The Impact of Investor Overoptimism on Equity Behavior: Evidence from the Seasonality in an Emerging Stock Market

Tsung-Cheng Chen

National Changhua University of Education

E-mail: chung_chen111@yahoo.com.tw

Fax number: 04-7211294

Telephone: 04-7232105 ext: 7521

The Impact of Investor Overoptimism on Equity Behavior: Evidence from the Seasonality in an Emerging Stock Market

ABSTRACT

This paper explores the overoptimism phenomenon in the behavioral finance literature from the view of seasonal pattern using an emerging stock market with mainly individual investors. By employing the dummy variable regression, mean test, and several robustness analyses, a lower equity performance in May and September is found to be significant and more pronounced for firms with announcement of bad news twice in the same calendar year, implying that investors are overoptimistic. Moreover, the different magnitude of an apparently lower equity performance in May and September suggests that the degree of investor overoptimism differs for firms with different equity size.

Psychological evidence on human heuristic biases with regard to individual judgment and decision-making has challenged the rational expectation of standard financial theory which has dominated the modern finance field over the past several decades, and cast doubt on the validity of behavioral rationality theme since 1980s. The traditional expected utility theory can not explain why a person is risk-seeking in some contexts and risk-averse in others. Thus, behavioral finance attempts to explain various puzzles and anomalies which are not explained by traditional economic theory, and suggests that the market is not always efficient because of human heuristic biases and frame dependence. According to Shefrin (2000), the research themes on behavioral finance are divided into three categories: heuristic-driven biases, frame dependence, and inefficient markets. Among the heuristic-driven biases, overconfidence is the one finding of judgmental psychology, which has the most support in the literature (De Bondt and Thaler (1995)).

Overconfidence, such as when people believe themselves better than the average, is viewed as a common phenomenon or psychology characteristic, and refers to systematic overestimation of the accuracy of one's decisions and the precision of one's knowledge or ability, as well as overoptimism about the future, in the literature from various fields.[1]

[1] For example, among entrepreneurs (Cooper et al. (1988)), investment banks (Stael von Holstein (1972)), lawyers (Wagenaar and Keren (1986)), managers (Russo and Schoemaker (1992), Malmendier and Tate (2005a,

Shefrin and Statman (1994) suggested that the investment decisions of overconfident investors are bad, as they do not know that their information is insufficient. Moreover, Barber and Odean (2000) showed that overtrading is hazardous to wealth and conjectured that a higher trading volume is due to overconfidence, which was also suggested by Gervais and Odean (2001). However, underconfident investors may also trade too much, as they overstate the risk and tend not to hold stocks too long, although this is rarely examined and discussed in the behavioral finance field. In the psychological literature, the terms overconfidence and overoptimism, which are closely related human traits, are often used synonymously and loosely. However, Baker et al. (2006) provided a definition which this study will adhere to: overconfidence describes that people have narrow confidence intervals around their predictions, while overoptimism means that people overvalue the mean of stochastic future events. In other words, overconfidence results in an underestimation of future risks, whilst overoptimism induces an overestimation of future positive outcomes. In this study, overoptimism will be the focus explored and examined.

Most of previous related studies explored overconfidence or overoptimism in managers or investors by examining the bad consequences of overtrading or overinvesting. However,

---

2005b, 2008), Gombola and Marciukaityte (2007)), and physicians and nurses (Baumann et al. (1991)).

this study attempts to explore that whether Taiwanese investors, who are mainly individuals, are overoptimistic by investigating the seasonal behavior of an emerging equity market. It is noted that individual investors are generally more likely to be non-professional, unsophisticated, less informed, and irrational traders, have less analytical ability compared to institutional investors, and be distinctly more sensitive to losses than to gains.[2] Overoptimistic investors generally overestimate the outcomes of the invested targets at the time of the investment decision-making, even if under uncertain conditions of financial reports. Like that for managers, investor overoptimism may be value destroying (i.e. bad judgment). In addition, investors tend to underreact in the short run but overreact in the long run (Daniel et al. (1998), Poteshman (2001), Jackson and Johnson (2006)). Thus, the stock returns behavior should be relatively lower in the month subsequent to the legal deadline that all firms must disclose certain accounting information (audited financial reports), which further leads to a lower May and September pattern of seasonality, especially for firms which do not achieve an anticipated earnings objective. Moreover, the firm size is also taken into account in this study to explore how the degree of overoptimism of investors

[2] Shapira and Venezia (2001) showed that the disposition effect is weaker for professional investors in contrast to independent investors, meaning that professional training and experience is useful in reducing judgmental biases.

with regard to the invested targets affects the equity behavior.

Using the regression model and mean test approaches for all the listed firms in Taiwan with mainly individual investors over 1986-2006, this paper first finds that the average stock return is significantly lower in May and September than in other months. Specifically, after employing the good/bad earnings news as the proxy of the lower/higher degree of a negative earnings surprise or the failure to achieve expected earnings, which is positively related to the degree of overoptimism of individual investors, the more lower equity behavior in May and September is shown for firms with two episodes of bad news in the same calendar year. The results that emerge from the empirical evidence suggest a positive relationship between the degree of overoptimism of investors and lower equity performance in May and September. Moreover, the lower equity performance in May and September differs along with the size of the invested targets, implying that individual investors generally focus on small firms, in contrast to institutional investors that prefer to hold large firms, thus tend to be more overoptimistic in their investment judgments and decision making for small firms. These results are robust and consistent, even if taking into account the two sub-periods, the stock returns adjusted for risk, the control for the January effect, the potential effect of outliers, and the year time-series factor.

This paper has three contributions. First, this is the first academic study to link overoptimism bias and seasonality behavior. In contrast to previous research that examined overtrading behaviors, this study employs the seasonal behavior to test overoptimism of investors. It throws additional light on the issue about overoptimism and helps fill a gap in the literature by examining an emerging market with mainly individual investors, namely Taiwan. Second, the findings will have practical implications for investors to allocate their funds. Third, this paper will provide academics and practitioners with more understanding of the behaviors of individual investors.

The remainder of this study is organized as follows. Section I reviews the literature and further introduces the hypotheses development. Section II describes the research methodology and data selection. Section III provides the empirical results and analyses. The conclusions are in the final section.

I. Literature Review and Hypotheses Development

The consequences of human mental biases are the decision-making and behavioral biases, which further lead to stock price biases. Behavioral finance is the study of how psychology affects finance. Both overconfidence and overoptimism, which are often mentioned and

loosely used in literature, are the systematic biases of evaluation. Specifically, overoptimism means that people tend to overvalue the positive outcome of events, such as the earnings forecasts of analysts. Empirical results that security analysts are overoptimistic and that overoptimism is more easily apparent in earnings forecasts data are well documented (Givoly and Lakonishok (1984), Schipper (1991), Rajan and Servaes (1997), Dechow et al. (2000), Asquith et al. (2005), Bradshaw et al. (2006), Rajapakse and Siriwardana (2007)). In contrast to previous studies that explore the overoptimism of investors by using the change in trading volume (Odean (1998, 1999), Barber and Odean (2000), Gervais and Odean (2001)) or the post-issue performance data (Yi (2001), Paleari and Vismara (2007), Yi et al. (2008)), this study will examine this issue in an emerging stock market with mainly individual investors from the equity seasonality.

Since stock transactions in Taiwan are mainly executed by individual investors, financial statements are an important public information source related to the financial positions, operating profit, and cash flows of firms for most individual investors, except for some insiders and traders who have their own private information. Moreover, Taiwan's SEC requires public firms to report their annual financial statements for the preceding year audited by CPAs within four months after the end of the fiscal year, and the semiannual financial

statements for the current year audited by CPAs within two months after the middle of the fiscal year. The first and the third quarterly financial statements only need to be reviewed by CPAs and announced within one month after the end of the quarter in Taiwan. In contrast to the quarterly financial statements, the audited annual and semiannual financial statements offer more complete and certain accounting information for individual investors. This is different from the SEC regulations in the US, where only the annual financial statement needs to be audited by CPAs.

Another difference between Taiwan and the US is that almost all firms have December as the end of their fiscal year in Taiwan. For these firms, the filing deadlines are April 30 and August 31 for annual reports and semiannual reports, respectively. According to the statistics of reporting months for financial statements, 100 percent and 83.16 percent of all listed firms in Taiwan reported their annual financial statements in April 1986 and April 2006, respectively. In addition, 100 percent and 97.01 percent of all such firms reported their semiannual financial statements in August 1986 and August 2006, respectively. In addition, Table I shows that more than half of the listed firms in Taiwan announced their audited financing reports during the week before the legal deadline.

According to the concept of overoptimism, individuals usually believe that they have

sufficient information, resulting in positively overvaluing the outcomes, which in turn induces bad investment decisions. Once the information in financial reports which is originally uncertain or private becomes largely reliable and completely public as CPAs audit and firms announce them, which is generally in April for annual reports and in August for semiannual ones, bad performances, that is a lower monthly stock return, will be found in May and September subsequent to the filing deadline, and imply the anteriorly overoptimistic behaviors of individual investors. Thus, the first hypothesis of this study is as follows:

H1: In contrast to other months, there is an apparently and systematically lower monthly equity behavior in May and September subsequent to the legal deadline of financial reports.

This study examines this hypothesis by comparing the average stock return in the months subsequent to the legal deadline of reporting the audited operating incomes and financial conditions with that in other months.

This study also expects that the higher the overoptimism of individual investors, the more the outcome is not good as expected and the worse the relative performance of the stock returns. This study assumes that in contrast to firms with good news, the degree the outcome is not as good as expected is larger for firms with bad news, which is defined as

negative earnings growth. Thus, the second hypothesis is:

H2: In contrast to the seasonal pattern of firms with good news, the lower May and September performance is more apparent for firms with bad news.

In order to maximize the gap between the highest and lowest degree of failure to achieve the expected outcome, this study first divides all firms into four groups according to the positive/negative earnings growth in the audited annual and semiannual financial reports in the same calendar year, then mainly focuses on the firms with two episodes of bad news and ones with two episodes of good news by assuming the positive (negative) earnings growth as good (bad) news. The firms with two episodes of bad news are regarded as ones with the highest degree of failure to achieve the expected outcome, while the firms with two episodes of good news are regarded as ones with the lowest degree of failure to achieve the expected outcome.

Moreover, Keim (1983) indicated that the average return of small firms appears disproportionately large in January relative to the remaining months, suggesting that firm size is significantly related to the seasonal pattern. Thus, the firm size is also taken into account in this study. In contrast to institutional investors that prefer to hold larger firms, individual investors tend to buy and pay attention to small firms, thus are more likely to have higher

overoptimism about the future prospects of such firms. This study therefore develops the third hypothesis, as follows:

H3: In contrast to the seasonal pattern of larger firms after taking into account the earnings growth, the lower May and September performance is more apparent for smaller firms.

This study examines this hypothesis by comparing the lower seasonal behavior of stock returns for the sub-sample with smaller equity size with the sub-sample with larger equity size.

II. Research Methodology and Data Selection

A. Research Methodology

This study first investigates the existence of the lower May and September pattern to confirm the overoptimism of investors in Taiwan for the first hypothesis.

Most empirical evidence on stock market seasonality is based on the dummy variable approach (hereafter DVA), including the work in Rogalski and Tinic (1986), Reinganum and Shapiro (1987), Ogden (1990), Kohers and Kohli (1991), Reinganum and Gangopadhyay (1991), Lee (1992), Chen and Fishe (1994), Chan et al. (1996), Cheung and Coutts (1999), Hillier and Marshall (2002), and Chien and Chen (2007, 2008). However, Chien et al.

(2002) showed that the heteroskedasticity among monthly returns may result in erroneous inferences.[3] As a result, the mean test is also employed for validity besides DVA.

The simple dummy variable regression model for investigating the lower equity behavior in May and September is employed, as follows:

$$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t \quad (1)$$

where R_{it} is the monthly return on stock *i* in calendar month *t*, and D is a dummy variable equal to one in May and September and zero in other months of the year. The regression intercept indicates the mean stock return in months other than May and September for all firms, and the slope reports the difference in stock performance between May and September and other months.

To test the second hypothesis that the lower equity performance in May and September is more apparent for firms with bad news than those with good news, this study divides the entire sample into four sub-samples based on the interaction of earnings per share (hereafter EPS) for the preceding year in the audited annual financial reports, and the EPS for the first six months of the current year in the audited semiannual financial reports. For example, the

[3] They investigated US stocks, and showed that although the estimators of the dummy regression are unbiased, the test statistics tend to reject the null hypotheses incorrectly once the stock return volatility is considered. Therefore, they suggested that the so-called January effect could be attributed to the application of inappropriate statistical methods.

annual EPS for the year ended December 31, 2000, and the EPS for the semiannual period ended June 30, 2001, were generally reported in April and August of 2001, respectively. If the EPS announced in 2001 was higher (lower) than the EPS for the same period of the preceding year, then the firm has good (bad) news in the annual or semiannual EPS. Thus, the first sub-sample includes the firms with good news in both the audited annual reports for the preceding year and the semiannual reports for the current year. The second sub-sample includes the firms with bad news in both the audited annual reports for the preceding year and the semiannual reports for the current year. The third sub-sample includes the firms with bad news in the audited annual reports for the preceding year but good news in the semiannual reports for the current year. The fourth sub-sample includes the firms with good news in the audited annual reports for the preceding year but bad news in the semiannual reports for the current year. The earnings forecasts from analysts are not used in this paper because of the following reasons. First, there is no complete information system in Taiwan, such as the Institutional Brokers Estimate System Tape (IBES) in the US. Second, the analysts' earnings forecasts in the Taiwan Economic Journal (hereafter TEJ) database were established after 1989, and there are many missing data. Third, the forecasts in the TEJ are only for annual and not for semiannual EPS information. Finally, the statistical or

econometric model is not employed, since individuals generally have less professional analysis ability than institutional investors.

The multiple dummy variables regression analysis is employed for examining the second hypothesis, as follows:

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t \qquad (2)$$

where R_{it} is the monthly return on stock *i* in calendar month *t*, and D is a dummy variable equal to one in May and September and zero in other months of the year. G_1, G_2, and G_3 are dummy variables based on the conditions of EPS news for each firm every year. G_1 is equal to one if both announced annual and semiannual EPS in the same calendar year are bad news, and zero otherwise. G_2 is equal to one if the announced annual EPS is bad news but the semiannual EPS in the same calendar year is good news, and zero otherwise. G_3 is equal to one if the announced annual EPS is good news but the semiannual EPS in the same calendar year is bad news, and zero otherwise.

The regression intercept α_0 indicates the mean stock return in months other than May and September for the firms with good news in both annual and semiannual EPS in the same calendar year. Meanwhile, the regression slope α_1 represents the difference in stock return between May and September and other months for the firms with good news twice in the

same calendar year. A significantly negative coefficient α_1 indicates that there exists an apparently lower equity performance in May and September for the firms with good news twice in the same calendar year. The coefficients α_2, α_3, and α_4 represent the differences in stock return between the firms with good news twice and those with different conditions of EPS news for months other than May and September. D^*G_1, D^*G_2, D^*G_3 are the interaction variables derived from the multiplication of two dummy variables for monthly seasonality and the conditions of annual and semiannual EPS news, respectively. Thus, the coefficients α_5, α_6, and α_7 represent the difference in the magnitude of the lower equity performance in May and September between the firms with two reports of good news and those with different conditions of EPS information.

To understand more about whether the impact of the certain financial reports on the lower equity performance in May and September differs for different sizes of invested targets, this study classifies all the listed firms into ten portfolios according to their market values at the end of the preceding year. Firms in the top ten percent of this ranking comprise the largest firm portfolio, MV10, while firms in the bottom ten percent form the smallest firm portfolio, MV1. The remaining firms are placed into eight intermediate portfolios, MV9 through MV2. This process is repeated for each year so that the portfolio rankings can be updated

annually. This method has been commonly used in the literature (Keim (1983), Reinganum (1983), Baker and Limmack (1998), Elfakhani and Zaher (1998)). The third hypothesis, that the lower equity performance in May and September is more apparent for the smaller firms than the larger ones, is tested using the DVA and mean test for different size portfolios. Finally, several robust tests and sensitivity analyses, including the two different sub-periods, the stock returns adjusted for market performance, the data outliers, and the excluding of the January effect, are also taken into account in this study to increase the internal validity of the empirical results.

B. Data

The securities selected for analysis are from the TEJ database. The TEJ file includes all securities that have listed or ceased trading on Taiwan's stock market (including the security exchange and OTC) since January 1971, with the market index data since February 1971. After taking into account the available accounting information based on the EPS of the firms in both audited annual and semiannual financial statements, the final sample period is from January 1986 to December 2006. The monthly returns are used for analysis to avoid the bias inherent in a daily rebalancing strategy, as described by Blume and Stambaugh (1983)

and Roll (1983).[4]

III. Empirical Results and Analyses

A. Examinations of A Lower Equity Performance in May and September

To understand the tendency of mean returns among the twelve months, this study starts the analysis by considering the descriptive statistics of monthly stock returns in Taiwan from 1986 to 2006. Table II shows that January has the highest mean return of 8.2646 percent, while May and September have the lowest relative to other months, at -2.157 percent and -2.5983 percent, respectively. In addition, the ANOVA indicates that there are significant differences in stock returns among the twelve months. Figure 1 shows a W-shape pattern of equity behavior in which May and September seem to be the bottom, and the beginning (January) and end (December) of the year seem to be the top. This study pays close attention to whether investors are overoptimistic, leading to a bad performance after the information contained in financial reports become definite and clear, that is a apparently lower equity behavior in May and September. The May and September seasonality is thus

[4] Blume and Stambaugh (1983) indicated that the results for the size effect with using daily returns data are statistically biased, and returns with a buy-and-hold strategy largely avoid overstating the magnitude of the size effect. Returns measured monthly will reduce the potential problems associated with nonsynchronous trading.

explored in this study by employing both the dummy regression analysis used in most prior literature and the mean test for taking into account the heteroskedasticity among monthly returns.

Table III reports the dummy regression results, showing that the slope coefficient α_1 is significantly negative at the one percent level for the period of 1986 to 2006. The empirical results of Table IV also show that the mean return of May and September is significantly lower than that of other months after taking into account the equality of variances of stock returns, consistent with the findings of Table III. Overall, the preliminary results indicate that an obviously lower equity behavior in May and September tends to exist in the Taiwan stock market with mainly individual investors, in support of the first hypothesis.

B. Examinations of the Effect of the Degree of the Failure to Achieve Expected Outcomes on A Lower Equity Performance in May and September

This paper further explores whether the degree of overoptimism has different effects on the lower equity behavior in May and September. Generally, the gap between the actual consequence and the expected outcome increases along with the degree of investor overoptimism. Furthermore, the firms with fully certain bad news (two reports of negative earnings growth) in the same calendar year could be regarded as the agents of the firms that

perform least as well as expected, in contrast to the firms with fully certain good news (two reports of positive earnings growth) in the same calendar year, which could be regarded as the agents of the firms that perform mostly as well as expected. Thus, the bad performance of investment decision- making should be more evident for firms with fully certain bad news in the same calendar year, implying that the degree of investors' overoptimism is higher for those firms. In other words, the magnitude of a significantly lower monthly equity behavior in May and September for firms with two episodes of bad news in the financial reports in the same calendar year should be more than ones with two episodes of good news.

Table V details the empirical results of the dummy variable regression to test the second hypotheses. It indicates that α_1 is -3.5265 percent with a *t*-statistic of -16.18, which is significant at the one percent level, suggesting that a lower May and September performance exists in firms with good news in both their annual and semiannual EPS. In addition, not only firms with two reports of good news, but also those with other conditions of EPS news, show the existence of the lower May and September effect because of the negative coefficients of the three interaction terms. The coefficients α_5, α_6, and α_7 are -1.8628 percent (with a *t*-statistic of -6.29), -0.4102 percent (with a *t*-statistic of -0.95), and -0.9188 percent (with a *t*-statistic of -2.12), respectively. More importantly, they are all significant,

except for the coefficient α_6, meaning that the magnitude of this seasonality is significantly different between firms for different conditions of audited EPS news. In other words, the lower equity behavior in May and September is more evident for firms with two episodes of bad news, and next for those with good news in their annual but bad news in their semiannual financial reports. These results tend to support the second hypothesis that in contrast to the seasonal pattern of firms with good news, the lower May and September performance is more apparent for firms with bad news.

Further taking into account the stock return volatility, the mean test is employed and shown in Table VI. Panels A through D report the empirical results for four sub-samples with different conditions of EPS information. They show that the mean return is 0.3329 percent in May and September and 3.8594 percent in other months in Panel A, -4.76 percent in May and September and 0.6295 percent in other months in Panel B, -2.83 percent in May and September and 1.1065 percent in other months in Panel C, and -1.623 percent in May and September and 2.8222 percent in other months in Panel D. As expected from the behavioral view of overoptimism, the mean returns in May and September are all significantly lower than that in other months at the one percent level, especially for firms with two episodes of certain bad news, consistent with Table V.

C. Examinations of Different Magnitude of A Lower Equity Performance in May and September for Different Size of Invested Targets

Another focus point in this study is the degree of investor overoptimism for different size invested targets. As noted in the literature on seasonality, there could be a relationship between seasonality and firm size (Keim (1983)). This study also investigates whether the magnitude of the lower equity behavior in May and September changes when the size of the invested firms differs. Table VII shows the dummy regression results of this question for ten size deciles. What is interesting is that α_1 tends to monotonously decrease as the size of the decile increases. The slope coefficient is -6.8604 percent for the smallest size decile, while -2.8215 percent for the largest size decile. The slope coefficients are significantly negative and different than zero at the one percent level for all size deciles. The empirical results indicate that the lower equity behavior in May and September is a common phenomenon, and more pronounced in smaller firms rather than larger ones. The results of the mean test for robustness are shown in Table VIII. The mean returns in May and September are lower than -3 percent for the two smallest size deciles, while approximately -1.764 percent for the MV9 size decile and -1.351 percent for the largest size decile. On the other hand, the mean returns in other months are higher than 2.5 percent for the two smallest

size deciles, while lower than 1.5 percent for the three largest size deciles. The differences in stock return between May and September and other months are significant for all size deciles, consistent with Table VII, also showing that the magnitude of the lower equity behavior in May and September is greater for the smaller firms.

To understand more clearly the relationship between the lower equity behavior and the size of invested targets, the good/bad news of certain information is taken into account, and the results are reported in Tables IX and X. Table IX first controls for firm size and then reports the results of the dummy variable regression as to whether the magnitude of the lower equity behavior in May and September is different between the sub-sample with two reports of good news and the other three sub-samples with different conditions of EPS news for the smallest and largest size deciles, respectively. Panel A of Table IX shows that α_1 is -4.9212 percent with a *t*-statistic of -4.83 in the smallest size decile, which is at the one percent level. The coefficients α_5, α_6, and α_7 are -4.0634 percent (with a *t*-statistic of -2.66), -0.6238 percent (with a *t*-statistic of -0.28), and -3.7761 percent (with a *t*-statistic of -1.83). They are all significant, except for the coefficient α_6, meaning that in the smallest size decile the magnitude of this lower seasonally equity behavior for the sub-sample with two bad reports is significantly different than that for the sub-sample with two episodes of good news. The

results are not only consistent with, but also more apparent than those in Table V. Panel B of Table X shows the results in the largest size decile. Although α_1 is -2.3349 percent with a *t*-statistic of -4.14, which is at the one percent level, the coefficients α_5, α_6, and α_7 are not significantly negative, suggesting that the magnitude of the lower equity behavior in May and September is not significantly different among the four sub-samples with different conditions of earnings information. Therefore, the lower equity behavior in May and September is not only a common phenomenon, but also exists more obviously in the small firms, suggesting that the degree of overoptimism has different effects on the seasonality of larger/smaller firms.

On the other hand, Table X first controls for the good/bad conditions of audited earnings news and then reports the results of the mean test as to whether the mean return is equal between May and September and other months for the sub-samples with different conditions of earnings information and equity size. Panel A of Table X shows that the difference in return between May and September and other months is -4.9211 percent (equal to 0.1909 percent minus 5.112 percent) for the smallest size decile and -2.3349 percent (equal to 0.3796 percent minus 2.7145 percent) for the largest size decile. Panel B of Table X shows that the difference in return is -8.9845 percent for the smallest size decile and -3.4945 percent for the

largest size decile. Panel C of Table X shows that the difference in return for the smallest size decile is -5.5453 percent compared to -2.7769 percent for the largest size decile. Panel D of Table X shows that the difference in return for the smallest size decile is -8.6973 percent compared to -1.5493 percent for the largest size decile. Evidently, after controlling for the good/bad news of audited earnings reports, more obviously lower equity behavior exists in May and September for the smallest firms, which is approximately 5 or more percent difference, than the largest firms, which is only approximately 3.5 or less percent difference. Thus, these findings tend to be in support of the third hypothesis that in contrast to the seasonal pattern of the larger firms after taking into account the earnings growth, the lower May and September performance is more apparent for the smaller firms.

D. Robustness Tests

For robustness and internal validity, several analyses are also executed, such as the changes between the early and recent periods, the adjustment for risk, the control for the January effect, the potential effect of outliers, and the year time-series factor.

First, to understand the changes between the early and recent periods, the overall period is divided into two sub-periods: 1986-1996 and 1997-2006. Table XI reports that the coefficients α_1 are significantly negative in two sub-periods, consistent with H1, and the

magnitude is larger in the later period (α_1=-5.0612 percent with a *t*-statistic of -35.03) than the early one (α_1=-2.0469 percent with a *t*-statistic of -7.04). Table XII also reports the results in support of H2, especially for the later period (α_1=-4.3534 percent and α_5=-1.4227 percent). Table XIII shows that the lower equity behavior is more evident in the smaller firms for both sub-periods. Especially for the later period, the coefficient α_1 is -7.2085 percent for the smallest firms. Table XIV shows that α_1 is significant only in the later period for the largest firms. For the smallest firms, α_1 is significant in the early period, while α_1 and α_5 are significantly negative in the later period. These results imply that the degree of investor overoptimism does not decrease across the sample period, but is higher in the more recent period. Therefore, H3 is also supported.

Second, taking into account the adjustment for risk, the index return is employed to adjust stock returns for market risk. Table XV reports that the parameter estimate is still obvious (α_1=-0.9678 percent with a *t*-statistic of -8.57), consistent with H1. Table XVI reports that the lower equity behavior in May and September adjusted for market performance is more pronounced for firms with two episodes of bad news in the same calendar year (α_5=-0.6562 percent with a *t*-statistic of -2.54), consistent with H2. Table XVII shows that the mean excess return of May and September is significantly lower than that of other months,

especially for the smallest size decile, which supports H3. In addition, the Sharpe-Lintner CAPM, which relates the risk-adjusted returns to the market performance, is also employed. The results of using Jensen alpha as the excess return are not reported here because of the similarity of the findings.

Third, since Rozeff and Kinney (1976) many studies have documented the January effect that stock returns appear to be systematically higher in January than in other months for several markets. Recently, Chien and Chen (2007, 2008) also indicated that the January effect is found in the Taiwanese stock market. Thus, this study excludes the January returns to reexamine all hypotheses. The results in Table XVIII indicate that α_1=-3.7649 percent with a *t*-statistic of -30.18, which is at the one percent level, supporting H1. Table XIX indicates that α_1 and α_5 are significantly negative (α_1=-2.8135 percent with a *t*-statistic of -13.41 and α_5=-1.9285 percent with a *t*-statistic of -6.76), in support of H2. Table XX shows that the lower equity performance in May and September is still found after controlling for the January effect, especially for the smaller firms (α_1=-5.4375 percent with a *t*-statistic of -8.79 for the smallest firms, while α_1=-2.4336 percent with a *t*-statistic of -7.6 for the largest ones). Table XXI shows that the lower equity behavior in May and September is more pronounced for the smallest firms with two episodes of bad news in the same calendar

year (α_1 =-3.5049 percent and α_5 =-4.0893 percent, which are both at the one percent level). The findings of Tables XX and XXI still tend to support H3.

Fourth, the cross-sectional regressions are sensitive to outliers, particularly for the returns on individual securities in less developed stock markets. This study thus sets the top and bottom one percent of observations for returns at the 1st and 99th percentiles to reduce the influence of extreme outliers. The results are still consistent. Finally, the year dummy variables are included in the regression model to consider the year time-series factor, and the findings are still similar.

IV. Conclusions

As argued by Kim and Nofsinger (2008), it will be useful to understand the cognitive biases of Asians and the impact of their decision-making on financial markets from the perspective of behavioral finance. This study employs the Taiwanese stock market to look for investor overoptimism. This is of concern, as the majority of investors in American and European markets are institutional investors, but in Taiwan the investors are mainly individuals. In addition, all firms in Taiwan have the same fiscal year-end (December) and legal deadline for reporting accounting information, and both annual and semiannual earnings

information must be audited by CPAs. Generally, people in Asian cultures tend to suffer from more behavioral biases than people from Western cultures (Yates et al. (1997)), and Shu et al. (2005) showed that investors in Taiwan had a stronger disposition effect than US investors. The Taiwanese stock market is thus a good place to explore the investor characteristics proposed in the behavioral finance literature. More importantly, no previous studies have explored individual overoptimism by linking equity performance and seasonal patterns.

By executing the dummy variable regression and mean test, several primary findings are obtained in support of the three hypotheses proposed in this paper. First, there is an apparently and systematically lower monthly equity performance in May and September subsequent to the legal deadline of financial reports. Second, the lower stock performance in May and September is more apparent for firms with two episodes of bad news than those with two episodes of good news. Third, this seasonal pattern of lower equity behavior is more obvious for the smaller firms than the larger ones. These empirical results suggest that overoptimism among individual investors is generally present in the Taiwanese stock market, leading a lower performance in months subsequent to the legal deadline that all listed must announce their audited financial reports. Moreover, the degree of investor overoptimism

has different effects on stock performance, and differs with the size of the invested targets.

Notably, the results which are still consistent after several robustness tests show that the lower equity behavior in May and September became more pronounced in the recent period of 1997 to 2006, suggesting that behavioral biases such as overoptimism do not disappear as investors' gain experience. In other words, individual investors are not always rational and their self-perceptions are not always accurate. This paper provides a new approach to explore investor overoptimism from the perspective of the seasonal patterns in an emerging equity market, and this topic deserves further investigation in future research.

REFERENCES

Asquith, Paul, Michael B. Mikhail, and Andrea S. Au, 2005, Information content of equity analyst reports, *Journal of Financial Economics* 75, 245-282.

Baker, R., and R. J. Limmack, 1998, Firm size, monthly seasonalities and tax-loss selling: Further evidence from the UK, *British Accounting Review* 30, 221-248.

Baker, Malcolm, Richard S. Ruback, and Jeffrey Wurgler, 2006, Behavioral corporate finance: A survey, in Espen Eckbo, eds. *Handbook of Corporate Finance: Empirical Corporate Finance* (Elsevier, North Holland).

Barber, Brad M., and Terrance Odean, 2000, Trading is hazardous to your wealth: The common stock investment performance of individual investors, *Journal of Finance* 55, 773-806.

Baumann, Andrea O., Raisa B. Deber, and Gail G. Thompson, 1991, Overconfidence among physicians and nurses: The micro-certainty, macro-uncertainty phenomenon, *Social Science and Medicine* 32, 167-174.

Blume, Marshall E., and Robert F. Stambaugh, 1983, Bias in computed returns: An application to the size effect, *Journal of Financial Economics* 12, 387-404.

Bradshaw, Mark T., Scott A. Richardson, and Richard G. Sloan, 2006, The relation between corporate financing activities, analysts' forecasts, and stock returns, *Journal of Accounting and Economics* 42, 53-85.

Chan, M. W. L., Anya Khanthavit, and Hugh Thomas, 1996, Seasonality and cultural influences on four Asian stock markets, *Asia Pacific Journal of Management* 13, 1-24.

Chen, Lein L., and Raymond P. H. Fishe, 1994, Seasonal money movements and the January effect, *Atlantic Economic Journal* 22, 26-42.

Cheung, Kwong C., and J. A. Coutts, 1999, The January effect and monthly seasonality in the Hang Seng index: 1985-1997, *Applied Economics Letters* 6, 121-123.

Chien, Chin C., and Tsung C. Chen, 2007, The impact of lunar new year on the January anomaly in Taiwan's stock market, *Applied Economics Letters* 14, 1075-1077.

Chien, Chin C., and Tsung C. Chen, 2008, Can the January anomaly in Taiwan's stock market be explained with the prospect theory? *Quantitative Finance* 8, 335-339.

Chien, Chin C., Cheng F. Lee, and Andrew M. L. Wang, 2002, A note on stock market seasonality: The impact of stock price volatility on the application of dummy variable regression model, *Quarterly Review of Economics and Finance* 42, 155-162.

Cooper, Arnold C., Carolyn Y. Woo, and William C. Dunkelberg, 1988, Entrepreneur's perceived chances for success, *Journal of Business Venturing* 3, 97-108.

Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam, 1998, Investor psychology and security market under- and over-reactions, *Journal of Finance* 53, 1839-1885.

De Bondt, Werner. F. M., and Richard H. Thaler, 1995, Financial decision-making in markets and firms: A behavioral perspective, in A.J. Robert, V. Maksimovic and W.Z. Ziemba, eds. *Handbooks in Operations Research and Management Science* (Elsevier Science, Amsterdam).

Dechow, Patricia, Amy P. Hutton, and Richard G. Sloan, 2000, The Relation between analysts' of long term growth stock price performance following equity offerings, *Contemporary Accounting Research* 17, 1-32.

Elfakhani, Said, and Tarek Zaher, 1998, Differential information hypothesis, firm neglect and the small firm size effect, *Journal of Financial and Strategic Decisions* 11, 29-40.

Gervais, Simon, and Terrance Odean, 2001, Learning to be overconfident, *Review of Financial Studies* 14, 1-27.

Givoly, Dan, and Josef Lakonishok, 1984, The quality of analysts' forecasts of earnings, *Financial Analysts Journal* 40, 40-47.

Gombola, Michael, and Dalia Marciukaityte, 2007, Managerial overoptimism and the choice between debt and equity financing, *Journal of Behavioral Finance* 8, 225-235.

Hillier, David, and Andrew Marshall, 2002, Insider trading, tax-loss selling, and the turn-of-the-year effect, *International Review of Financial Analysis* 11, 73-84.

Jackson, Andrew, and Timothy Johnson, 2006, Unifying underreaction anomalies, *Journal of Business* 79, 75-114.

Keim, Donald B., 1983, Size-related anomalies and stock return seasonality: Further empirical evidence, *Journal of Financial Economics* 12, 12-32.

Kim, Kenneth A., and John R. Nofsinger, 2008, Behavioral finance in Asia, *Pacific-Basin Finance Journal* 16, 1-7.

Kohers, Theoder, and Raj K. Kohli, 1991, The anomalous stock market behavior of large firms in January: The evidence from the S&P composite and component indexes, *Quarterly Journal of Business and Economics* 30, 14-32.

Lee, Insup, 1992, Stock market seasonality: Some evidence from the Pacific-Basin countries, *Journal of Business Finance and Accounting* 19, 199-210.

Lee, Tsun S., 1992, The study on seasonality and causes in Taiwan stock market, *NTU Management Review* 40, 181-215.

Malmendier, Ulrike, and Geoffrey Tate, 2005, CEO overconfidence and corporate investment, *Journal of Finance* 60, 2661-2700.

Malmendier, Ulrike, and Geoffrey Tate, 2005, Does overconfidence affect corporate investment? CEO overconfidence measures revisited, *European Financial Management* 11, 649-659.

Malmendier, Ulrike, and Geoffrey Tate, 2008, Who makes acquisitions? CEO overconfidence and the market's reaction, *Journal of Financial Economics* 89, 20-43.

Odean, Terrance, 1998, Volume, volatility, price, and profit when all trades are above average, *Journal of Finance* 53, 1887-1934.

Odean, Terrance, 1999, Do investors trade too much? *American Economic Review* 89, 1279-1298.

Ogden, Joseph P., 1990, Turn-of-the-month evaluations of liquid profits and stock returns: A common explanation for the monthly and January effects, *Journal of Finance* 45, 1259-1272.

Paleari, Stefano, and Silvio Vismara, 2007, Overoptimism when pricing IPOs, *Managerial Finance* 33, 352-367.

Poteshman, Allen M., 2001, Underreaction, overreaction, and increasing misreaction to information in the options market, *Journal of Finance* 56, 851-876.

Rajan, Raghuram, and Henti Servaes, 1997, Analyst following of initial public offerings, *Journal of Finance* 52, 507-529.

Rajapakse, Suri, and Mahinda Siriwardana, 2007, Overoptimism bias in market analysts' forecasts: The case of the Australian dollar, *Journal of the Asia Pacific Economy* 12, 103-113.

Reinganum, Marc R., 1983, The anomalous stock market behavior of small firms in January: Empirical tests for tax-loss-selling effects, *Journal of Financial Economics* 12, 89-104.

Reinganum, Marc R., and Partha Gangopadhyay, 1991, On information release and the January effect: Accounting-information hypothesis, *Review of Quantitative Finance and Accounting* 1, 169-176.

Reinganum, Marc R., and Alan C. Shapiro, 1987, Taxes and stock return seasonality: Evidence form the London stock exchange, *Journal of Business* 2, 281-295.

Rogalski, Richard J., and Seha M. Tinic, 1986, The January size effect: Anomaly or risk mismeasurement? *Financial Analysts Journal* 42, 63-70.

Roll, Richard, 1983, On computing mean returns and the small firm premium, *Journal of Financial Economics* 12, 371-386.

Rozeff, Michael S., and William R. Kinney, 1976, Capital market seasonality: The case of stock returns, *Journal of Financial Economics* 3, 379-402.

Russo, J. Edward, and Paul J. H. Schoemaker, 1992, Managing overconfidence, *Sloan Management Review* 33, 7-17.

Schipper, Katherine, 1991, Analysts' Forecasts, *Accounting Horizons* 5, 105-121.

Shapira, Zur, and Itzhak Venezia, 2001, Patterns of behavior of professionally managed and independent investors, *Journal of Banking and Finance* 25, 1573-1587.

Shefrin, Hersh, 2000, Beyond greed and fear: Understanding behavioral finance and the psychology of investing. (Harvard Business School Press, Boston).

Shefrin, Hersh, and Meir Statman, 1994, Behavioral capital asset pricing theory, *Journal of Finance and Quantitative Analysis* 29, 323-349.

Shu, Pei G., Yin H. Yeh, Shean B. Chiu, and Hsuan C. Chen, 2005, Are Taiwanese individual investors reluctant to realize their losses? *Pacific-Basin Finance Journal* 13, 201-223.

Stael Von Holstein, Carl A. S., 1972, Probabilistic forecasting: An experiment related to the stock market, *Organizational Behavioral and Human Performance* 8, 138-158.

Wagenaar, Willem, and G. B. Keren, 1986, Does the expert know? The reliability of predictions and confidence ratings of experts, in Erik Hollnagel, Giuseppe Mancini, and David D. Woods, eds. *Intelligent Decision Support in Process Environments* (Springer, Berlin).

Yates, J. Frank, Ju Lee, and Julie G. Bush, 1997, General knowledge overconfidence: Cross-national variations, response style, and reality, *Organizational Behavior and Human Decision Processes* 70, 87-94.

Yi, Jong H., 2001, Pre-offering earnings and the long-run performance of IPOs, *International Review of Financial Analysis* 10, 53-67.

Yi, Bingsheng, Mohamed El-Badawi, and J. Barry Lin, 2008, Pre-issue investor optimism and post-issue underperformance, *Financial Analysts Journal* 64, 77-87.

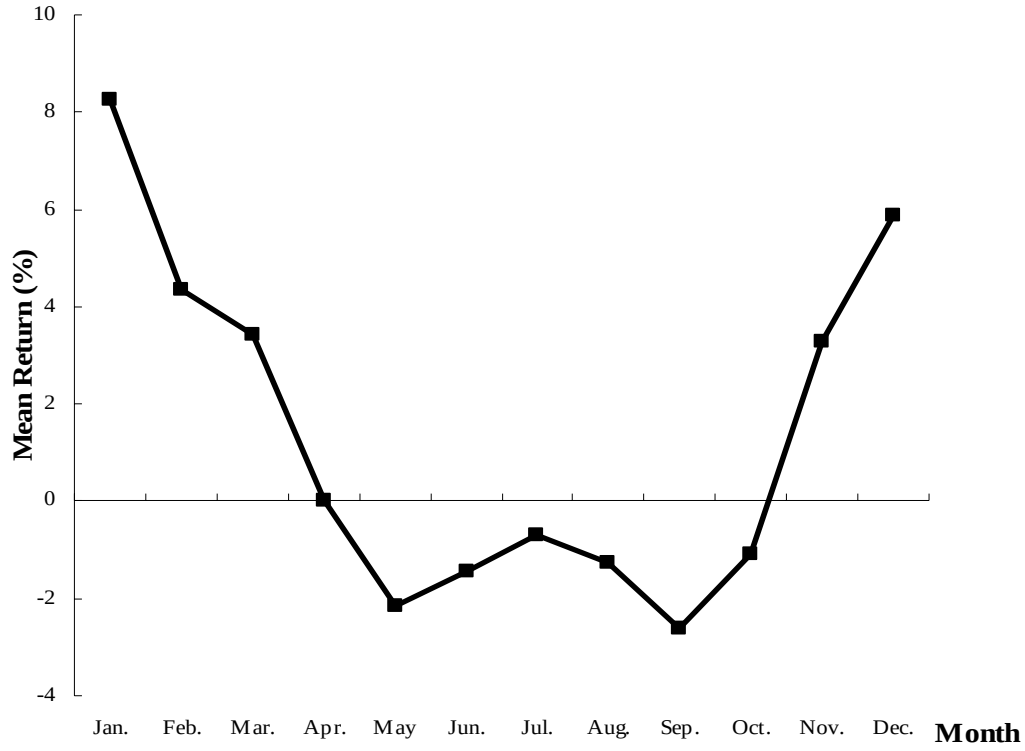

Figure 1. Monthly stock returns. This figure presents the mean monthly stock performance for all listed firms in the Taiwanese stock market over the period of January 1986 through December 2006.

Table I

The Announcement Timing of Audited Financing Reports before the Legal Deadline

This table shows the descriptive statistics of the forward days of announcing financial reports before the legal deadline for the period of January 1986 through December 2006. On average, more of half of listed firms reported their financial conditions and operating income audited by CPAs two to four days before the legal deadline.

	Annual Financial Reports			Semiannual Financial Reports		
Year	The First Quartile	Median	The Third Quartile	The First Quartile	Median	The Third Quartile
1986	0	0	0	0	0	0
1988	0	0	0	-	-	-
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	0	0	0	0	0
1994	0	0	58	0	0	0
1995	1.5	4	10	0	0	0
1996	1	5	14	1	2	3
1997	1	6	20	1	3	4
1998	1	2	11	2	3	4
1999	2	3	10	0	1	4
2000	2	4	13	1	1	3
2001	1	5	14	1	2	4
2002	1	5	14	2	3	4
2003	1	4	21	2	3	5
2004	1	3	11	1	1	5
2005	2	4	13	1	1	2
2006	1	5	13	0	1	2
1986-2006	1	4	14	1	2	4

Table II

The Descriptive Statistics and Tests of Equality in Monthly Stock Returns

The equally weighted average returns are reported in percentage terms. The table shows the descriptive statistics of Taiwanese stock returns for each month and the tests of equality of stock returns among twelve months. The monthly returns are retrieved from the Taiwan Economic Journal (TEJ) database for the period of January 1986 through December 2006. * (**)[***] denotes the ten (five)[one] percent significance level.

Month	Obs.	Mean	St. Dev.	Max.	Median	Min.
January	10372	8.2646	23.0062	299.80	3.00	-68.55
February	10372	4.3549	16.4586	374.77	1.49	-64.71
March	10372	3.4327	16.4451	217.81	0.37	-75.41
April	10372	-0.0018	16.7380	191.27	-2.31	-75.38
May	10372	-2.1570	14.9416	250.00	-3.05	-77.14
June	10372	-1.4492	14.6783	221.26	-1.93	-72.38
July	10372	-0.7001	15.1807	203.45	-1.99	-64.00
August	10372	-1.2590	15.6796	165.59	-1.79	-67.61
September	10372	-2.5983	16.0718	179.01	-2.08	-76.01
October	10372	-1.0704	14.9025	116.12	-1.06	-70.13
November	10372	3.2833	16.6826	247.18	1.07	-78.06
December	10372	5.8947	18.5996	327.62	3.86	-80.22
ANOVA test: F=469.95***			Fruskal-Wallis test: χ^2=5038.41***			

Table III

The Dummy Regression Results of Lower Equity Performance in May and September

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage return on stock *i* in calendar month *t*. *D* is equal to one if the calendar month is May or September, otherwise zero. The sample includes all listed firms on the security exchange and OTC for the period of January 1986 through December 2006. The table reports that the mean return of May and September is significantly lower than that of other months. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
α_0	2.0750	0.0529	39.26	0.0001***
α_1	-4.4526	0.1295	-34.39	0.0001***
F=1182.80***				

Table IV

The Mean Test Results of Lower Equity Performance in May and September

The equally weighted average returns are reported in percentage terms using all listed firms on the security exchange and OTC for the period of January 1986 through December 2006. The table reports that May and September has significantly lower mean performance compared to other months. * (**)[***] denotes the ten (five)[one] percent significance level.

Month	Mean	St. Dev.	Variances	*t*-statistic	*p*-value
May and September	-2.3780	15.5180	Equal	34.39	0.0001***
Others	2.0750	17.3070	Unequal	36.98	0.0001***
For H_0: Variances are equal, F=1.24***					

Table V

The Dummy Regression Results of Different Magnitude of Lower Equity Performance in May and September for Four Sub-samples with Different EPS News

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where D=1 if May or September, D=0 otherwise; G_1=1 if announced annual and semiannual EPS in the same calendar year are both bad news, G_1=0 otherwise; G_2=1 if announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. The table presents that the lower equity performance in May and September is more pronounced for firms with two episodes of bad news in the same calendar year. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
α_0	3.8594	0.0890	43.39	0.0001***
α_1	-3.5265	0.2179	-16.18	0.0001***
α_2	-3.2299	0.1209	-26.71	0.0001***
α_3	-2.7529	0.1763	-15.62	0.0001***
α_4	-1.0372	0.1772	-5.85	0.0001***
α_5	-1.8628	0.2962	-6.29	0.0001***
α_6	-0.4102	0.4318	-0.95	0.3421
α_7	-0.9188	0.4341	-2.12	0.0343**
F=333.33***				

Table VI

The Mean Test Results of Different Magnitude of Lower Equity Performance in May and September for Four Sub-samples with Different EPS News

The equally weighted average returns are reported in percentage terms. The sample includes all listed firms on the security exchange and OTC for the period of January 1986 through December 2006. The table presents that the magnitude of lower May and September performance is larger for firms with two episodes of bad news in the same calendar year. * (**)[***] denotes the ten (five)[one] percent significance level.

Month	Mean	St. Dev.	Variances	*t*-statistic	*p*-value
Panel A: The Firms in which Both Announced Annual and Semiannual EPS in the Same Calendar Year Contain Good News					
May and September	0.3329	16.9460	Equal	15.46	0.0001***
Others	3.8594	17.8880	Unequal	16.03	0.0001***
For H_0: Variances are equal, F=1.11***					
Panel B: The Firms in which Both Announced Annual and Semiannual EPS in the Same Calendar Year Contain Bad News					
May and September	-4.7600	14.2620	Equal	27.73	0.0001***
Others	0.6295	16.8130	Unequal	30.93	0.0001***
For H_0: Variances are equal, F=1.39***					
Panel C: The Firms in which the Announced EPS Contains Bad News, but the Semiannual EPS Is Good News in the Same Calendar Year					
May and September	-2.8300	14.2340	Equal	10.87	0.0001***
Others	1.1065	16.8690	Unequal	12.17	0.0001***
For H_0: Variances are equal, F=1.40***					
Panel D: The Firms in which the Announced EPS Contains Good News, but the Semiannual EPS Is Bad News in the Same Calendar Year					
May and September	-1.6230	15.1910	Equal	11.90	0.0001***
Others	2.8222	17.1720	Unequal	12.91	0.0001***
For H_0: Variances are equal, F=1.28***					

Table VII

The Dummy Regression Results of Lower Equity Performance in May and September for Ten Size Deciles

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage return on stock *i* in calendar month *t*. *D* equals one if the calendar month is May or September, otherwise zero. The size deciles are determined each year based on market value ranking at the end of the preceding year for all listed firms on the security exchange and OTC during the period of January 1986 through December 2006. The table shows that the mean return of May and September is significantly lower than that of other months in all size deciles, especially for the smallest size decile. * (**)[***] denotes the ten (five)[one] percent significance level.

Size Deciles	α_0		α_1	
	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)
MV1(Smallest)	3.8268	14.18	-6.8604	-10.38
	(0.2698)	(0.0001***)	(0.6608)	(0.0001***)
MV2	2.7305	14.01	-5.9238	-12.41
	(0.1949)	(0.0001***)	(0.4773)	(0.0001***)
MV3	2.4994	14.24	-5.1378	-11.95
	(0.1755)	(0.0001***)	(0.4299)	(0.0001***)
MV4	2.2323	13.05	-5.1028	-12.18
	(0.1710)	(0.0001***)	(0.4190)	(0.0001***)
MV5	1.9548	12.31	-4.6893	-12.06
	(0.1588)	(0.0001***)	(0.3889)	(0.0001***)
MV6	1.6176	10.57	-3.6177	-9.65
	(0.1530)	(0.0001***)	(0.3748)	(0.0001***)
MV7	1.8248	12.22	-3.5201	-9.62
	(0.1494)	(0.0001***)	(0.3659)	(0.0001***)
MV8	1.4788	10.33	-3.7815	-10.79
	(0.1431)	(0.0001***)	(0.3506)	(0.0001***)
MV9	1.4370	10.55	-3.2009	-9.60
	(0.1362)	(0.0001***)	(0.3335)	(0.0001***)
MV10(Largest)	1.4703	11.19	-2.8215	-8.77
	(0.1314)	(0.0001***)	(0.3219)	(0.0001***)

Table VIII

The Mean Test Results of Lower Equity Performance in May and September for Ten Size Deciles

The size deciles are determined each year based on market value ranking at the end of the preceding year, and the equally weighted average returns are reported in percentage terms. The table shows that the mean return of May and September is significantly lower than that of other months in all size deciles, especially for the smallest size decile. * (**)[***] denotes the ten (five)[one] percent significance level.

Size Deciles	Mean (St. Dev.)		H_0: Variances are equal	*t*-statistic (*p*-value)	
	May and September	Others		Variances: Equal	Variances: Unequal
MV1(Smallest)	-3.0340	3.8268	F=1.26***	10.38	11.20
	(21.7560)	(24.3990)		(0.0001***)	(0.0001***)
MV2	-3.1930	2.7305	F=1.26***	12.41	13.42
	(17.4550)	(19.6250)		(0.0001***)	(0.0001***)
MV3	-2.6380	2.4994	F=1.27***	11.95	12.92
	(16.0190)	(18.0180)		(0.0001***)	(0.0001***)
MV4	-2.8710	2.2323	F=1.17***	12.18	12.83
	(16.3910)	(17.7250)		(0.0001***)	(0.0001***)
MV5	-2.7350	1.9548	F=1.20***	12.06	12.82
	(14.9730)	(16.4250)		(0.0001***)	(0.0001***)
MV6	-2.0000	1.6175	F=1.08**	9.65	9.91
	(15.7580)	(16.1130)		(0.0001***)	(0.0001***)
MV7	-1.6950	1.8248	F=1.11***	9.62	9.97
	(14.7570)	(15.5680)		(0.0001***)	(0.0001***)
MV8	-2.3030	1.4788	F=1.27***	10.79	11.69
	(13.3670)	(15.0840)		(0.0001***)	(0.0001***)
MV9	-1.7640	1.4370	F=1.27***	9.60	10.40
	(12.7090)	(14.3440)		(0.0001***)	(0.0001***)
MV10(Largest)	-1.3510	1.4703	F=1.21***	8.77	9.34
	(12.4090)	(13.6600)		(0.0001***)	(0.0001***)

Table IX

The Dummy Regression Results of Different Magnitude of Lower Equity Performance in May and September for the Smallest and Largest firms with Different EPS News

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where D=1 if May or September, D=0 otherwise; G_1=1 if both the announced annual and semiannual EPS in the same calendar year contain bad news, G_1=0 otherwise; G_2=1 if the announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if the announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. Ten size deciles are determined each year based on market value ranking at the end of the preceding year. The table reports that the lower equity performance in May and September is more pronounced for the smallest-firms decile with two episodes of bad news in the same calendar year. $^{*}(^{**})[^{***}]$ denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
Panel A: The Smallest Firms (MV1)				
α_0	5.1120	0.4160	12.29	0.0001***
α_1	-4.9212	1.0189	-4.83	0.0001***
α_2	-2.6346	0.6238	-4.22	0.0001***
α_3	-1.8737	0.9077	-2.06	0.0390**
α_4	-1.4367	0.8446	-1.70	0.0890*
α_5	-4.0634	1.5280	-2.66	0.0078***
α_6	-0.6238	2.2233	-0.28	0.7791
α_7	-3.7761	2.0688	-1.83	0.0680*
F=21.65***				
Panel B: The Largest Firms (MV 10)				
α_0	2.7145	0.2303	11.78	0.0001***
α_1	-2.3349	0.5642	-4.14	0.0001***
α_2	-1.9801	0.3030	-6.53	0.0001***
α_3	-2.6826	0.4316	-6.22	0.0001***
α_4	-0.2193	0.4638	-0.47	0.6364
α_5	-1.1596	0.7422	-1.56	0.1182
α_6	-0.4417	1.0572	-0.42	0.6761
α_7	0.7856	1.1360	0.69	0.4892
F=24.79***				

Table X

The Mean Test Results of Different Magnitude of Lower Equity Performance in May and September for the Smallest and Largest firms with Different EPS News

The table reports that the magnitude of lower May and September performance is larger for the smallest firms with both bad news in the same calendar year. * (**)[***] denotes the ten (five)[one] percent significance level.

Size Deciles	Mean (St. Dev.)		H_0: Variances are equal	*t*-statistic (*p*-value)	
	May and September	Others		Variances: Equal	Variances: Unequal
Panel A: The Firms in which Both Announced Annual and Semiannual EPS in the Same Calendar Year Contain Good News					
The smallest firms	0.1909 (25.1700)	5.1120 (25.1770)	F=1.00	4.59 (0.0001^{***})	4.59 (0.0001^{***})
The largest firms	0.3796 (13.0950)	2.7145 (13.4610)	F=1.06	4.14 (0.0001^{***})	4.22 (0.0001^{***})
Panel B: The Firms in which Both Announced Annual and Semiannual EPS in the Same Calendar Year Contain Bad News					
The smallest firms	-6.5070 (18.1460)	2.4775 (22.8540)	F=1.59***	8.53 (0.0001^{***})	9.93 (0.0001^{***})
The largest firms	-2.7600 (11.7040)	0.7345 (13.8870)	F=1.41***	7.17 (0.0001^{***})	8.03 (0.0001^{***})
Panel C: The Firms in which the Announced EPS Contains Bad News, but the Semiannual EPS Is Good News in the Same Calendar Year					
The smallest firms	-2.3070 (17.6970)	3.2383 (22.8570)	F=1.67***	3.04 (0.0024^{***})	3.60 (0.0004^{***})
The largest firms	-2.7450 (10.6820)	0.0319 (12.5950)	F=1.39**	3.39 (0.0001^{***})	3.78 (0.0001^{***})
Panel D: The Firms in which the Announced EPS Contains Good News, but the Semiannual EPS Is Bad News in the Same Calendar Year					
The smallest firms	-5.0220 (20.1170)	3.6753 (26.6380)	F=1.75***	4.50 (0.0001^{***})	5.42 (0.0001^{***})
The largest firms	0.9460 (14.0370)	2.4953 (14.1680)	F=1.02	1.49 (0.1366)	1.50 (0.1349)

Table XI

The Dummy Regression Results of Lower Equity Performance in May and September during Two Sub-periods

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage return on stock *i* in calendar month *t*. *D* is equal to one if the calendar month is May or September, otherwise zero. The sample includes all listed firms on the security exchange and OTC and the period studied of January 1986 through December 2006 is divided into two sub-periods. The table presents that the mean return of May and September is significantly lower than that of other months, especially for the later period. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
Panel A: 1986-1996				
α_0	2.5808	0.1186	21.75	0.0001***
α_1	-2.0469	0.2906	-7.04	0.0001***
F=49.61***				
Panel B: 1997-2006				
α_0	1.9470	0.0590	33.01	0.0001***
α_1	-5.0612	0.1445	-35.03	0.0001***
F=1227.20***				

Table XII

The Dummy Regression Results of Different Magnitude of Lower Equity Performance in May and September for Four Sub-samples with Different EPS News during Two Sub-periods

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where D=1 if May or September, D=0 otherwise; G_1=1 if announced annual and semiannual EPS in the same calendar year are both bad news, G_1=0 otherwise; G_2=1 if announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. The table presents that the magnitude of lower equity performance in May and September is larger for firms with two episodes of bad news in the same calendar year during two sub-periods. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
Panel A: 1986-1996				
α_0	4.1482	0.2083	19.92	0.0001***
α_1	-0.0991	0.5101	-0.19	0.8460
α_2	-2.4943	0.2728	-9.14	0.0001***
α_3	-2.7716	0.4073	-6.81	0.0001***
α_4	-1.1357	0.4064	-2.79	0.0052***
α_5	-4.1154	0.6683	-6.16	0.0001***
α_6	-0.0646	0.9970	-0.06	0.9484
α_7	-2.5234	0.9955	-2.53	0.0113**
F=38.08***				
Panel B: 1997-2006				
α_0	3.7935	0.0982	38.61	0.0001***
α_1	-4.3534	0.2406	-18.09	0.0001***
α_2	-3.4526	0.1349	-25.60	0.0001***
α_3	-2.7515	0.1953	-14.09	0.0001***
α_4	-1.0178	0.1967	-5.17	0.0001***
α_5	-1.4227	0.3304	-4.31	0.0001***
α_6	-0.5314	0.4784	-1.11	0.2667
α_7	-0.5858	0.4818	-1.22	0.2241
F=316.91***				

Table XIII

The Dummy Regression Results of Lower Equity Performance in May and September for Ten Size Deciles during Two Sub-periods

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage return on stock *i* in calendar month *t*. *D* equals one if the calendar month is May or September, otherwise zero. The size deciles are determined each year based on market value ranking at the end of the preceding year. The table shows that the mean return of May and September is significantly lower than that of other months, especially for the smallest size decile during the later sub-period. * (**)[***] denotes the ten (five)[one] percent significance level.

Size Deciles	α_1			
	1986-1996		1997-2006	
	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)
MV1(Smallest)	-5.4227	-4.37	-7.2085	-9.44
	(1.2417)	(0.0001***)	(0.7638)	(0.0001***)
MV2	-5.0578	-4.91	-6.1560	-11.43
	(1.0303)	(0.0001***)	(0.5384)	(0.0001***)
MV3	-2.5825	-2.71	-5.8147	-12.09
	(0.9545)	(0.0069***)	(0.4809)	(0.0001***)
MV4	-2.6850	-2.94	-5.7416	-12.19
	(0.9139)	(0.0033***)	(0.4710)	(0.0001***)
MV5	-1.9348	-2.14	-5.3904	-12.55
	(0.9051)	(0.0326**)	(0.4296)	(0.0001***)
MV6	-1.1681	-1.38	-4.2511	-10.19
	(0.8483)	(0.1686)	(0.4172)	(0.0001***)
MV7	-0.9351	-1.07	-4.1831	-10.42
	(0.8701)	(0.2826)	(0.4015)	(0.0001***)
MV8	-0.5479	-0.68	-4.5890	-11.83
	(0.8111)	(0.4994)	(0.3878)	(0.0001***)
MV9	-0.3108	-0.41	-3.9276	-10.58
	(0.7548)	(0.6805)	(0.3713)	(0.0001***)
MV10(Largest)	-0.2157	-0.26	-3.4316	-9.91
	(0.8286)	(0.7947)	(0.3462)	(0.0001***)

Table XIV

The Dummy Regression Results of Different Magnitude of Lower Equity Performance in May and September for the Smallest and Largest Firms with Different EPS News during Two Sub-periods

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where D=1 if May and September, D=0 otherwise; G_1=1 if both the announced annual and semiannual EPS in the same calendar year contain bad news, G_1=0 otherwise; G_2=1 if the announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if the announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. The table shows that the lower equity performance in May and September is more pronounced for the smallest firms with two episodes of bad news in the same calendar year, especially for the later sub-period. $^{*}(^{**})[^{***}]$ denotes the ten (five)[one] percent significance level.

Parameters	1986-1996		1997-2006	
	Parameter Estimate	*t*-statistic	Parameter Estimate	*t*-statistic
Panel A: The Smallest Firms (MV1)				
α_0	4.6604	5.64***	5.2080	10.97***
α_1	-3.7739	-1.87*	-5.1649	-4.44***
α_2	-0.9089	-0.80	-3.1362	-4.30***
α_3	-2.7041	-1.44	-1.7271	-1.68*
α_4	-2.1529	-1.27	-1.2938	-1.35
α_5	-4.0829	-1.46	-4.1788	-2.34**
α_6	3.2709	0.71	-1.3339	-0.53
α_7	-2.1341	-0.51	-4.1028	-1.74*
	F=3.85***		*F*=18.51***	
Panel B: The Largest Firms (MV 10)				
α_0	4.5046	7.12***	2.3603	9.66***
α_1	1.2911	0.83	-3.0524	-5.10***
α_2	-3.8339	-4.80***	-1.6097	-4.96***
α_3	-4.8469	-4.26***	-2.2434	-4.86***
α_4	-1.2767	-1.11	-0.0672	-0.13
α_5	-2.1012	-1.07	-1.1241	-1.41
α_6	-1.5267	-0.55	-0.3017	-0.27
α_7	-2.6731	-0.94	1.4570	1.18
	F=6.17***		*F*=23.19***	

Table XV

The Dummy Regression Results of Lower Equity Performance Adjusted for Market in May and September

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

Where R_{it} is the percentage excess return adjusted for market performance on stock *i* in calendar month *t*. *D* is equal to one if the calendar month is May or September, otherwise zero. The table reports that the mean excess return of May and September is significantly lower than that of other months. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
α_0	0.6775	0.0461	14.69	0.0001***
α_1	-0.9678	0.1130	-8.57	0.0001***
F=73.37***				

Table XVI

The Dummy Regression Results of Different Magnitude of Lower Equity Performance Adjusted for Market in May and September for Four Sub-samples with Different EPS News

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where R_{it} is the percentage excess return adjusted for market performance on stock *i* in calendar month *t*. D=1 if May or September, D=0 otherwise; G_1=1 if announced annual and semiannual EPS in the same calendar year are both bad news, G_1=0 otherwise; G_2=1 if announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. The table reports that the lower equity performance in May and September is more pronounced for firms with two episodes of bad news in the same calendar year after taking into account the adjustment of market performance. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
α_0	2.3584	0.0776	30.38	0.0001***
α_1	-0.6016	0.1902	-3.16	0.0016***
α_2	-3.1121	0.1055	-29.49	0.0001***
α_3	-2.0005	0.1538	-13.00	0.0001***
α_4	-1.3348	0.1547	-8.63	0.0001***
α_5	-0.6562	0.2585	-2.54	0.0111**
α_6	-0.5377	0.3768	-1.43	0.1536
α_7	-0.2645	0.3789	-0.70	0.4852
F=173.77***				

Table XVII

The Dummy Regression Results of Lower Equity Performance Adjusted for Market in May and September for Ten Size Deciles

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage excess return adjusted for market performance on stock *i* in calendar month *t*. *D* equals one if the calendar month is May or September, otherwise zero. The size deciles are determined each year based on market value ranking at the end of the preceding year. The table presents that the mean excess return of May and September is significantly lower than that of other months, especially for the smallest size decile. * (**)[***] denotes the ten (five)[one] percent significance level.

Size Deciles	α_0		α_1	
	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)
MV1(Smallest)	2.5171	9.78	-2.8803	-4.57
	(0.2574)	(0.0001***)	(0.6304)	(0.0001***)
MV2	1.3544	7.66	-2.2364	-5.16
	(0.1768)	(0.0001***)	(0.4331)	(0.0001***)
MV3	1.0751	6.95	-1.6554	-4.37
	(0.1548)	(0.0001***)	(0.3792)	(0.0001***)
MV4	0.8014	5.36	-1.6161	-4.41
	(0.1495)	(0.0001***)	(0.3663)	(0.0001***)
MV5	0.5537	4.08	-1.2819	-3.86
	(0.1357)	(0.0001***)	(0.3323)	(0.0001***)
MV6	0.2022	1.56	-0.2581	-0.81
	(0.1299)	(0.1198)	(0.3183)	(0.4175)
MV7	0.4071	3.29	-0.1365	-0.45
	(0.1237)	(0.0010***)	(0.3029)	(0.6524)
MV8	0.0514	0.44	-0.4077	-1.42
	(0.1172)	(0.6610)	(0.2872)	(0.1557)
MV9	0.0262	0.24	0.1875	0.69
	(0.1108)	(0.8132)	(0.2715)	(0.4899)
MV10(Largest)	0.0928	0.92	0.5160	2.09
	(0.1008)	(0.3573)	(0.2470)	(0.0367**)

Table XVIII

The Dummy Regression Results of Lower Equity Performance in May and September after Excluding January Returns

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage return on stock *i* in calendar month *t*, excluding January returns. *D* is equal to one if the calendar month is May or September, otherwise zero. The table presents that the mean return of May and September is still significantly lower than that of other months, even if excluding January returns. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
α_0	1.3872	0.0532	26.08	0.0001***
α_1	-3.7649	0.1248	-30.18	0.0001***
F=910.86***				

Table XIX

The Dummy Regression Results of Different Magnitude of Lower Equity Performance in May and September for Four Sub-samples with Different EPS News after Excluding January Returns

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where R_{it} is the percentage return on stock *i* in calendar month *t*, excluding January returns. D=1 if May or September, D=0 otherwise; G_1=1 if announced annual and semiannual EPS in the same calendar year are both bad news, G_1=0 otherwise; G_2=1 if announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. The table shows that the lower equity performance in May and September is still more pronounced for firms with two episodes of bad news in the same calendar year, even if excluding January returns. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
α_0	3.1464	0.0895	35.17	0.0001***
α_1	-2.8135	0.2098	-13.41	0.0001***
α_2	-3.1642	0.1216	-26.02	0.0001***
α_3	-3.0526	0.1773	-17.22	0.0001***
α_4	-0.7487	0.1783	-4.20	0.0001***
α_5	-1.9285	0.2852	-6.76	0.0001***
α_6	-0.1104	0.4158	-0.27	0.7906
α_7	-1.2073	0.4180	-2.89	0.0039***
F=301.35***				

Table XX

The Dummy Regression Results of Lower Equity Performance in May and September for Ten Size Deciles after Excluding January Returns

The dummy variable regression model is as follows.

$R_{it} = \alpha_0 + \alpha_1 D + \varepsilon_t$

where R_{it} is the percentage return on stock *i* in calendar month *t*, excluding January returns. *D* equals one if the calendar month is May or September, otherwise zero. The size deciles are determined each year based on market value ranking at the end of the preceding year. The table shows that the mean return of May and September is still significantly lower than that of other months even if excluding January returns, especially for the smallest size decile. * (**)[***] denotes the ten (five)[one] percent significance level.

Size Deciles	α_0		α_1	
	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)	Parameter Est. (St. Err.)	*t*-statistic (*p*-value)
MV1(Smallest)	2.4039	9.11	-5.4375	-8.79
	(0.2639)	(0.0001***)	(0.6189)	(0.0001***)
MV2	1.8847	9.49	-5.0780	-10.91
	(0.1985)	(0.0001***)	(0.4655)	(0.0001***)
MV3	1.8428	10.32	-4.4812	-10.70
	(0.1786)	(0.0001***)	(0.4188)	(0.0001***)
MV4	1.4928	8.62	-4.3634	-10.74
	(0.1732)	(0.0001***)	(0.4062)	(0.0001***)
MV5	1.3306	8.25	-4.0651	-10.75
	(0.1613)	(0.0001***)	(0.3782)	(0.0001***)
MV6	1.0124	6.53	-3.0125	-8.29
	(0.1550)	(0.0001***)	(0.3636)	(0.0001***)
MV7	1.3556	8.82	-3.0509	-8.47
	(0.1537)	(0.0001***)	(0.3604)	(0.0001***)
MV8	0.9227	6.37	-3.2254	-9.50
	(0.1448)	(0.0001***)	(0.3397)	(0.0001***)
MV9	0.9133	6.62	-2.6772	-8.27
	(0.1380)	(0.0001***)	(0.3236)	(0.0001***)
MV10(Largest)	1.0823	7.92	-2.4336	-7.60
	(0.1366)	(0.0001***)	(0.3203)	(0.0001***)

Table XXI

The Dummy Regression Results of Different Magnitude of Lower Equity Performance in May and September for the Smallest and Largest firms with Different EPS News after Excluding January Returns

The dummy variable regression model is as follows.

$$R_{it} = \alpha_0 + \alpha_1 D + \alpha_2 G_1 + \alpha_3 G_2 + \alpha_4 G_3 + \alpha_5 D * G_1 + \alpha_6 D * G_2 + \alpha_7 D * G_3 + \varepsilon_t$$

where R_{it} is the percentage return on stock *i* in calendar month *t*, excluding January returns. D=1 if May or September, D=0 otherwise; G_1=1 if both the announced annual and semiannual EPS in the same calendar year contain bad news, G_1=0 otherwise; G_2=1 if the announced annual EPS is bad news, but semiannual EPS is good news, G_2=0 otherwise; G_3=1 if the announced annual EPS is good news, but semiannual EPS is bad news, G_3=0 otherwise. The table reports that the lower equity performance in May and September is still more pronounced for the smallest firms with two episodes of bad news in the same calendar year, even if excluding January returns. * (**)[***] denotes the ten (five)[one] percent significance level.

Parameters	Parameter Estimate	Standard Error	*t*-statistic	*p*-value
Panel A: The Smallest Firms (MV1)				
α_0	3.6958	0.4067	9.09	0.0001***
α_1	-3.5049	0.9537	-3.68	0.0002***
α_2	-2.6087	0.6098	-4.28	0.0001***
α_3	-2.4213	0.8873	-2.73	0.0064***
α_4	-1.0961	0.8257	-1.33	0.1844
α_5	-4.0893	1.4302	-2.86	0.0043***
α_6	-0.0762	2.0810	-0.04	0.9708
α_7	-4.1167	1.9364	-2.13	0.0335**
F=18.15***				
Panel B: The Largest Firms (MV 10)				
α_0	2.3082	0.2393	9.65	0.0001***
α_1	-1.9285	0.5612	-3.44	0.0006***
α_2	-1.9730	0.3148	-6.27	0.0001***
α_3	-2.8472	0.4484	-6.35	0.0001***
α_4	0.1256	0.4818	0.26	0.7943
α_5	-1.1667	0.7382	-1.58	0.1140
α_6	-0.2771	1.0515	-0.26	0.7922
α_7	0.4407	1.1299	0.39	0.6965
F=22.63***				