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Full Length Research Paper

Short-termism, earnings and asset prices

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This study examines a simple theory in which investors with short-termism behaviors to show the influence of short-termism on the relation between earnings, returns, and return volatility, and then we examine the empirical evidences from our theory. It first illustrates how asset prices may fluctuate more than the fundamental value when investors have short-termism behaviors. The result of excess asset price volatility in relation to earnings is presented. Asset price volatility is also shown to be positively related with the degree of short-termism and the variation in earnings. Then, we empirically examine the influence of short-termism in the relation between earnings and stock returns, and between earnings volatility and return volatility. Our observation indicates that the empirical results support the theory of short-termism.

Key words: Short-termism, earnings, asset prices.

INTRODUCTION

Short-termism, as a particular form of bounded rationality, is referred to as a cognitive boundary of holding information in memory and learning new information. It is widely acknowledged to affect human behaviors and may also influence investors' behaviors in financial markets on several aspects. First, individuals may easily forget the history in their memory. They may find it hard to use all information to form fully rational forecasts. Moreover, the capacity for data could be constrained by technology. Secondly, many investors may choose not to exploit full information to make predictions to either save on the cost of information gathering or just simplify the calculation. Finally, investors may not always be assumed to have complete understanding or knowledge of the fundamental structure. In many circumstances, there occur structural changes arisen either from macroeconomic or industrial environments, such as financial crises, technological changes, restructures, new managements, and others. Therefore, it might be appropriate for investors to ignore older records and exploit only the most recent part of the historical data.

The theories regarding short-termism are studied in Simon (1956, 1972), Smith and Deely (1975), Dow (1991) and Piccione and Rubinstein (1997). These studies provide several game theoretical frameworks to analyze human behaviors. Other researches, such as Stein (1989), Barberis et al. (1998), Daniel et al. (1998), De Long et al. (1990) and Froot et al. (1992) have developed theoretical models with finite periods based on different psychological biases [for a suvey, Conlisk (1996) and Barberis and Thaler (2003)]. The theoretical part of this study proposes a simple infinite-period model in which investors have short-termism behaviors to investigate a few of the features of the relation between short-termism, earnings, and asset prices.

Asset price volatility has been a concern of many academic researchers and regulators. The traditional present value model based on the assumption of rational expectation could not satisfactorily provide a full understanding of price volatility in financial markets. Shiller (1981, 1989) found evidence of excess price volatility that cannot be explained by the dividend information. De Bondt and Thaler (1985) observed the phenomenon of overreaction. This study uses a simple model to illustrate how asset prices may deviate from the fundamental value. The intuition behind the model can be described as follows. When the investor has received positive information about the earnings (which are being paid as dividends), based on the short-termism decision

Abbreviations: REE, Rational expectations equilibrium; **GLS,** generalized least squares.

he will tend to overweigh the received recent data. Therefore, the investor may become too optimistic and, as a result, overvalue the asset.

The reverse argument holds as well. Consequently, the asset price may reflect too much in relation to the observations of earnings. This result contributes to providing an alternative explanation for the anomaly of excess price volatility and overreaction in financial markets.

The second part of this article deals with directly testing the theory on the relation between short-termism, earnings, and volatilities by means of empirical data, which to the knowledge has not been fully examined. The study take advantage of the margin trading data available for Taiwanese stocks with the turnover rate of margin trading being used as a proxy for short-termism. The margin trading data include quarterly panel data on the Taiwan stock market over the Q1 1991 to Q3 2008 period. Domestic individual investors, who are considered to have more irrational behavior and less information, account for 83.63% of the total trading volume. The average turnover rate for all participators in the market is 201.84% during the sample period, which implies that most trading activities are short-term. Given the above-mentioned market characteristics, the Taiwanese market has become particularly suitable for studying the impact of short-termism on stock market volatility. When E/P, book-to-market and size effects are controlled, the empirical results show that short-termism is positively related to abnormal returns, and has a positive effect on the relation between earnings (E/P as well) and abnormal returns.

They also indicate that short-termism is positively related to excess return volatility. These results are consistent with the theoretical predictions.

THE MODEL

Consider a risky asset with infinite-horizon earnings $\{d(t)\}_{t=1}^{\infty}$, which are being paid to the stockholders totally as dividends. For simplicity, earnings $d(t)$ is assumed to follow an i.i.d. binomial process whose realizations are d_L and d_H, with probabilities of $1-\pi$ and π, respectively; $d_H > d_L > 0$. Investors are not assumed to have knowledge of π. Denote the constant discount rate as r. At each time period t, a risk-neutral representative investor i uses his subjective judgment to value the asset by the present value model as

$$\mathrm{E}_t^i\left\{\frac{d_{t+1}}{1+r}+\frac{d_{t+2}}{(1+r)^2}+\cdots+\frac{d_{t+s}}{(1+r)^s}+\cdots\right\}, \qquad (1)$$

where E^i is the subjective expectation. Consider first the benchmark case of rational expectations equilibrium (REE). By the i.i.d. assumption, the constant REE price at time t is obtained as

$$p^e(t)=p^e=\frac{\bar{d}}{r}$$
$$=\frac{1}{r}\cdot[(1-\pi)\cdot d_L+\pi\cdot d_H],$$
$$\text{for all } t, \qquad (2)$$

where $\bar{d}$ is the mean of the earnings. This representation simply describes the fundamental value of the asset as the discount stream of future earnings based on REE. Now consider the environment in which the representative investor faces m-period short-termism, where m is exogenously given as a natural number.[1] The investor is assumed to anticipate future earnings as an i.i.d. process. However, he does not have access to the true model and determines the subjective valuation of the asset based on previous m-period historical data.

The assessment of investors can then be described as a simple assessment based on the frequency of observations. It provides unbiased estimators when only the previous m-period observations are used and the other earlier records are deleted. Given the most recent observations of earnings as $d(t),d(t-1),\cdots,d(t-m+1)$, the estimator of π by the investor's subjective judgment shall be

$$q^m[d(t),d(t-1),\cdots,d(t-m+1)]$$
$$=\frac{\text{the number of } d_{t-j} \text{ being } d_H}{m}. \qquad (3)$$

Note that as m approaches infinite, that is, as the investor is allowed to observe and exploit long-enough data, the above estimation converges to the true value of π, as is the case of REE by the law of large numbers. In this setting, an analytical solution for asset valuation can be obtained based on the investor's subjective expectation, which can be calculated from Equation 1 and 3. The investor's subjective asset valuation at time t can be written as

$$p^m(t\mid d(t),d(t-1),\cdots,d(t-m+1))$$
$$=\frac{1}{r}\left[(1-q^m)\cdot d_L+q^m\cdot d_H\right], \qquad (4)$$

where q^m is the subjective estimator as in (3). The following part first illustrates the case of single-period short-termism. Suppose that $d_t=d_L$ is realized. From Equation (3) it follows that $q^1(d_L)=0$. This reflects the fact that the investor may take into account observed low earnings to conduct an overly pessimistic assessment of future earnings, which leads to a low asset price level as $p^1(d_L)=d_L/r$.

[1]It is possible to consider the cost of information gathering in our framework. Then there considers an optimal decision problem that regards the tradeoff between cost and benefit for receiving the amount of information as in Dow (1991). However, incorporating such generality only complicates the solution while the basic argument of excess volatility in this study shall not be affected, and in general, it cannot provide closed-form solutions.

The reverse argument is true when $d_t = d_H$: an overly optimistic belief $q^1(d_H) = 1$ and a high asset price $p^1(d_H) = d_H / r$ are presented. This result suggests an interesting phenomenon in which asset prices may be overpriced (greater than p^e) or underpriced (less than p^e). Such behavior of the asset price is consistent with evidence of excess volatility and overreaction. In the framework, overpriced valuation occurs when the investor receives and reflects the positive information on earnings too much. On the other hand, the asset shall be underpriced when low earnings are recently observed.

Now we compare the mean of the asset price with the REE. The expected value of the prices can be computed as

$$\begin{aligned} \mathrm{E}(p^1) &= \mathrm{Prob}(d(t-1) = d_L) \cdot p^1(d_L) \\ &\quad + \mathrm{Prob}(d(t-1) = d_H) \cdot p^1(d_H) \\ &= \frac{1}{r}[(1-\pi) \cdot d_L + \pi \cdot d_H] = p^e . \end{aligned} \quad (5)$$

$$\begin{aligned} \mathrm{V}(p^1) &= \mathrm{Prob}(d(t-1) = d_L) \cdot (p^1(d_L) - p^e)^2 \\ &\quad + \mathrm{Prob}(d(t-1) = d_H) \cdot (p^1(d_H) - p^e)^2 \\ &= \frac{1}{r^2} \pi(1-\pi)(d_H - d_L)^2 > 0 . \end{aligned}$$

This result suggests that the asset price in one-period short-termism has the same mean value as in a REE.

However, the asset price volatility can be very different from the corresponding REE price volatility. By further calculations it follows that for comparison on the volatility of earnings d_t , the asset price can be calculated to obtain

$$\begin{aligned} &\mathrm{V}(d_t) = (1-\pi) \cdot (d_L - \bar{d})^2 + \pi \cdot (d_H - \bar{d})^2 \\ &= \pi(1-\pi)(d_H - d_L)^2 . \end{aligned} \quad (6)$$

It then follows that the ratio of the volatility of the asset price in one-period short-termism to the volatility of earnings shall be

$$\frac{\mathrm{V}(p^1)}{\mathrm{V}(d)} = \frac{1}{r^2} . \quad (7)$$

This result demonstrates that the volatility of asset price p^1 can be much greater than the volatility of $d(t)$. For example, if the interest rate r is considered as 10%, then the ratio will become 100. All these properties are presented as formal results in the next in course of this work.

The Influence of short-termism on asset prices

Now consider the general framework with general m -period short-termism. Consider x_k^m as the event set such that the number of realization of $\{d_{t-j}\}_{j=1}^m$ as d_H is k . Denote $\#(x_k^m) = k$ as the number of d_H . The first result demonstrates the relationship between earnings and asset prices.

Proposition 1: The asset price with m -period short-termism $p^m(t)$ at time t is positively related to the recent earnings, that is,

$$p^m(t) = \frac{1}{r}[d_L + \frac{\#(x_k^m)}{m}(d_H - d_L)] . \quad (8)$$

Proof: Since d_t follows an i.i.d. binomial process, the probability distribution function for x_k shall be

$$\begin{aligned} &\mathrm{Prob}(\#(x_k^m) = k) \\ &= \frac{m!}{k!\,(m-k)!}(1-\pi)^{m-k}\pi^k , k = 0,1,\cdots,m. \end{aligned}$$

The subjective estimator is $q^m(x_k^m) = k/m$ by (3). Then the asset price p^m can be represented as

$$\begin{aligned} &p^m(t) \\ &= \frac{1}{r} \cdot [(1 - q^m(x_k))d_L + q^m(x_k)d_H \\ &= \frac{1}{r}[d_L + \frac{\#(x_k^m)}{m}(d_H - d_L)] . \end{aligned}$$

This proposition suggests that in this framework, when high earnings are observed, the subjective expectation based on short-termism causes the asset price to increase to a high level. Then, on subsequent periods, as new information arrives, the price may move down, with long-term mean value as REE. Such pattern of asset price also helps to explain the phenomenon of overreaction as in De Bondt and Thaler (1985).

The next result demonstrates the mean of asset prices as the same with REE; that is, the asset price shall fluctuate around the REE price p^e .

Proposition 2: The unconditional mean value of the asset price with m -period short-termism p^m is equal to the REE price for any natural number m , that is,

$$E(p^m) = p^e , m = 1,2,\cdots \quad (7)$$

Proof: From (8) the mean value of the asset price p^m can be represented as

$$\mathrm{E}(p^m(t)) = E(\frac{1}{r}[d_L + \frac{\#(x_k^m(t))}{m}(d_H - d_L)] .$$

Given that the mean value of $\#(x_k^m)$ is $m\pi$ (Ross, 2000), the following can be obtained:

$$
\begin{aligned}
&\mathrm{E}(p^m)\\
&=\frac{1}{r}[d_L+\frac{m\pi}{m}(d_H-d_L)]\\
&=\frac{1}{r}[(1-\pi)\cdot d_L+\pi\cdot d_H]\\
&=p^e
\end{aligned}
$$

The above result suggests that the long run average asset price shall reflect the fundamental valuation. However, the asset price can deviate largely from the REE in the short run. It may be overpriced or underpriced, depending on the most recent observations of earnings. In the next proposition, the property of excess volatility is demonstrated.

Proposition 3: The unconditional price volatility with m -period short-termism is greater than the REE price for any finite natural number m ; $m=1,2,\cdots$.

$$V(p^m)=\frac{\pi(1-\pi)}{m}\frac{(d_H-d_L)^2}{r^2}. \quad (9)$$

Furthermore, the ratio of the volatility of the asset price to the volatility of the earnings is a decreasing function of m and r , that is.,

$$\frac{\mathrm{V}(p^m)}{V(d)}=\frac{1}{m\cdot r^2}. \quad (10)$$

Proof: From the probability distribution function of x_k^m in Equation 7 and given that the variance of $\#(x_k^m)$ is $m\pi(1-\pi)$ (Ross, 2000), it follows that

$$
\begin{aligned}
&\mathrm{V}(p^m)\\
&=\frac{1}{r^2}\mathrm{V}(\#(x_k^m))\frac{1}{m^2}(d_H-d_L)^2\\
&=\frac{\pi(1-\pi)}{m}\frac{1}{r^2}(d_H-d_L)^2
\end{aligned}
$$

Then Equation 10 is easily followed by Equation 6. ϒ The above result demonstrates that the excess asset price volatility is related to the earnings. It also demonstrates that the price volatility is positively related to the degree of short-termism m and the variation of the earnings. The degree of excess volatility is greater when the interest rate is lower and the degree of short-termism is stronger (m is smaller). Note that when m approaches infinite, $V(p^m)$ converges at zero, as in the benchmark case of REE price p^m , which has only one value. The result helps to provide additional explanation for the phenomenon of excess volatility as in Shiller (1981, 1989) by demonstrating the association between short-termism, earnings and asset valuation.

Empirical models and data description

The theory implies that with short-termism, stock prices tend to overreact on earnings, and the stock price volatility is positively associated with the degree of short-termism. To test the theoretical results, the study examines the relation between short-termism, earnings, and volatility using the empirical data observed in Taiwan.

To normalize the different price levels, the study examine the quarterly return over the Q1 1991 to Q3 2008 period for 1373 listed companies in the Taiwan Stock Exchange. The data were collected from the TEJ database. As suggested by Oh et al., (2006), the study use panel data which allow to increase the scope of information. This is especially beneficial in research with limited data. The study uses quarterly data because earnings can only be observed quarterly. Besides, daily returns are widely found to be serially correlated. The study believes quarterly stock returns and return volatility may reduce the factors of autocorrelation. Accordingly, the study shall focus on investigating the relation between stock returns, earnings, and short-termism by controlling E/P, book-to-market, and size effects in the same spirit as previous studies such as Fama and McBeth (1973), Banz (1981), and Fama and French (1992):

$$
\begin{aligned}
&R_{it}=a+b_1\mathrm{E/P(+)}_{it}+b_2\mathrm{E/P\ dummy}_{it}\\
&+b_3\mathrm{short\text{-}termism}_{it}+b_4\mathrm{size}_{it}\\
&+b_5\ln(\mathrm{B/M})_{it}+b_6\mathrm{E/P(+)}_{it}\times\mathrm{short\text{-}termism}_{it}\\
&+b_7\mathrm{E/P\ dummy}_{it}\times\mathrm{short\text{-}termism}_{it}+\mathrm{e}_{\mathrm{it}}\ ,
\end{aligned} \quad (11)
$$

where R_{it} is the abnormal return for company *i* at period *t*, computed from market models using the previous 250 daily returns; $\mathrm{E/P(+)}$ is the earnings-to-price ratio for positive-earning firms; E/P dummy is the dummy variable for positive- and negative-earning firms, which equals one when the firm has negative earnings and zero otherwise; size is the logarithm of market capitalization; B/M is the book-to-market ratio; short-termism is the turnover rate of margin trading being used as a proxy; and e_{it} is the residual error of the regression. For robustness, we show two other models in which E/P (+) and the earnings dummy are replaced by earnings per share and E/P, respectively. Since short-termism cannot be observed directly from empirical data, we take advantage of the margin trading data available for Taiwanese stocks, with the turnover rate of margin trading being used as a proxy for short-termism for several reasons. First, in the Taiwanese market, margin trades should be resold within 1 year; therefore, margin trading is more likely to be short-term. Second, margin trading is only allowed for domestic individual investors whose behavior is expected to be more short-termist. Third, the interest rate on margin borrowing is much higher than the lending rate (normally by about 2-4%). The higher investment cost provides an incentive to engage more in short-term trading. The study also examines the relation between excess volatility and short-termism with the following model:

$$
\begin{aligned}
&\mathrm{abnormal\ volatility}_{it}\\
&=a+b_1\mathrm{earnings\ volatility}_{it}\\
&+b_2\mathrm{short\text{-}termism}_{it}+b_3\mathrm{size}_{it}\\
&+b_4\mathrm{earnings\ volatility}_{it}\times\mathrm{short\text{-}termism}_{it}+e_{it}\ ,
\end{aligned} \quad (12)
$$

Table 1. Descriptive statistics.

Variable	Mean	Median	First quartile	Third quartile	Std. deviation	Observation
Abnormal return (%)	0.408	-1.807	16.9584	-21.5438	39.734	52119
Abnormal return volatility ($\%^2$)	460.468	349.572	595.6573	186.9281	647.465	52002
Short-termism	0.243	0.129	0.3361	0.0340	0.304	41768
Earnings per share	0.369	0.290	0.7000	0.0100	1.175	62382
E/P	-0.035	0.010	0.0214	-0.0022	0.681	49649
E/P(+)	0.016	0.010	0.0215	0.0000	0.071	50648
E/P dummy	0.240	0.000	0.0000	0.0000	0.427	62382
Earnings volatility	0.554	0.051	0.1662	0.0158	6.630	57295
Ln(B/M)	-0.374	-0.370	0.1043	-0.8450	0.715	51225
Size	15.106	15.051	16.0290	14.0370	1.545	52306

where $\text{abnormal volatility}_{it}$ is the excess volatility for company *i* at period *t*, measured by $\sigma_{it}^2 - \beta_{it}^2 \sigma_{mt}^2$, in which σ_{it}^2 abnormal return volatility is as large as 460.5%. The earnings volatility is also large, reflecting the dispersion of earnings performance. The difference in firm sizes is insignificant since most firms in Taiwan are small. The average E/P dummy is 0.24, which implies that 24% of quarterly earnings are negative. Significant dispersion exists in the short-termism variable.

EMPIRICAL RESULTS

The study report the panel data estimates from a random effects regression model with generalized least squares (GLS) eliminates. Table 2 shows the relation between earnings, short-termism, and stock returns. Model 3 provides a benchmark case without short-termism. It indicates positive E/P effects consistent with most developed and developing markets. However, the study find that negative B/M effects exist, and size has no explanatory power for returns in the Taiwan market. Considering short-termism in Model 4, significant short-termism effects are found, leaving the properties of other factors unchanged. The results are robust when considering that E/P (+) and the E/P dummy are replaced by either earnings per share in Model 1 or by E/P in Model 2. Models 5 and 6 show that short-termism amplifies E/P effects when the cross-variable E/P*short-termism is incorporated.

The association between short-termism and return volatility is reported in Table 3. The benchmark case without short-termism is shown in Model 1, which indicates a positive relation between earnings volatility and return volatility. Short-termism has a significant effect on return volatility in Models 2 and 3. Negative cross-variable effects are also observed in Models 4 and 5, partly because of a negative correlation (with a correlation coefficient of -0.33) between short-termism and earnings volatility. As mentioned by Caner and Önder (2005), the asset market volatility in emerging markets may be associated with other risks, such as the exchange rate risk and lagged return. One interesting finding in their study shows that exchange rate volatility is not a significant factor for return volatility in the Taiwanese market. In the study, however, the use of quarterly data may preclude the daily autocorrelation between stock returns; we shall therefore focus on the role of short-termism on the association between earnings and return volatility.

To check whether the results are driven by extreme observations in some of the subperiods, in Tables 4 and 5 the study subdivide the data into four subperiods: 1991 - 1996, 1997 - 1998, 1999 - 2000, and 2001 - 2008, and report the regression results on these four periods. The subperiods 1997-1998 and 1999 - 2000 are selected because of the Asian financial crises and internet bubble periods, respectively. The influences of short-termism on returns are robust for all subperiods in Table 4. Cross-variable effects of short-termism and E/P (+) are also observed, while insignificant E/P dummy*short-termism is found in two subperiods, leading to an overall robust cross-variable effect between E/P and short-termism on stock returns. Similarly, the associations between short-termism, earnings volatility and return volatility are shown with robustness in Table 5.

CONCLUSIONS

This study documents a simple but clear model for studying the investor's decision that takes into account the cognitive limitation known as short-termism. Considering short-termism leads the investor to participate in the market with either optimistic or pessimistic expectations. The asset price volatility is shown to be much greater than the rational expectations equilibrium, while the mean value of the asset price stays the same as the rational expectations equilibrium. This framework demonstrates that excess asset price volatility is related to earnings, since investors overweigh the

Table 2. Earnings, short-termism, and stock returns.

Regressor	Dependent variable: Abnormal return					
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Constant	-8.473*** (-35.40)	-7.966*** (-3.66)	-3.833* (-1.95)	-7.219*** (-3.24)	-8.959*** (-4.05)	-8.511*** (-3.80)
Earnings per share	4.484*** (25.52)	1.872*** (6.74)				
E/P(+)			16.193*** (3.95)	27.672*** (4.72)		28.213*** (4.62)
E/P dummy			-5.287*** (-12.32)	-5.264*** (-10.99)		-3.427*** (-5.80)
E/P					7.122*** (7.06)	
Short-termism	31.037*** (51.18)	24.030*** (34.64)		24.950*** (39.05)	24.389*** (37.51)	26.078*** (29.10)
Earnings per share * Short-termism		2.893*** (4.42)				
E/P * Short-termism					67.122*** (9.22)	
E/P(+) * Short-termism						20.936 (0.56)
E/P dummy* Short-termism						-8.173*** (-4.86)
Ln(B/M)		-8.317*** (-25.36)	-11.774*** (-42.64)	-8.645*** (-26.42)	-9.009*** (-27.70)	-8.726*** (-26.58)
Size		-0.066 (-0.46)	0.078 (0.60)	-0.027 (-0.18)	0.036 (0.24)	0.028 (0.19)
Adjusted R^2	0.077	0.093	0.057	0.093	0.093	0.094
Observations	41569	41290	49679	40267	39388	40267

Note: The numbers within parentheses are the t-statistics of corresponding coefficients. Stars refer to the level of significance: *, 10%; **, 5%; and ***, 1%.

recent observations of earnings. A positive association between asset price volatility and short-termism is also shown.

Besides the theory, our empirical results also contribute to providing a direct behavioral explanation for the cross-sectional differences in stock returns. The use of

Table 3. Earnings volatility, short-termism, and return volatility.

Regressor	Dependent variable: Abnormal return volatility				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	2152.641*** (45.46)	394.741*** (79.05)	2078.089*** (73.25)	1732.506*** (61.05)	2067.677*** (72.89)
Earnings volatility	7.889*** (14.10)		9.275*** (26.82)	10.295*** (25.21)	11.429*** (28.85)
Short-termism		161.205*** (29.09)	262.100*** (48.35)		268.729*** (49.34)
Earnings volatility *Short-termism				-10.530*** (-5.58)	-20.396*** (-11.10)
Size	-109.476*** (-35.10)		-113.325*** (-60.36)	-86.470*** (-46.61)	-112.673*** (-60.03)
Adjusted R^2	0.039	0.043	0.140	0.093	0.142
Observations	51244	41717	41312	41312	41312

Note: The numbers within parentheses are the t-statistics of corresponding coefficients. Stars refer to the level of significance: *, 10%; **, 5%; and ***, 1%.

Table 4. Earnings volatility, short-termism, and stock returns for different periods.

Regressor	Dependent variable: Abnormal return			
	1991-1996	**1997-1998**	**1999-2000**	**2001-2008**
Constant	103.468*** (-13.54)	-34.118*** (-4.53)	-38.474*** (-5.90)	-14.348*** (-5.77)
E/P(+)	53.053** (2.37)	198.172*** (2.96)	45.817* (1.79)	23.240*** (3.68)
E/P dummy	-3.283* (-1.71)	-6.678*** (-3.69)	-9.359*** (-6.27)	0.589 (0.87)
Short-termism	34.006*** (20.95)	20.855*** (11.62)	26.379*** (11.15)	37.924*** (28.36)
E/P(+) * Short-termism	-227.486*** (-2.81)	-305.667*** (-2.82)	-491.013*** (-4.48)	-136.747*** (-2.81)
E/P dummy * Short-termism	0.857 (0.24)	-8.629*** (-2.77)	-0.599 (-0.14)	-14.338*** (-5.87)
Ln(B/M)	-12.541*** (-11.56)	-18.682*** (-18.30)	-15.836*** (-19.29)	-8.665*** (-22.48)
Size	5.510*** (10.76)	0.543 (1.17)	1.227*** (2.92)	0.537*** (3.30)
Adjusted R^2	0.165	0.245	0.191	0.094
Observations	5077	2860	4540	27990

Note: The numbers within parentheses are the t-statistics of corresponding coefficients. Stars refer to the level of significance: *10%; **5%; and ***1%.

Table 5. Earnings volatility, short-termism, and return volatility for different periods.

Regressor	Dependent variable: Abnormal return volatility			
	1991-1996	**1997-1998**	**1999-2000**	**2001-2008**
Constant	366.380*** (7.49)	702.915*** (10.13)	1549.365*** (20.99)	1713.548*** (45.03)
Earnings volatility	2.675*** (6.99)	5.604*** (5.32)	12.988*** (10.86)	16.603*** (28.39)
Short-termism	180.312*** (29.16)	263.366*** (28.65)	379.840*** (20.30)	479.800*** (62.73)
Earnings volatility * Short-termism	-1.168 (-0.56)	-7.328** (-2.30)	-18.246*** (-4.75)	-30.762*** (-8.40)
Size	-15.078*** (-4.95)	-29.310*** (-6.91)	-71.959*** (-14.84)	-90.212*** (-35.57)
Adjusted R^2	0.181	0.238	0.130	0.171
observations	5162	2904	4699	28547

Note: The numbers within parentheses are the t-statistics of corresponding coefficients. Stars refer to the level of significance: *, 10%; **, 5%; and ***, 1%.

quarterly data allows us to describe the influence of short-termism and earnings on stock returns and return volatility rather than considering the serial correlations that are necessary when daily data are used. By controlling the market risk (betas), size, book-to-market ratio, and earnings/price, this study provides new empirical evidence on the earnings-returns relationships in the Taiwanese market. Short-termism is observed to amplify the effect of earnings on stock returns, and the results indicate significant positive influences of short-termism on stock returns and return volatilities as well, which are generally consistent with the theory.

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