional, probability of a loss/profit. Since the unconditional probability of a loss/profit is lower than the corresponding conditional probability, this type of investor behavior would result in systematic underestimation of the probability of a loss/profit. Moreover, once the magnitude of the loss/profit in the previous quarter is considered, differences between conditional and unconditional probabilities become more pronounced. Consequently, a negative (positive) post loss (profit) announcement drift in stock returns would be observed, and more so for extreme earnings realizations. Consistent with this explanation for the observed loss/profit mispricing, we find that the differences between conditional and unconditional probabilities, our measure of the misperception of the probability of a future loss/profit, are correlated with the levels of loss/profit mispricing. In other words, the higher is the difference between conditional and unconditional probabilities, the larger is the mispricing.

The primary contribution of our study is that it uncovers a new anomaly related to the pricing of earnings. While previous studies have focused on the pricing of earnings surprises and earnings components, we show that the earnings signs and their magnitudes are mispriced. This finding is statistically significant and economically important. Further, our study shows that this mispricing is related to differences between conditional and unconditional probabilities of losses/profits, as if stock prices do not fully reflect conditional probabilities in a timely fashion.[38] Finally, we demonstrate that considering conditional rather than unconditional probability of losses/profits, and in particular focusing on the tails of the earnings distribution (i.e., extreme losses/profits), lead to new insights about the likelihood of losses/profits. Our findings thus have important implications to our understanding of the time-series properties of earnings and on investors' valuation of loss/profit firms.

[38] A natural question that often arises in the context of earnings-related anomalies is whether it is plausible for a mispricing to persist for so long (i.e., decades). One answer to this intriguing question is provided by behavioral research. For example, Libby et al. (2002, p. 778) observe, "Learning to overcome biases is difficult because of the uncertainty and poor feedback inherent in complex environments."

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Figure 1
Buy-and-Hold Abnormal Stock Returns by Year for the High Loss/Profit Strategy

	Overall		Up Market MKTRET > 0		Down Market MKTRET ≤ 0	
	SAR	FF	SAR	FF	SAR	FF
Min	-0.005	-0.030	-0.005	-0.029	0.047	-0.026
Max	0.231	0.188	0.149	0.122	0.231	0.188
Median	0.073	0.059	0.073	0.055	0.121	0.070
p-value of signed rank	*(<0.01)*	*(<0.01)*	*(<0.01)*	*(<0.01)*	*(0.02)*	*(0.05)*
Mean	0.083	0.056	0.070	0.050	0.126	0.076
t-stat	*(8.62)*	*(6.15)*	*(8.46)*	*(5.78)*	*(4.74)*	*(2.79)*

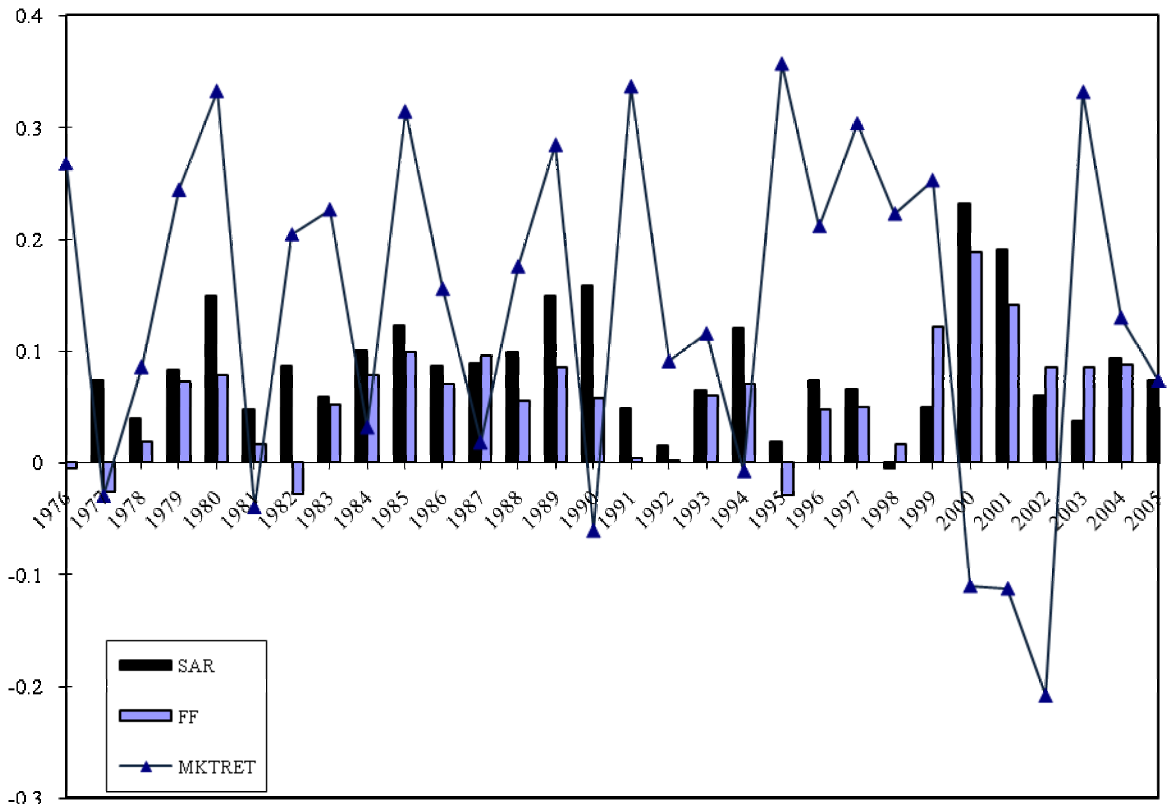

Figure notes:
This figure presents buy-and-hold abnormal returns by calendar year for the window [1, 120], where day 0 is the quarterly earnings announcement date. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four-factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) scaled by beginning-of-quarter total assets (Compustat Quarterly data44). The loss/profit strategy consists of a long position in the largest Earnings quintile of profit firms (High Profit) and a short position in the smallest Earnings quintile of loss firms (High Loss). All portfolios are formed every quarter using cut-off points determined based on the distribution of Earnings in the previous quarter. MKTRET represents the value-weighted annual market return.

Figure 2
Behavior of Buy-Hold Abnormal Returns for the Window [-30, 120]

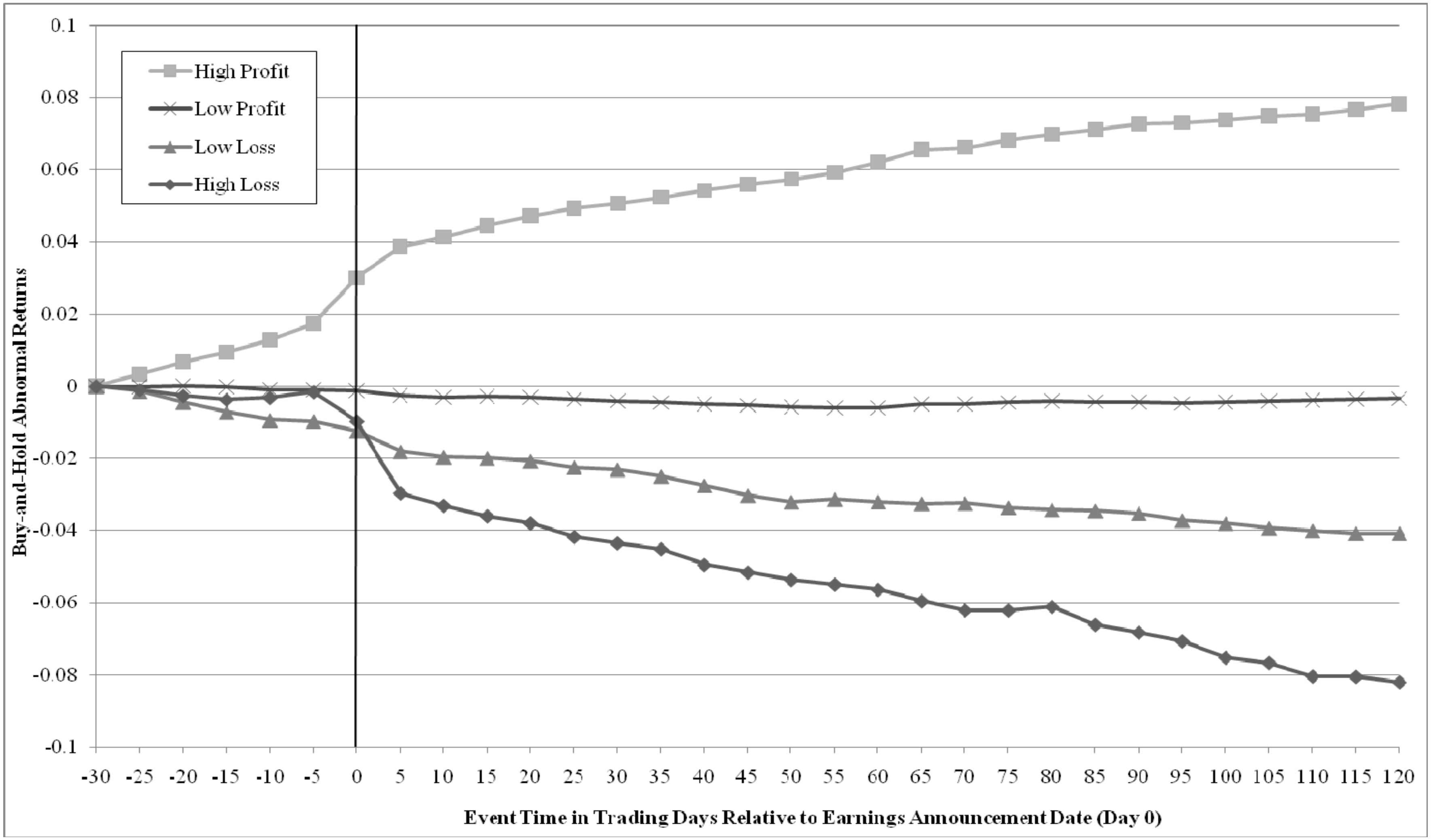

Figure notes:
This figure presents buy-and-hold abnormal returns for the Low/High Loss/Profit portfolios for the window [-30, 120], where day 0 is the quarterly earnings announcement date. Abnormal returns are measured using size-adjusted returns. For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate size-matched portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) scaled by beginning-of-quarter total assets (Compustat Quarterly data44). Low Loss (Profit) corresponds to loss (profit) firms which are ranked into the smallest Earnings quintile of all loss (profit) firms. High Loss (Profit) corresponds to loss (profit) firms which are ranked into the largest Earnings quintile of all loss (profit) firms.

Table 1
Sample Selection

	Number of firm-quarters	Number of distinct firms
Primary Tests		
All firm-quarter observations with required quarterly data on Compustat during sample period 1976-2005 and with returns data available on the CRSP database.[a]	391,278	11,939
With stock price five days prior to the quarterly earnings announcement date above the stock price threshold.[b]	358,634	11,667
Primary tests sample size	**358,634**	**11,667**
First Set of Supplementary Tests: Loss/Profit Effect vs. PEAD Effect		
Primary tests sample with additional data constraints to compute SUE, i.e. quarterly earnings data on Compustat for at least 13 consecutive quarters.[c]	281,267	9,782
Second Set of Supplementary Tests: Loss/Profit Effect vs. Value/Glamour Effect		
Primary tests sample with additional data constraints to compute book-to-market value of equity ratio.[d]	351,463	11,636
Third Set of Supplementary Tests: Loss/Profit Effect vs. Accruals Effect		
Primary tests sample with additional data constraints to compute accruals.[e]	191,328	7,746

Table notes:

[a] Required data on Compustat is earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter q, and total assets (Compustat Quarterly data44) in quarter q-1.

[b] The stock price threshold is set at $5 in year 2005 and decreased 8 percent annually for earlier years to account for stock market appreciation.

[c] SUE is the standardized unexpected earnings (generated using a seasonal random walk with drift model). Required data on Compustat to compute SUE in quarter q is earnings per share excluding extraordinary items and discontinued operations (Compustat Quarterly data9) from quarters q-12 to q (an estimation period spanning the most recent 12 quarters is required).

[d] Required data on Compustat to compute the ratio of book-to-market value of equity is: Compustat Quarterly data59 / (data61 * data14) in quarter q.

[e] Required data on Compustat to compute accruals is earnings before extraordinary items and discontinued operations (Compustat Quarterly data76), net cash flow from operating activities (Compustat Quarterly data108), and extraordinary income and discontinued operations (Compustat Quarterly data78) in quarter q, as well as total assets (Compustat Quarterly data44) in quarters q and q-1. Due to the unavailability of cash flow data prior to 1988, this sample spans 1988-2005.

Table 2
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Loss/Profit

Loss/Profit Firms	N	Buy-and-Hold Abnormal Returns					
		[-2, 0]		[1, 60]		[1, 120]	
		SAR	FF	SAR	FF	SAR	FF
Loss Firms	67,257	-0.0091	-0.0096	-0.0280	-0.0434	-0.0507	-0.0849
		(-28.56)	*(-30.67)*	*(-24.04)*	*(-32.18)*	*(-29.42)*	*(-41.01)*
Profit Firms	291,377	0.0064	0.0059	0.0077	-0.0001	0.0146	-0.0052
		(56.54)	*(54.94)*	*(20.92)*	*(-0.24)*	*(25.73)*	*(-7.97)*
Profit – Loss		**0.0155**	**0.0155**	**0.0357**	**0.0433**	**0.0652**	**0.0797**
t-statistics		*(62.97)*	*(62.70)*	*(31.03)*	*(18.79)*	*(37.93)*	*(17.61)*
Alternate t-statistics (Fama-MacBeth)		*(34.12)*	*(35.96)*	*(5.95)*	*(6.02)*	*(6.43)*	*(4.83)*

Table notes:
This table presents buy-and-hold abnormal stock returns for the following windows: [-2, 0], [1, 60] and [1, 120], where 0 is the earnings announcement date of quarter *q*. t-statistics are in parenthesis. Alternate t-statistics are calculated using the Fama-MacBeth (1973) procedure on the returns to the strategy every quarter. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. The full sample (358,634 firm-quarter observations) consists of 67,257 firm-quarter observations with negative Earnings (Loss Firms), 291,267 firm-quarter observations with positive Earnings (Profit Firms), and 110 firm-quarter observations with zero Earnings (included in the Profit Firms).

Table 3
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings for Loss/Profit Firms

Loss/Profit Quintile	N	Buy-and-Hold Abnormal Returns [-2, 0] SAR	[-2, 0] FF	[1, 60] SAR	[1, 60] FF	[1, 120] SAR	[1, 120] FF
High Loss	13,929	-0.0129	-0.0134	-0.0368	-0.0613	-0.0658	-0.1282
		(-15.68)	*(-16.25)*	*(-11.70)*	*(-16.83)*	*(-13.93)*	*(-22.17)*
2	13,071	-0.0096	-0.0100	-0.0324	-0.0509	-0.0619	-0.0984
		(-12.01)	*(-12.85)*	*(-11.12)*	*(-15.20)*	*(-14.43)*	*(-19.36)*
3	13,244	-0.0098	-0.0100	-0.0321	-0.0441	-0.0608	-0.0891
		(-13.69)	*(-14.48)*	*(-13.09)*	*(-15.04)*	*(-17.04)*	*(-19.79)*
4	13,336	-0.0086	-0.0094	-0.0232	-0.0361	-0.0408	-0.0678
		(-13.47)	*(-15.31)*	*(-10.10)*	*(-13.28)*	*(-12.04)*	*(-16.24)*
Low Loss	13,677	-0.0047	-0.0050	-0.0153	-0.0248	-0.0244	-0.0424
		(-8.37)	*(-9.16)*	*(-7.65)*	*(-10.67)*	*(-8.19)*	*(-11.96)*
Low Profit	58,884	-0.0003	-0.0007	-0.0035	-0.0079	-0.0012	-0.0133
		(-1.41)	*(-3.27)*	*(-4.55)*	*(-8.83)*	*(-1.02)*	*(-9.58)*
2	58,106	0.0027	0.0024	0.0021	-0.0028	0.0060	-0.0102
		(11.46)	*(10.77)*	*(2.69)*	*(-3.09)*	*(5.09)*	*(-7.18)*
3	57,777	0.0060	0.0058	0.0060	-0.0012	0.0117	-0.0075
		(24.39)	*(24.74)*	*(7.48)*	*(-1.26)*	*(9.68)*	*(-5.26)*
4	57,230	0.0089	0.0084	0.0120	0.0024	0.0208	-0.0015
		(34.59)	*(34.18)*	*(14.75)*	*(2.54)*	*(16.46)*	*(-1.04)*
High Profit	59,380	0.0148	0.0137	0.0219	0.0090	0.0355	0.0066
		(50.22)	*(49.78)*	*(23.03)*	*(8.47)*	*(23.90)*	*(4.06)*
High Profit – High Loss		**0.0277**	**0.0270**	**0.0587**	**0.0703**	**0.1013**	**0.1348**
t-statistics		*(50.61)*	*(50.07)*	*(25.36)*	*(17.11)*	*(27.47)*	*(17.18)*
Alternate t-statistics (Fama-MacBeth)		*(36.67)*	*(36.19)*	*(11.93)*	*(10.66)*	*(11.96)*	*(9.19)*
Difference between (High Profit – High Loss) and (Profit – Loss)		**0.0122**	**0.0115**	**0.0230**	**0.0270**	**0.0361**	**0.0551**
t-statistics		*(24.57)*	*(24.11)*	*(12.65)*	*(9.15)*	*(12.41)*	*(9.75)*
Alternate t-statistics (Fama-MacBeth)		*(17.33)*	*(17.38)*	*(5.04)*	*(5.60)*	*(4.48)*	*(5.04)*

Table notes:
This table presents buy-and-hold abnormal stock returns for the following windows: [-2, 0], [1, 60] and [1, 120], where 0 is the earnings announcement date of quarter *q*. t-statistics are in parenthesis. Alternate t-statistics are calculated using the Fama-MacBeth (1973) procedure on the returns to the strategy every quarter. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. The full sample is partitioned into loss and profit firms (67,257 and 291,377 firm-quarter observations, respectively) based on the sign of Earnings. Loss (profit) firms are then ranked into five quintiles from smallest Earnings, High Loss (Low Profit), to largest Earnings, Low Loss (High Profit). The cut-off points are determined every quarter *q* based on the distribution of Earnings in quarter *q*-1.

Table 4
Buy-and-Hold Abnormal Stock Returns for High Loss/Profit Firms, by Subperiods

High Loss/Profit	N	Buy-and-Hold Abnormal Returns [-2, 0] SAR	[-2, 0] FF	[1, 60] SAR	[1, 60] FF	[1, 120] SAR	[1, 120] FF
Panel A: Subperiod 1976-1985							
High Loss	2,491	-0.0251	-0.0257	-0.0460	-0.0694	-0.0915	-0.1571
		(-14.39)	*(-14.04)*	*(-8.14)*	*(-8.63)*	*(-11.54)*	*(-12.28)*
High Profit	15,508	0.0133	0.0124	0.0201	0.0060	0.0315	-0.0046
		(28.30)	*(27.90)*	*(14.43)*	*(3.36)*	*(14.80)*	*(-1.56)*
High Profit – High Loss		**0.0384**	**0.0381**	**0.0661**	**0.0753**	**0.1231**	**0.1526**
t-statistics		*(31.61)*	*(30.94)*	*(16.51)*	*(7.76)*	*(18.57)*	*(5.71)*
Alternate t-statistics (Fama-MacBeth)		*(27.80)*	*(29.87)*	*(9.44)*	*(5.04)*	*(9.38)*	*(2.96)*
Panel B: Subperiod 1986-1995							
High Loss	5,374	-0.0175	-0.0177	-0.0190	-0.0398	-0.0418	-0.0957
		(-13.66)	*(-13.62)*	*(-4.16)*	*(-7.05)*	*(-6.26)*	*(-10.92)*
High Profit	20,870	0.0160	0.0146	0.0242	0.0078	0.0409	0.0038
		(31.36)	*(30.75)*	*(15.68)*	*(4.33)*	*(16.86)*	*(1.33)*
High Profit – High Loss		**0.0334**	**0.0322**	**0.0432**	**0.0477**	**0.0827**	**0.0994**
t-statistics		*(33.75)*	*(32.98)*	*(15.00)*	*(7.78)*	*(17.37)*	*(7.83)*
Alternate t-statistics (Fama-MacBeth)		*(25.72)*	*(23.50)*	*(7.76)*	*(6.07)*	*(8.98)*	*(5.40)*
Panel C: Subperiod 1996-2005							
High Loss	6,064	-0.0038	-0.0045	-0.0489	-0.0758	-0.0765	-0.1451
		(-2.90)	*(-3.47)*	*(-8.85)*	*(-12.81)*	*(-9.02)*	*(-15.24)*
High Profit	23,002	0.0148	0.0135	0.0209	0.0124	0.0332	0.0177
		(28.68)	*(28.18)*	*(11.76)*	*(6.71)*	*(11.91)*	*(6.47)*
High Profit – High Loss		**0.0186**	**0.0180**	**0.0698**	**0.0882**	**0.1097**	**0.1628**
t-statistics		*(25.36)*	*(24.96)*	*(14.70)*	*(13.35)*	*(14.93)*	*(14.98)*
Alternate t-statistics (Fama-MacBeth)		*(17.10)*	*(16.88)*	*(5.55)*	*(7.60)*	*(5.17)*	*(7.95)*

Table notes:
This table presents buy-and-hold abnormal stock returns for the following windows: [-2, 0], [1, 60] and [1, 120], where 0 is the earnings announcement date of quarter *q*. Panel A spans the subperiod 1976-1985, Panel B the subperiod 1986-1995, and Panel C the subperiod 1996-2005. t-statistics are in parenthesis. Alternate t-statistics are calculated using the Fama-MacBeth (1973) procedure on the returns to the strategy every quarter. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1.

High Loss (High Profit) corresponds to loss (profit) firms which are ranked into the smallest (largest) Earnings quintile of all loss (profit) firms for the sample period 1976-2005. The cut-off points are determined every quarter *q* based on the distribution of Earnings in quarter *q*-1.

Table 5
Characteristics of Portfolios Formed on Earnings and on other Accounting-Based Anomaly Variables

Panel A: Number of Observations

Loss/Profit Quintile	SUE Quintile			BM Quintile			Accruals Quintile		
	Low (Sell)	2-4	High (Buy)	Low (Sell)	2-4	High (Buy)	Low (Buy)	2-4	High (Sell)
High Loss (Sell)	4,453	3,725	1,080	6,271	5,704	1,770	5,149	3,124	1,157
2-4	45,334	138,170	41,183	31,755	189,051	58,625	20,967	98,092	27,918
High Profit (Buy)	7,505	25,259	14,558	24,849	31,179	2,259	5,922	19,063	9,936

Panel B: Fundamental Characteristics

Variables	Loss/Profit Quintile	SUE Quintile			BM Quintile			Accruals Quintile		
		Low (Sell)	2-4	High (Buy)	Low (Sell)	2-4	High (Buy)	Low (Buy)	2-4	High (Sell)
MVE ($)	High Loss (Sell)	346.0	184.5	197.5	271.1	234.1	72.8	390.4	237.2	167.8
	2-4	1,206.4	1,179.8	1,258.5	1,848.7	1,173.3	223.8	783.3	1,716.7	791.8
	High Profit (Buy)	2,203.8	2,423.4	1,806.2	3,273.1	906.1	117.4	1,215.0	4,335.9	1,238.5
Assets ($)	High Loss (Sell)	364.4	99.4	98.2	95.1	251.6	292.3	288.8	92.9	44.7
	2-4	2,526.1	2,477.2	2,846.4	1,198.7	2,718.9	1,523.8	821.0	2,651.2	1,030.5
	High Profit (Buy)	812.9	867.9	865.8	921.2	606.3	267.9	515.7	1,416.6	494.9
Sales ($)	High Loss (Sell)	78.0	15.6	12.4	19.4	45.4	73.5	56.8	7.7	5.5
	2-4	323.0	325.3	352.7	292.4	330.9	154.5	230.7	420.7	242.5
	High Profit (Buy)	279.2	261.5	271.9	288.9	194.5	84.1	225.9	401.8	155.4
Return Volatility	High Loss (Sell)	0.76	0.84	0.85	0.83	0.80	0.77	0.84	0.84	0.84
	2-4	0.45	0.44	0.45	0.54	0.43	0.50	0.57	0.48	0.56
	High Profit (Buy)	0.44	0.45	0.46	0.45	0.47	0.56	0.52	0.48	0.56
Z Score	High Loss (Sell)	4.71	10.14	9.55	13.44	5.34	1.10	6.40	17.14	14.72
	2-4	3.12	2.84	2.74	6.63	2.84	1.80	3.10	3.61	4.24
	High Profit (Buy)	8.38	7.39	6.53	10.34	5.41	2.65	6.77	8.90	9.29

Table notes:
Panel A presents the number of firm-quarter observations in portfolios formed on Earnings, SUE, BM, and Accruals. Panel B presents mean values of selected variables for these portfolios. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) scaled by beginning-of-quarter total assets (Compustat Quarterly data44). SUE is the standardized unexpected earnings (generated using a seasonal random walk with drift model), based on diluted earnings per share excluding extraordinary items (Compustat Quarterly data9). BM is the ratio of book-to-market value of equity (Compustat Quarterly data59 / (data61 * data14)). Accruals are defined as (Compustat Quarterly data76 – (data108 – data78)) scaled by average assets (Compustat Quarterly data44). MVE is the market value of equity (Compustat Quarterly data61 * data14). Assets is total assets (Compustat Quarterly data44). Sales is total sales (Compustat Quarterly data2). Return volatility is the annualized stock return volatility over a 120-day window prior to the quarterly earnings announcement date. Altman's (1968) Z score is computed as follows: 1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before extraordinary items and discontinued operations / total assets) + 0.6*(market value of equity / total liabilities) + 1*(total sales / total assets), which in terms of Compustat Quarterly data items corresponds to: 1.2*[(data40-data49)/data44] + 1.4*(data58/data44) + 3.3*(data8/data44) + 0.6*[(data61*data14)/data54] + 1*(data2/data44). To mitigate the influence of outliers, MVE, Assets, Sales, Return Volatility, and Z Score are winsorized at the 1st and 99th percentile. The full sample is partitioned into loss and profit firms based on the sign of Earnings. Loss (profit) firms are then ranked into five quintiles from smallest Earnings, High Loss (Low Profit), to largest Earnings, Low Loss (High Profit). Loss/Profit quintiles 2-4 in this table refer to all loss and profit quintiles, except the High Loss and High Profit quintiles. The full sample is also independently classified into quintiles of SUE, BM, and Accruals, from smallest (Low) to largest values (High), and then partitioned into loss and profit firms. The cut-off points for Earnings, SUE, BM, and Accruals are determined every quarter based on the distribution of the underlying variables in the previous quarter.

Table 6
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings and Other Accounting-Based Anomaly Variables

Panel A: Portfolios Formed on Earnings and SUE for the Window [1, 120]

		SUE Quintile						
		Low SUE	2	3	4	High SUE	High SUE – Low SUE	
Loss Quintile	High Loss	-0.0386	-0.0709	-0.0429	-0.0539	-0.0430	**-0.0044**	*(-3.44)*
	2	-0.0520	-0.0481	-0.0467	-0.0583	-0.0282	**0.0238**	*(4.97)*
	3	-0.0544	-0.0754	-0.0523	-0.0228	-0.0394	**0.0150**	*(5.37)*
	4	-0.0418	-0.0476	-0.0303	-0.0327	-0.0306	**0.0111**	*(3.41)*
	Low Loss	-0.0378	-0.0281	-0.0276	-0.0034	0.0003	**0.0382**	*(4.71)*
Profit Quintile	Low Profit	-0.0215	-0.0146	-0.0044	0.0128	0.0263	**0.0478**	*(11.01)*
	2	-0.0163	-0.0040	0.0103	0.0195	0.0293	**0.0456**	*(10.57)*
	3	-0.0178	0.0035	0.0107	0.0228	0.0406	**0.0584**	*(14.02)*
	4	-0.0049	0.0122	0.0192	0.0296	0.0507	**0.0556**	*(14.71)*
	High Profit	0.0049	0.0193	0.0308	0.0378	0.0637	**0.0589**	*(16.62)*
High Profit – High Loss		**0.0435**	**0.0902**	**0.0738**	**0.0917**	**0.1068**		
		(5.13)	*(6.98)*	*(8.07)*	*(11.01)*	*(19.37)*		

High Profit & High SUE – High Loss & Low SUE:
SAR = 0.1024 *(19.28)*
FF = 0.1080 *(13.54)*

Panel B: Portfolios Formed on Earnings and Book-to-Market for the Window [1, 120]

		glamour		BM Quintile		*value*		
		Low BM	2	3	4	High BM	High BM – Low BM	
Loss Quintile	High Loss	-0.0874	-0.0604	-0.0429	-0.0349	-0.0373	**0.0501**	*(10.05)*
	2	-0.0731	-0.0692	-0.0648	-0.0467	-0.0424	**0.0308**	*(3.38)*
	3	-0.0787	-0.0725	-0.0714	-0.0297	-0.0527	**0.0260**	*(0.03)*
	4	-0.0313	-0.0633	-0.0528	-0.0345	-0.0303	**0.0010**	*(2.52)*
	Low Loss	-0.0284	-0.0429	-0.0252	-0.0140	-0.0205	**0.0080**	*(2.23)*
Profit Quintile	Low Profit	-0.0184	-0.0294	-0.0070	0.0065	0.0086	**0.0271**	*(4.57)*
	2	-0.0163	-0.0130	0.0037	0.0116	0.0254	**0.0417**	*(9.30)*
	3	-0.0145	-0.0010	0.0102	0.0225	0.0363	**0.0508**	*(10.06)*
	4	-0.0025	0.0099	0.0265	0.0392	0.0642	**0.0667**	*(7.62)*
	High Profit	0.0188	0.0333	0.0571	0.0757	0.0767	**0.0579**	*(5.06)*
High Profit – High Loss		**0.1062**	**0.0937**	**0.1000**	**0.1106**	**0.1140**		
		(14.36)	*(12.92)*	*(13.05)*	*(12.90)*	*(9.31)*		

High Profit & High BM – High Loss & Low BM:
SAR = 0.1641 *(15.12)*
FF = 0.2354 *(19.73)*

Table 6 (cont'd)
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings and Other Accounting-Based Anomaly Variables

Panel C: Portfolios Formed on Earnings and Accruals for the Window [18, 137]

		Accruals Quintile						
		Low Accruals	2	3	4	High Accruals	Low – High Accruals	
Loss Quintile	High Loss	-0.0416	-0.0653	-0.0177	-0.0477	-0.0986	**0.0570**	*(2.16)*
	2	-0.0234	-0.0734	-0.0789	-0.0517	-0.0910	**0.0676**	*(1.48)*
	3	-0.0119	-0.0256	-0.0666	-0.0695	-0.0862	**0.0744**	*(4.26)*
	4	0.0166	-0.0257	-0.0415	-0.0600	-0.0708	**0.0874**	*(5.79)*
	Low Loss	0.0037	0.0138	-0.0290	-0.0295	-0.0456	**0.0493**	*(3.92)*
Profit Quintile	Low Profit	-0.0096	0.0042	0.0020	-0.0067	-0.0352	**0.0257**	*(3.25)*
	2	0.0159	0.0153	0.0120	-0.0051	-0.0249	**0.0408**	*(5.49)*
	3	0.0305	0.0175	0.0102	-0.0011	-0.0191	**0.0496**	*(6.44)*
	4	0.0484	0.0279	0.0188	0.0061	-0.0076	**0.0560**	*(6.89)*
	High Profit	0.0533	0.0435	0.0319	0.0310	0.0096	**0.0437**	*(4.24)*
High Profit – High Loss		**0.0949**	**0.1088**	**0.0495**	**0.0787**	**0.1082**		
		(10.17)	*(10.25)*	*(5.07)*	*(5.61)*	*(4.55)*		

High Profit & Low Accruals – High Loss & High Accruals:
SAR = 0.1519 *(12.17)*
FF = 0.2045 *(7.97)*

Table notes:
This table presents buy-and-hold abnormal stock returns for the following windows: [1, 120] (Panels A and B) and [18, 137] (Panel C), where day 0 is the earnings announcement date of quarter *q*. t-statistics are in parenthesis. Abnormal returns are measured using size-adjusted returns (SAR). For the hedge portfolio, we also provide Carhart's (1997) four factor model (FF) return. For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. SUE is the standardized unexpected earnings in quarter *q* (generated using a seasonal random walk with drift model), based on diluted earnings per share excluding extraordinary items (Compustat Quarterly data9). BM is the ratio of book-to-market value of equity (Compustat Quarterly data59 / (data61 * data14)) at the end of quarter *q*. Accruals is the accruals (Compustat Quarterly data76 – (data108 – data78)) in quarter *q* by average assets (Compustat Quarterly data44) in quarter *q*. In each panel, the full sample is partitioned into loss and profit firms based on the sign of Earnings. Loss (profit) firms are then ranked into five quintiles from smallest Earnings, High Loss (Low Profit), to largest Earnings, Low Loss (High Profit). The full sample is also independently classified into quintiles of SUE (Panel A), BM (Panel B), and Accruals (Panel C), respectively, from smallest (Low) to largest values (High), and then partitioned into loss and profit firms. The cut-off points for Earnings, SUE, BM, and Accruals are determined every quarter *q* based on the distribution of the underlying variables in quarter *q*-1.

Table 7
Regressions of Buy-and-Hold Size-Adjusted Stock Returns on Loss/Profit, PEAD, Value-Glamour, and Accruals Strategies

Model: $BHSAR_{i,q,[1,120]} = a_0 + a_1{*}Loss\_Profit_{i,q} + a_2{*}SUE_{i,q} + a_3{*}BM_{i,q} + a_4{*}Accruals_{i,q} + e_{i,q}$

Variable	Expected Sign	Model I	Model II	Model III	Model IV	Model V
Panel A: Pooled Estimation						
Loss_Profit	+	0.0739	0.0599	0.0739	0.0780	0.0975
		(46.53)	*(33.54)*	*(38.66)*	*(28.29)*	*(43.03)*
SUE	+		0.0472	0.0447	0.0445	0.0329
			(26.80)	*(25.12)*	*(16.55)*	*(14.91)*
BM	+			0.0446	0.0358	0.0523
				(22.73)	*(12.50)*	*(22.29)*
Accruals	–				-0.0460	-0.0439
					(-16.66)	*(-19.37)*
Number of Observations		358,589	281,267	276,372	156,708	155,141
Adj. R^2 (%)		0.6	0.8	1.0	0.9	1.7
Panel B: Fama-MacBeth Estimation						
Loss_Profit	+	0.0766	0.0602	0.0747	0.0796	0.0928
		(13.60)	*(11.58)*	*(13.35)*	*(8.14)*	*(10.54)*
SUE	+		0.0495	0.0459	0.0462	0.0367
			(17.78)	*(16.25)*	*(11.74)*	*(10.84)*
BM	+			0.0454	0.0380	0.0477
				(4.96)	*(2.78)*	*(4.05)*
Accruals	–				-0.0496	-0.0484
					(-10.20)	*(-11.64)*
Number of Quarters		120	120	120	71	71
Average Number of Observation Per Quarter		2,988	2,344	2,303	2,207	2,186
Adj. R^2 (%)		1.1	1.4	2.6	*2.5*	3.2

Table notes:
Panel A presents the results for the pooled regression. Panel B presents the time-series means and t-statistics of the coefficients from the quarterly cross-sectional regressions (following the Fama-MacBeth 1973 procedure). t-statistics are in parenthesis. In both panels, Model V corresponds to the least trimmed squares regression in which 1 percent of the observations with the largest squared residuals are excluded before re-estimating the model. $BHSAR_{i,q,[1,120]}$ is the buy-and-hold size-adjusted returns of firm i for the window [1, 120], where 0 is the earnings announcement date of quarter q. For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate size-matched portfolio. $Loss\_Profit_{i,q}$ is the quintile ranking of firm i based on earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter q scaled by total assets (Compustat Quarterly data44) in quarter q-1. $SUE_{i,q}$ is the quintile ranking of firm i based on standardized unexpected earnings in quarter q (generated using a seasonal random walk with drift model), calculated using diluted earnings per share excluding extraordinary items (Compustat Quarterly data9). $BM_{i,q}$ is the quintile ranking of firm i based on the ratio of book-to-market value of equity (Compustat Quarterly data59 / (data61 * data14)) at the end of quarter q-1. $Accruals_{i,q}$ is the quintile ranking of firm i based on accruals (Compustat Quarterly data76 – (data108 – data78)) in quarter q scaled by average total assets (Compustat Quarterly data44) in quarter q. The quintile rankings for all rank variables are determined every quarter q based on the distribution of the underlying variables in quarter q-1. Each rank variable is scaled to range between zero and one.

Table 8
Contingency Table of Loss/Profit

Conjecture 1a: $P(Loss_q) < P(Loss_q \mid Loss_{q-1})$

Conjecture 1b: $P(Profit_q) < P(Profit_q \mid Profit_{q-1})$

	$Loss_q$	$Profit_q$	Row Total
$Loss_{q-1}$	37,080	22,170	**59,250**
	(0.63)	*(0.37)*	***(1.00)***
$Profit_{q-1}$	24,091	254,392	**278,483**
	(0.09)	*(0.91)*	***(1.00)***
Column Total	**61,171**	**276,562**	**337,733**
	(0.18)	***(0.82)***	***(1.00)***
	Z = *309.53*		

Table notes:
This table presents the frequency and probability of a loss/profit in quarter *q* given a loss/profit in quarter *q*-1. The numbers represent frequencies and those in parentheses represent percentages. We employ a chi-square test to examine whether the conditional probability of a loss/profit is greater than the unconditional probability of a loss/profit. The z-statistic is the signed square root of the chi-square statistic used for one-sided tests. The distribution of this z-statistic is approximately standard normal (see Conover 1980, pp. 145-146). Critical values for 0.05 and 0.01 significance levels are, respectively, 1.64 and 2.32.

Table 9
Contingency Tables of Loss/Profit

*Conjecture 2: P(Row i, Column j) ≠ P(Row i)*P(Column j)* $\forall i, j$

Panel A: Loss Subsample

		$Loss_q$	$Profit_q$	Row Total
$Loss_{q\text{-}1}$	High Loss	9,102	2,445	**11,547**
		(0.79)	*(0.21)*	***(1.00)***
	2	8,245	3,062	**11,307**
		(0.73)	*(0.27)*	***(1.00)***
	3	7,418	4,320	**11,738**
		(0.63)	*(0.37)*	***(1.00)***
	4	6,674	5,381	**12,055**
		(0.55)	*(0.45)*	***(1.00)***
	Low Loss	5,641	6,962	**12,603**
		(0.45)	*(0.55)*	***(1.00)***
	Column Total	**37,080**	**22,170**	**59,250**
		(0.63)	***(0.37)***	***(1.00)***
		$\chi^2(4) = 3{,}796.88$		

Panel B: Profit Subsample

		$Loss_q$	$Profit_q$	Row Total
$Profit_{q\text{-}1}$	Low Profit	8,282	47,373	**55,655**
		(0.15)	*(0.85)*	***(1.00)***
	2	5,768	49,659	**55,427**
		(0.10)	*(0.90)*	***(1.00)***
	3	3,976	51,420	**55,396**
		(0.07)	*(0.93)*	***(1.00)***
	4	2,865	52,186	**55,051**
		(0.05)	*(0.95)*	***(1.00)***
	High Profit	3,200	53,754	**56,954**
		(0.06)	*(0.94)*	***(1.00)***
	Column Total	**24,091**	**254,392**	**278,483**
		(0.09)	***(0.91)***	***(1.00)***
		$\chi^2(4) = 4{,}592.18$		

Table notes:
Panel A (Panel B) presents the frequency and probability of a loss/profit in quarter *q* given the magnitude of the loss (profit) in quarter *q*-1. The numbers represent frequencies and those in parentheses represent percentages. We employ a chi-square test to examine whether the conditional probability of a loss/profit in quarter *q* is increasing in the magnitude of the loss/profit in quarter *q*-1. $\chi^2(4)$ is the chi-square statistic with four degrees of freedom (see Conover 1980, pp. 158-159). Critical values for 0.05 and 0.01 significance levels are, respectively, 9.48 and 13.28.

Table 10
Correlation Coefficients Between Differences in Conditional and Unconditional Probabilities of a Loss/Profit and Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings

Loss/Profit Subsample	Buy-and-Hold Abnormal Returns					
	[-2, 0]		[1, 60]		[1, 120]	
	SAR	FF	SAR	FF	SAR	FF
Loss Subsample	**-0.93**	**-0.92**	**-0.96**	**-0.99**	**-0.95**	**-0.98**
p-value (Pearson)	*(0.02)*	*(0.03)*	*(<0.01)*	*(<0.01)*	*(0.02)*	*(<0.01)*
p-value (Spearman)	*(0.04)*	*(<0.01)*	*(<0.01)*	*(<0.01)*	*(<0.01)*	*(<0.01)*
Profit Subsample	**0.87**	**0.89**	**0.86**	**0.87**	**0.85**	**0.82**
p-value (Pearson)	*(0.06)*	*(0.04)*	*(0.06)*	*(0.06)*	*(0.07)*	*(0.09)*
p-value (Spearman)	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*

Table notes:
This table presents the correlation coefficients between differences in conditional and unconditional probabilities and buy-and-hold abnormal stock returns for the following windows: [-2, 0], [1, 60] and [1, 120], where 0 is the earnings announcement date of quarter *q*. p-values are in parenthesis. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets in quarter *q*-1 (Compustat Quarterly data44). The full sample is partitioned into loss and profit firms (67,257 and 291,377 firm-quarter observations respectively) based on the sign of Earnings. Loss (profit) firms are then ranked into five quintiles from smallest Earnings, High Loss (Low Profit), to largest Earnings, Low Loss (High Profit). The cut-off points are determined every quarter *q* based on the distribution of Earnings in quarter *q*-1.

Table 11
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings and Altman's (1968) Z Score for the Window [1, 120]

	Z Score ≤ 1.81	**1.81 < Z Score ≤ 2.99**	**Z Score > 2.99**
High Loss	**-0.0609**	**-0.0229**	**-0.0806**
	(-9.14)	*(-1.61)*	*(-9.81)*
	6,710	*1,294*	*5,176*
High Profit	**0.0635**	**0.0607**	**0.0264**
	(6.20)	*(17.17)*	*(14.53)*
	4,809	*9,434*	*39,823*
High Profit – High Loss	**0.1244**	**0.0836**	**0.1070**
	(13.56)	*(15.80)*	*(17.48)*
	11,519	*10,728*	*44,999*

Table notes:
This table presents buy-and-hold abnormal stock returns for the window [1, 120], where 0 is the earnings announcement date of quarter *q*. t-statistics are in parenthesis and below them are the numbers of observations. Abnormal returns are measured using size-adjusted returns (SAR). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate size-matched portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. Altman's (1968) Z score in quarter *q* is computed as follows: 1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before extraordinary items and discontinued operations / total assets) + 0.6*(market value of equity / total liabilities) + 1*(total sales / total assets), which in terms of Compustat Quarterly data items corresponds to: 1.2*[(data40-data49)/data44] + 1.4*(data58/data44) + 3.3*(data8/data44) + 0.6*[(data61*data14)/data54] + 1*(data2/data44). High Loss (High Profit) corresponds to loss (profit) firms which are ranked into the smallest (largest) Earnings quintile of all loss (profit) firms. The full sample is also independently classified into three groups based on the Z score cut-offs in Altman (1968), where a Z score below (above) 1.81 (2.99) indicates that bankruptcy is likely (unlikely), and a Z score between 1.81 and 2.99 is in the "zone of ignorance" or "gray area."

Table 12
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings for Loss/Profit Firms, after Excluding Small Firms

Loss/Profit	N	Buy-and-Hold Abnormal Returns					
		[-2, 0]		[1, 60]		[1, 120]	
		SAR	FF	SAR	FF	SAR	FF
High Loss	14,577	-0.0094	-0.0100	-0.0353	-0.0600	-0.0572	-0.1169
		(-10.63)	*(-11.39)*	*(-10.03)*	*(-15.33)*	*(-10.75)*	*(-19.13)*
2	13,932	-0.0075	-0.0085	-0.0261	-0.0469	-0.0553	-0.0907
		(-8.95)	*(-10.38)*	*(-7.29)*	*(-13.32)*	*(-11.58)*	*(-16.95)*
3	13,908	-0.0067	-0.0074	-0.0298	-0.0406	-0.0526	-0.0748
		(-8.82)	*(-10.24)*	*(-11.14)*	*(-12.93)*	*(-13.18)*	*(-15.78)*
4	13,891	-0.0069	-0.0075	-0.0250	-0.0362	-0.0375	-0.0648
		(-10.13)	*(-11.71)*	*(-10.00)*	*(-12.91)*	*(-9.84)*	*(-15.15)*
Low Loss	14,399	-0.0037	-0.0041	-0.0149	-0.0240	-0.0238	-0.0385
		(-6.36)	*(-7.47)*	*(-7.17)*	*(-10.21)*	*(-7.69)*	*(-10.76)*
Low Profit	56,858	-0.0002	-0.0006	-0.0030	-0.0077	0.0001	-0.0132
		(-0.87)	*(-2.70)*	*(-3.86)*	*(-8.51)*	*(0.11)*	*(-9.44)*
2	56,421	0.0026	0.0023	0.0022	-0.0031	0.0059	-0.0107
		(10.79)	*(10.03)*	*(2.77)*	*(-3.34)*	*(5.00)*	*(-7.47)*
3	55,930	0.0058	0.0055	0.0058	-0.0018	0.0113	-0.0080
		(23.47)	*(23.78)*	*(7.00)*	*(-1.95)*	*(9.13)*	*(-5.57)*
4	55,396	0.0083	0.0079	0.0127	0.0026	0.0210	-0.0017
		(32.50)	*(32.34)*	*(15.21)*	*(2.71)*	*(16.30)*	*(-1.17)*
High Profit	57,408	0.0138	0.0128	0.0215	0.0083	0.0356	0.0062
		(46.89)	*(46.45)*	*(21.91)*	*(7.68)*	*(23.11)*	*(3.72)*
High Profit – High Loss		**0.0232**	**0.0228**	**0.0568**	**0.0683**	**0.0927**	**0.1231**
t-statistics		*(43.73)*	*(43.22)*	*(22.96)*	*(15.99)*	*(24.46)*	*(15.68)*
Alternate t-statistics (Fama-MacBeth)		*(33.46)*	*(35.16)*	*(10.02)*	*(8.77)*	*(10.59)*	*(7.76)*

Table notes:
This table presents buy-and-hold abnormal stock returns for the following windows: [-2, 0], [1, 60] and [1, 120], where 0 is the earnings announcement date of quarter *q*. t-statistics are in parenthesis. Alternate t-statistics are calculated using the Fama-MacBeth (1973) procedure on the returns to the strategy every quarter. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. The full sample (352,720 firm-quarter observations) consists of firm-quarter observations with required quarterly data on Compustat and returns data on the CRSP database, after excluding all firm-quarter observations ranked in the lowest size decile (i.e., small firms), where size is defined as market value of equity (Compustat Quarterly data61 * data14) at the end of quarter *q*. Loss (profit) firms are ranked into five quintiles from smallest Earnings, High Loss (Low Profit), to largest Earnings, Low Loss (High Profit). The cut-off points are determined every quarter *q* based on the distribution of Earnings in quarter *q*-1.

Table 13
Buy-and-Hold Abnormal Stock Returns for Portfolios Formed on Earnings for Loss/Profit Firms with Traded Options

Panel A: Percentage of Firm-Quarter Observations with Traded options

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
High Loss (%)	27.29	36.80	40.97	36.20	31.12	49.04	57.76	51.43	57.83	59.19
High Profit (%)	37.54	42.80	49.01	53.09	48.83	50.17	55.74	54.09	55.52	61.06

Panel B: Portfolios Formed on Earnings for Loss/Profit Firms with Traded Options

Loss/Profit	N	Buy-and-Hold Abnormal Returns					
		[-2, 0]		[1, 60]		[1, 120]	
		SAR	FF	SAR	FF	SAR	FF
High Loss	2,584	-0.0052	-0.0051	-0.0367	-0.0473	-0.0540	-0.0740
		(-2.65)	*(-2.73)*	*(-4.86)*	*(-5.77)*	*(-4.92)*	*(-5.96)*
2	2,714	-0.0025	-0.0027	-0.0276	-0.0336	-0.0468	-0.0579
		(-1.37)	*(-1.49)*	*(-3.80)*	*(-4.53)*	*(-4.22)*	*(-5.15)*
3	2,509	-0.0017	-0.0020	-0.0183	-0.0202	-0.0378	-0.0410
		(-0.97)	*(-1.21)*	*(-2.85)*	*(-3.03)*	*(-4.12)*	*(-4.02)*
4	2,412	-0.0027	-0.0028	-0.0140	-0.0291	-0.0254	-0.0477
		(-1.64)	*(-1.78)*	*(-2.15)*	*(-4.52)*	*(-2.52)*	*(-4.94)*
Low Loss	2,360	0.0001	-0.0004	-0.0070	-0.0201	0.0005	-0.0217
		(0.07)	*(-0.27)*	*(-1.32)*	*(-3.66)*	*(0.06)*	*(-2.62)*
Low Profit	5,568	0.0023	0.0023	0.0011	-0.0120	0.0067	-0.0186
		(3.00)	*(3.30)*	*(0.41)*	*(-4.19)*	*(1.64)*	*(-4.32)*
2	8,538	0.0040	0.0041	0.0056	-0.0036	0.0108	-0.0050
		(6.48)	*(7.24)*	*(2.58)*	*(-1.60)*	*(3.40)*	*(-1.50)*
3	9,752	0.0051	0.0056	-0.0001	-0.0063	-0.0024	-0.0173
		(8.57)	*(10.05)*	*(-0.03)*	*(-2.90)*	*(-0.82)*	*(-5.44)*
4	10,691	0.0060	0.0054	0.0086	-0.0027	0.0147	-0.0055
		(10.22)	*(9.88)*	*(4.26)*	*(-1.28)*	*(4.76)*	*(-1.76)*
High Profit	11,519	0.0088	0.0081	0.0134	0.0014	0.0207	-0.0001
		(13.44)	*(13.03)*	*(5.77)*	*(0.60)*	*(5.77)*	*(-0.01)*
High Profit – High Loss		**0.0140**	**0.0133**	**0.0501**	**0.0487**	**0.0747**	**0.0740**
t-statistics		*(12.65)*	*(12.32)*	*(7.52)*	*(3.98)*	*(7.54)*	*(3.66)*
Alternate t-statistics (Fama-MacBeth)		*(9.28)*	*(8.91)*	*(3.55)*	*(2.69)*	*(3.79)*	*(2.44)*

Table notes:
Panel A presents the percentage of firm-quarter observations with traded options, as reported in the database Optionmetrics, in the window [0, 5], where 0 is the earnings announcement date of quarter *q*. This panel covers the period 1996-2005. Panel B presents buy-and-hold abnormal stock returns for the following windows: [-2, 0], [1, 60] and [1, 120], where 0 is the earnings announcement date of quarter *q*. t-statistics are in parenthesis. Alternate t-statistics are

calculated using the Fama-MacBeth (1973) procedure on the returns to the strategy every quarter. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. The sample (58,647 firm-quarter observations) consists of firm-quarter observations with traded options, as reported in the database Optionmetrics, in the window [0, 5], where 0 is the earnings announcement date of quarter *q*. The sample covers the period 1996-2005. Loss (profit) firms are ranked into five quintiles from smallest Earnings, High Loss (Low Profit), to largest Earnings, Low Loss (High Profit). The cut-off points are determined every quarter *q* based on the distribution of Earnings in quarter *q*-1.

Table 14
Trading Returns from Loss/Profit Strategy Net of Trading Costs

Trading Costs (in bps)	Buy-and-Hold Abnormal Returns for the Window [1, 120]					
	SAR			FF		
	High Loss	High Profit	**High Profit – High Loss**	High Loss	High Profit	**High Profit – High Loss**
0	-0.0658	0.0355	**0.1013**	-0.1282	0.0066	**0.1348**
	(-13.93)	*(23.90)*	*(27.47)*	*(-22.17)*	*(4.06)*	*(17.18)*
20	-0.0639	0.0334	**0.0973**	-0.1264	0.0046	**0.1311**
	(-13.51)	*(22.55)*	*(26.13)*	*(-21.83)*	*(2.84)*	*(16.05)*
40	-0.0621	0.0313	**0.0934**	-0.1247	0.0026	**0.1273**
	(-13.08)	*(21.19)*	*(24.79)*	*(-21.48)*	*(1.61)*	*(14.92)*
60	-0.0602	0.0293	**0.0894**	-0.1230	0.0006	**0.1236**
	(-12.67)	*(19.83)*	*(23.45)*	*(-21.14)*	*(0.37)*	*(13.79)*
80	-0.0583	0.0272	**0.0855**	-0.1212	-0.0014	**0.1198**
	(-12.25)	*(18.47)*	*(22.11)*	*(-20.80)*	*(-0.87)*	*(12.66)*
100	-0.0565	0.0251	**0.0816**	-0.1195	-0.0034	**0.1161**
	(-11.83)	*(17.09)*	*(20.76)*	*(-20.46)*	*(-2.11)*	*(11.53)*

Table notes:
This table presents buy-and-hold abnormal stock returns for the window [1, 120], where 0 is the earnings announcement date of quarter *q*, after accounting for transaction costs on a trading strategy based on high loss/profit. Transaction costs are estimated to amount to 0, 20, 40, 60, 80, and 100 basis points (bps) per round-trip transaction. t-statistics are in parenthesis. Abnormal returns are measured using size-adjusted returns (SAR) and Carhart's (1997) four factor model (FF). For firms that delist during the return window, the remaining return is calculated by using the delisting return from the CRSP database, and then reinvesting any remaining proceeds in the appropriate benchmark portfolio. Earnings are earnings before extraordinary items and discontinued operations (Compustat Quarterly data8) in quarter *q* scaled by total assets (Compustat Quarterly data44) in quarter *q*-1. High Loss (High Profit) corresponds to loss (profit) firms which are ranked into the smallest (largest) Earnings quintile of all loss (profit) firms. The cut-off points are determined every quarter *q* based on the distribution of Earnings in quarter *q*-1.