TRADING STRATEGIES BASED ON DIVIDEND YIELD: EVIDENCE FROM THE TAIWAN STOCK MARKET

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ABSTRACT

This study examines whether "a high dividend yield is equivalent to a high return". For constructing a proposed portfolio, we use the panel data of listed companies' dividends in six consecutive quarters, and other financial data to estimate expected current yields, which more conform to firms' profit prospective than the traditional current dividend yield. The results show that in 2003 Q1 to 2008 Q2, the performance differences between the portfolio and the benchmark portfolio are significantly positive statistically. Furthermore, the use of Sharpe ratios and Treynor indices to re-measure the performances does not change the results. In addition, when we extend our prediction period, the effectiveness of the portfolio persists for at least a quarter.

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KEYWORDS: Dividend, dividend yield, trading strategies

INTRODUCTION

Within the overall field of financial management, the adoption of trading strategies based upon dividend yields has continued to raised issues of interest and importance for a considerable time. One of the most controversial of these issues relates to whether dividend yields are equivalent to high rates of return. In an earlier study analyzing the trading strategies of the Top-10 dividend yield rankings on the Dow-30 index, McQueen, Sheilds and Thorley (1997) provided confirmation that the performance of high-dividend yield portfolios was indeed statistically better than that of the market benchmark. Furthermore, in some of the later studies, including examinations of the markets of Canada (Visscher and Filbeck, 2003) and Poland (Brzeszczyński and Gajdka, 2007), it was found that after appropriate adjustment for risk, a dividend yield portfolio was once again capable of beating the benchmark.

In contrast, however, other studies, including Filbeck and Visscher (1997) and Ap Gwilym, Seaton and Thomas (2005), both of which focused on the UK market, found that while there was some evidence of the existence of advantages in dividend yield portfolios, such advantages tended to disappear after appropriate risk adjustment. Thus, it is clear that the literature on the performance of dividend yield portfolios has produced diverse results.

There has, nevertheless, been a tendency for researchers to construct portfolios which are generally based upon the rankings of current dividend yields. The rationale behind this approach is that researchers are essentially acknowledging the fundamental proposition of the dividend signaling hypothesis; that is, that managers may tend to increase their dividends, thereby raising their dividend yields, in order to convey a message of potential future profits. In particular, the dividends of those firms situated at the very top of the dividend yield rankings are generally regarded as having greater information content than those situated further down the rankings.

However, investors are likely to face a number of problems if they choose to construct their portfolios based solely upon the use of current dividend yield rankings. For example, the managers of firms with

abundant free cash flows may significantly increase their dividend levels either to reduce any predatory acquisition intent or to make up for the capital losses of their shareholders in previous years; in such cases, there may well be unexpected and significant rises in dividend yields. Furthermore, high dividend yields may simply come about as a result of a fall in stock prices; this can ultimately have the effect of increasing the dividend yield, despite the fact that there has actually been no increase in dividends.

In view of these particular problems, among others, researchers need to be able to identify the 'winners' and rule out the 'losers' that are relevant to the success or failure of transactions based upon dividend yields. Pursuing this point, Harada and Nguyen (2005) argue that investors have reasons to expect increases in the dividends of firms only in those cases where such firms have regular increases in profits and optimistic financial ratios. Their argument is based upon unexpected increases in dividends arising merely from the behavior of over-confident managers, and that this simply represents 'noise' as opposed to real information.

Thus, if there is a tendency amongst researchers and investors to sort the firms by their current dividend yields, there is a strong likelihood of certain stocks being included that are not actually profitable; this will of course result in their portfolios having some real difficulty in beating the market indices. In an attempt to improve this situation, this study proposes a new model constructed on the basis of expected dividend yield, attempting to build a portfolio, based upon firms with high dividend yields, which is capable of beating the benchmark even after adjustment for risk.

The benchmark index adopted for this study is the Taiwan Dividend+ Index. This index, which was jointly created by the Taiwan Stock Exchange and the Financial Times Stock Exchange (FTSE) of the UK, began operations on 15 January 2007. In the construction of this index, the approach was to sort the constituent firms in the Taiwan 50 Index and the Taiwan 100 Medium-sized Firms Index based upon the expected dividend yields in the coming year, and then to select the Top-30 stocks to form the index portfolio. The producers of this index review the latest data on a quarterly basis, from the quarterly reports of the listed companies, and then announce the constituent stocks of the index portfolio on the web site of Taiwan Stock Exchange and the Financial Times during the first month of each season.

As noted earlier, expected future dividend yields have been widely used in the construction of dividend yield portfolios, whilst the use of current dividend yields is commonplace within academia as the traditional method of sorting stocks. Our approach in this study differs from both of these approaches, since we adopt the use of the latest quarterly reports to re-estimate the current dividend yield, which we then refer to as the 'expected dividend yield'. Our empirical evidence demonstrates that not only was the performance of the constructed portfolio superior to that of the benchmark index from Q1 2007 to Q2 2008, the period during which the 'sub-prime mortgage' crisis emerged, but also that when further analysis is undertaken using the period from Q1 2003 to Q4 2006, there is no discernible change in the results.

This would therefore appear to verify the efficacy of assessing portfolio performance on the basis of expected dividend yields – which thereby excludes the information noise brought into the market by the behavior of over-confident managers – and indicates that this approach is apparently better than those based upon current dividend yields and expected future dividend yields. This model would also seem to be transferable to other countries, particularly those where firms tend to pay quarterly dividends, where it can serve as an important reference when setting out to construct portfolios based upon dividend yields.

The remainder of this paper is organized as follows. A description of our study design is provided in Section 2, along with the related variables. Section 3 presents the data adopted for this study, followed in Section 4 by the empirical results and related analyses. Finally, the conclusions drawn from this study are presented in Section 5.

LITERATURE REVIEW

In practice, though firms' dividend policies attract the attention of numerous retirees and institutional investors. However, Miller and Modigliani (1961), contend that under the assumption of perfect market, rational behavior, and perfect certainty, dividend policies do not affect company's market value. They suggest that the company engage in investment projects to enhance corporate value, and this is not related to the dividend policy. In other words, in a rational and perfect capital market environment, the desired effect of dividend signals will not arise. This means that the level of dividend yields or other dividend indicators do not associate with the company's future rate of return.

The above suggestions are consistent with the view of Black and Scholes (1974), who contend that "If a corporation could increase its share price by increasing (or decreasing) its payout ratio, then many corporations would do so, which would saturate the demand for higher (or lower) dividend yield, and would bring about an equilibrium in which marginal changes in a corporation's dividend policy would have no effect on the price of its stock "(p. 2). Based on the above description, both in theory or market efficiency, the performance of dividend yield portfolio is not possible to be superior to that of market indicators. However, Lintner (1956) found that firms mainly concern the stability of dividends. Managers believe that the market gives higher premium to firms with stable dividend policies. Baker and Wurgler (2004) and Li and Lie (2006) also suggest that "the capital market rewards managers for considering investor demand for dividends when making decisions about the level of dividends". With such viewpoints, companies, in principle, are not likely to adjust the quarterly dividend, unless the level of future earnings changes apparently.

As for whether the change of dividend levels has an effect of dividend signals, Bhattacharya (1979), Miller and Rock (1985) and John and Williams (1985) used models to elucidate the asymmetry of information, that is, managers have more information about firms' performance. To enable investors to properly assess the real value of companies, managers, convey the future operation, profitability and cash flow of firms to investors through pipelines, among which dividend policy is the most effective. In general, under the premise of information asymmetry, companies usually make efforts in keeping the level of dividends to avoid being mistakenly viewed as bad companies by investors. In addition, unless a company expects future earnings to be higher than current levels, or at least to maintain a certain standard, the company will not increase dividend level and thus increase dividend yield. To extend, high dividend yield can be regarded as a positive signal of improvement in future earnings, whereas low dividend yield may imply a poor prospect of stock's future earnings.

Except that the level of cash dividend conveys dividend signal effects, investors prefer cash dividends for the following reasons: First, retiree investors and investment institutions such as pension funds need a stable cash flow to cover their expenditure budget. Second, investors believe that the risk of firms paying cash dividends is lower, because most of these companies are mature industries. Third, investors believe that through paying high dividends, companies not only present their rich cash flow, but also show that managers have the financial ability to exercise self-discipline. Accordingly, the collective needs of these investors may lead to a result that the performance of the portfolio of high dividend yield is better than that of market performance indicators. (Arnott, Hsu and Moore, 2005)

STUDY DESIGN AND VARIABLES

Study Design

We build our portfolios of expected dividend yield in this study in accordance with the following steps: (i) we use the expected dividend yield model, Model (1), to test the panel data with a sample period covering ten consecutive quarters; (ii) the estimated coefficients of Model (1) are then used along with quarterly

data to calculate the expected dividend yield, in line with the prospective profits of the firms; (iii) a portfolio of the Top-30 firms is then constructed based upon the data sorted by expected dividend yield; (iv) the proposed portfolio is then invested in the coming quarter; and (v) we iterate the above procedures during future rolling quarters.

$$DivYield = \beta_0 + \beta_1 DivEQTY_t + \beta_2 EPS_t + \beta_3 {}^{M}/_{A_t} + \beta_4 Size_t + \beta_5 DivYield_{t-4} + \beta_6 \Delta Cashflow_t + \beta_7 DA_t + \varepsilon_t \quad (1)$$

where $DivYield_t$ is the dividend yield for quarter t; $DivEQTY_t$ is the dividend payout ratio, measured as the dividend for quarter t by the firm's equity at the end of quarter t; EPS_t is the after-tax earnings per share for quarter t; M/A_t refers to the opportunities for investment growth, which are proxied by the market value divided by total assets at the end of quarter t; $Size_t$ refers to firm size, measured as the natural logarithm of total assets; $DivYield_{t-4}$ is the dividend yield for quarter $t-4$; $\Delta Cashflow_t$ is the change in free cash flow, measured as operating cash flow divided by total assets; DA_t refers to the earnings manipulation variables for quarter t;[1] and ε_t is the error term.

The specific processes involved in the construction of the abovementioned portfolios are explained in the following example. The dividend yield for Q3 2006 is used to determine the Top-30 stocks for those portfolios in which investment is to be made in the Q1 2007 period; since the data on Q4 2006 dividends would not have been made available until February 2007, it would obviously have been too late to invest in this portfolio in Q1 2007. Therefore, in order to obtain the expected dividend yields for Q3 2006, this study uses a backwards sampling period for the ten quarters prior to Q3 2006, that is, the period from Q1 2004 to Q2 2006.

Through the use of the estimated coefficients and other Q3 2006 data, we then obtain the expected dividend yield for Q3 2006; given that the data on Q3 2006 is available in November 2006 for investment in Q1 2007, these estimated dividend yields, to some extent, already reflect the most recently updated current information. Similarly, if the investment period is taken as Q2 2007, the sample period of Model (1) will roll forward one quarter to become Q2 2004 to Q3 2006, with the dividend yields being estimated for the period up to Q4 2006.

Listed companies in Taiwan pay dividends once each year on a regular basis; however, since this study uses quarterly data, and calculate the returns of the portfolios in quarterly units, we divide the annual dividends by four to obtain the quarterly dividends. We provide four dividend yield patterns in the construction of the portfolios, comprising of those portfolios based upon expected dividend yields, as well as those based upon current dividend yields, dividend yields in the previous year, and changes in dividend yields (current dividend yields minus dividend yields in the previous year). The main reason for the addition of the changing patterns of dividend yields is based upon the findings of Aharony and Dotan (1994), in which they suggest that the greater the magnitude of the dividend changes, the higher the unexpected profits in the subsequent period. Furthermore, we use other indicators, including the Sharpe ratios and the Treynor index, as additional measures of portfolio performance.

The Variables

Lintner (1956) contend that when paying dividends, if future profits are uncertain, firms will be inclined to maintain the stability of their dividend payout ratio. Miller and Modigliani (1961) also suggest that managers will traditionally adhere to the firm's targeted dividend payout ratio. We therefore expect to see a result that in Model (1) both the current payout ratio and previous dividend yield associate positively with current dividend yield.

Fukuda (2000) also demonstrate that where there is a dividend increase, significant increases in earnings would subsequently be discernible in both the current year and the previous year, whilst a reduction in annual dividends would have the opposite effect; this empirical result is in line with the findings of Brav, Graham, Harvey and Michaely (2005), in which they contend that managers will not readily adjust their dividend level unless the firm has seen increasing surpluses for several years. In summary, therefore, we expect to find a positive association between current earnings and current dividend yields.

In terms of investment growth opportunities (*M/A*), the 'pecking order' theory of financing priority, proposed by Myers (1984), shows that high-growth companies invariably prefer to use internally-generated cash flows to satisfy their investment demand, and that they will often show a tendency to reduce their dividend payouts if they wish to extend their investment. As regards firm size, DeAngelo, DeAngelo and Skinner (2004) suggest that the size effect does exist for listed companies with regard to their cash dividend payouts; that is, with larger firm size, there will be correspondingly larger cash dividend payouts. However, since the capital available to such firms is much larger than that of smaller firms, the dividend yields will be relatively small. To summarize, we expect to see *M/A* and *Firm size* having negative associations with the current dividend yield. In general, if there is a rise in the profits of a firm in both the previous and current periods, then there will also be a corresponding significant increase in the cash flow of the firm. Therefore, we expect to see a positive association between free cash flow and dividend yield in this study.

One final consideration is the fact that managers may themselves represent an influential factor with regard to the implementation of a firm's dividend policy; thus, in order to make the measurement of Model (1) more stringent, based upon all of the above considerations, we add discretionary accruals (DA_t) as a control variable. This variable proxies for the earnings manipulation undertaken by managers; however, since the direction of earnings manipulation is uncertain, we have no expectations with regard to the sign of its coefficient.

DATA DESCRIPTION

The research data used in this study is obtained from the Taiwan Economic Journal (TEJ) database.[2] Since the benchmark index, the Taiwan Dividend$^+$ Index, came into being on 15 January 2007, the sample period for this study runs from January 2007 to June 2008, a total period of one-and-a-half years. However, since the evaluation period for the Taiwan Dividend$^+$ Index (TWDP) is obviously too short, we also use the Taiwan Weighted Index (TAIEX) as an alternative, expanding the sample period by an additional four years, from January 2003 to June 2008. Furthermore, when estimating the dividend yields of the various stocks, we need to form a sampling period comprising of a total of ten retrospective quarters; thus, the actual period data used in this study runs from January 2001 to June 2008.

The selection criteria for the data are described as follows: (i) to be included in the study sample, the firms should be listed on the Taiwan Stock Exchange (TWSE); (ii) those firms with incomplete financial data, preferred shares or TDRs are excluded from the sample; (iii) those firms which do not make dividend payouts are excluded from the sample; and (iv) only firms in the non-financial industries would be included in the sample; firms within the financial industry are excluded essentially because their financial structure differs from that of other industries.

In the above procedure for selecting the data, the original sample size for the expected dividend yield of 2007.01-2008.06 is 10,965 observations, which we obtained from the listed companies, excluding financial industry. Then, after the exclusion of observations without paying dividends,the samples were reduced to 7,427. Ultimately, the exclusion of observations with missing financial information resulted in a sample size of only 6,864. Table 1 shows the statistical summary of key variables.

Table 1**:** Summary Statistics

Main Variable	25%	Mean	Median	75%	S.D.	No. of Obs.
DivYieldt	0.0149	0.0269	0.0233	0.0347	0.0176	
DivEQTYt	0.0131	0.0270	0.0232	0.0371	0.0183	
EPSt	0.2400	0.7501	0.5300	0.9900	0.9475	
M/At	0.6100	1.1386	0.8800	1.3500	0.8949	
Sizet	14.9850	15.8275	15.6200	16.3640	1.2273	6,864
DivYieldt– 4	0.0150	0.0286	0.0260	0.0380	0.0201	
ΔCashflowt	-0.0220	0.0025	0.0020	0.0270	0.0574	
DAt	-0.0240	-0.0013	-0.0020	0.0180	0.0487	

Notes: The dependent variable $DivYield_t$ denotes current dividend yield (dividend per share divided by quarter-end stock price); $DivEQTY_t$ denotes the ratio of dividend payouts (dividend divided by quarter-end book equity); EPS_t denotes current earnings, measured as quarter post-tax earnings for common shares; M/A_t is a proxy variable for the opportunities for investment growth, measured as market value divided by total assets; $Size_t$ denotes total firm assets, measured as the natural logarithm of the total assets at the end of quarter t; $DiviYield_{t-4}$ denotes the dividend yields of quarter t– 4; $\Delta Cashflow_t$ denotes the change in cashflow, measured as operational cash flow divided by total assets; and DA_t is the earnings management variable, following the approach of Kothari, Leone and Wasley (2005: 174), Model (7).

In order to avoid the potential problem of collinearity between the variables in Model (1), we first examine whether the correlation coefficients are unusual. As shown in Table 2, with the exceptions of the correlation coefficients of 0.7084 for the dividend payout ratio and current dividend yield, those for all of the other variables are below 0.7, whilst the regression results show that the VIF factors of all of the variables are below 2; thus, we can reasonably assume that the problem of collinearity does not exist in Model (1).

Table 2**:** Variable Correlation Matrix*

Variables	DivYieldt	DivEQTYt	EPSt	M/At	Sizet	DivYieldt– 4	ΔCashflowt	DAt
DivYieldt	1.0000	0.7084	0.4230	0.1710	0.0189	0.6274	0.0214	0.0614
DivEQTYt	–	1.0000	0.5807	0.5295	0.0460	0.5783	0.0383	–0.0427
EPSt	–	–	1.0000	0.5762	0.1812	0.3988	0.0785	–0.0462
M/At	–	–	–	1.0000	–0.0053	0.2825	0.0477	–0.1391
Sizet	–	–	–	–	1.0000	0.0164	0.0018	–0.0017
DivYieldt– 4	–	–	–	–	–	1.0000	0.0349	–0.0050
ΔCashflowt	–	–	–	–	–	–	1.0000	–0.6841
DAt	–	–	–	–	–	–	–	1.0000

*Note: * The dependent variable $DivYield_t$ denotes current dividend yield (dividend per share divided by quarter-end stock price); $DivEQTY_t$ denotes the ratio of dividend payouts (dividend divided by quarter-end book equity); EPS_t denotes current earnings, measured as quarter post-tax earnings for common shares; M/A_t is a proxy variable for the opportunities for investment growth, measured as market value divided by total assets; $Size_t$ denotes total firm assets, measured as the natural logarithm of the total assets at the end of quarter t; $DiviYield_{t-4}$ denotes the dividend yields of quarter t– 4; $\Delta Cashflow_t$ denotes the change in cashflow, measured as operational cash flow divided by total assets; and DA_t is the earnings management variable, following the approach of Kothari, Leone and Wasley (2005: 174), Model (7). All correlation coefficients are significant at the 1 per cent level.*

THE EMPIRICAL RESULTS AND ANALYSIS

The Expected Dividend Yield Model

The expected dividend yield model proposed in this study is regressed upon a panel dataset, with the

sample period for estimation running from Q1 2004 to Q3 2007. We start from Q1 2004 using the consecutive ten quarters as a sub-sample, and then produce a total of six sub-samples by rolling forward from this point. During the course of tests, we apply the LM test of Breusch and Pagan (1980) and Hausman Test to confirm the use of panel data and random effects model, and execute Tobit regression for robustness tests, obtaining similar results.

Table 3 presents the empirical results that each of the dividend payout ratios, *EPS*, *M/A* and *Size* variables are significant at the 1 per cent level for all of the sub-sample periods, and without exception in the intercept. The previous dividend yield is found to be statistically significant only after the Q4 2004 to Q1 2007 period.

As regards the changes in free cash flow and earnings manipulation, only earnings manipulation is found to be significant in the Q2 2005 to Q3 2007 sub-sample periods, at the 10 per cent level, whilst there is no significance in any of the other sub-sample periods. As for the signs of the coefficients, with the exception of the previous dividend yield in the Q1 2004 to Q2 2006 sub-sample periods, all of the other variables are in line with our expectations; that is, current dividend yield is found to have a positive association with dividend payout ratio, *EPS* and previous dividend yields, and a negative association with *M/A* and *Size*. However, the results reveal no evidence of any significant association with the changes in free cash flow and earnings manipulation. Finally, the R^2 for the six sub-samples are 0.6231, 0.6068, 0.5910, 0.5793, 0.5531 and 0.5328, providing a good indication of the strength of the explanatory power of Model (1).

The above results indicate that most of the variables associate with current dividend yield, and the model have some degree of explanatory power; we therefore apply the estimated coefficients and the data to the subsequent quarter to estimate the expected dividends of the listed companies so as to build up a portfolio of the Top-30 firms, and to explore whether the performance of this portfolio is superior to that of the benchmark during the same sample period.

The Comparison of the Portfolio Performances

In this study, we adopt a 'buy and hold' strategy to compute the performance of the portfolios, presenting the investment results for each quarterly holding period in Table 3. The investment results for the six full quarters reveal portfolio returns of 0.5485 based on the expected dividend yield (*DY*1), 0.3055 based on the current dividend yield (*DY*2), 0.0258 based on the previous dividend yield (*DY*3), and 0.4539 based on changes in the dividend yields (*DY*4). The portfolio returns based on expected dividend yields are clearly the best; however, even the return for the current dividend yield portfolio is superior to that of the benchmark (TWDP).

With regard to our examination of investment on a quarter-by-quarter basis, with the one exception of Q1 2007, the returns based on the expected dividend yield portfolio are higher than those of the benchmark, and this is particularly so for the Q2 2007 to Q4 2007 period, where the returns are found to be the highest of all of the portfolios. For all of the remaining quarters, the portfolio returns based on changes in dividend yield have the highest ranking. Finally, we focus on the differences in quarterly returns between the expected dividend yield portfolio and the benchmark, with our results clearly showing that the differences are significant at the 1 per cent level.

It is worth noting that in the present study, not only do we calculate the returns for each quarter, but we also examine the daily cumulative rates of return in order to determine whether the returns are higher than those of the benchmark. Where this is the case, we classify these as 'winning' days. As shown in Table 4, with the one exception of Q1 2007, there are significantly more winning days in our portfolio based on expected dividend yields than in the benchmark, with the former achieving 278 winning days, about 78.98

per cent of the 352 trading days in the entire sample period.

Table 3**:** Dividend Yield Estimation Results Using Random-Effects Panel Data

	DivYield$_t$					
	Q1 2004 – Q2 2006	Q2 2004 – Q3 2006	Q3 2004 – Q4 2006	Q4 2004 – Q1 2007	Q1 2005 – Q2 2007	Q2 2005 – Q3 2007
	Coeff.[c]	Coeff.[c]	Coeff.[c]	Coeff.[c]	Coeff.[c]	Coeff.
Intercept	0.0394*** (0.0045)	0.0408 (0.0045)	0.0412*** (0.0045)	0.0372*** (0.0040)	0.0399*** (0.0040)	0.0377*** (0.0039)
$DivEQTY_t$	0.7811*** (0.0117)	0.7851 (0.0120)	0.7764*** (0.0122)	0.7329*** (0.0124)	0.6774*** (0.0122)	0.6633*** (0.0127)
EPS_t	0.0023*** (0.0002)	0.0022 (0.0002)	0.0022*** (0.0002)	0.0021*** (0.0002)	0.0019*** (0.0002)	0.0017*** (0.0002)
M/A_t	-0.0062*** (0.0003)	-0.0064 (0.0003)	-0.0061*** (0.0003)	-0.0061*** (0.0003)	-0.0062*** (0.0002)	-0.0061*** (0.0002)
$Size_t$	-0.0017*** (0.0003)	-0.0018 (0.0003)	-0.0019*** (0.0003)	-0.0016*** (0.0002)	-0.0017*** (0.0002)	-0.0016*** (0.0002)
$DivYield_{t-4}$	-0.0023 (0.0088)	0.0083 (0.0092)	0.0145 (0.0094)	0.0249*** (0.0095)	0.0229** (0.0099)	0.0336*** (0.0100)
$\Delta Cashflow_t$	0.0015 (0.0026)	0.0021 (0. 0025)	0.0024 (0.0024)	0.0018 (0.0026)	0.0031 (0.0025)	0.002 (0.0026)
DA_t	0.0014 (0.0032)	0.0029 (0.0032)	0.0041 (0.0031)	0.0001 (0.0025)	0.0038 (0.0032)	0.0061 (0.0033)
No. of Obs.	4,421	4,459	4,500	4,563	4,618	4,685
R^2	0.6231	0.6068	0.5910	0.5793	0.5531	0.5328

*The use of random-effects panel data is based upon the results of the Breusch and Pagan Lagrangian multiplier and Hausman tests, which indicate random-effects model is better than alternative models for the full sample period (Q1 2004 - Q3 2007). The dependent variable $DivYield_t$ denotes current dividend yield (dividend per share divided by quarter-end stock price); $DivEQTY_t$ denotes the ratio of dividend payouts (dividend divided by quarter-end book equity); EPS_t denotes current earnings, measured as quarter post-tax earnings for common shares; M/A_t is a proxy variable for the opportunities for investment growth, measured as market value divided by total assets; $Size_t$ denotes total firm assets, measured as the natural logarithm of the total assets at the end of quarter t; $DiviYield_{t-4}$ denotes the dividend yields of quarter t– 4; $\Delta Cashflow_t$ denotes the change in cashflow, measured as operational cash flow divided by total assets; and DA_t is the earnings management variable, following the approach of Kothari, Leone and Wasley (2005: 174), Model (7). The figures in parentheses are standard errors; * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.*

The Portfolios of Risk-Adjusted Performance

Although the performance of the portfolio based on expected dividend yield is clearly better than that of the benchmark, this outcome may simply be the result of the nature of the market, or of the high risk nature of the portfolio itself. Therefore, we also adopt the use of the Sharpe ratios and the Treynor index to measure the performances of each of the portfolios. The investment results for the Q1 2007 to Q2 2008 periods are presented in Table 5.

Firstly, for the whole period, the Sharpe ratios is 10.76 for the portfolio based on expected dividend yields, whilst the Treynor index is 1.06, as compared to the respective values of −1.73 and −0.10 for the

benchmark. Secondly, as regards the investment results reviewed on a quarterly basis, with the exception of Q1 2007, both the Sharpe ratios and Treynor index are higher for the expected dividend yield portfolio than those of the benchmark. Overall, the performance of the expected dividend yield portfolio is found to be better than that of the benchmark, even after risk adjustment.

Table 4: Accumulated Returns for Portfolios DY1, DY2, DY3, DY4, for Single Quarter Holding Periods (Q1 2007 to Q2 2008)

Portfolios	Holding Periods						
	Q1 2007	Q2 2007	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q1 2007 - Q2 2008
TAIEX	–0.46%	12.66%	6.01%	–10.35%	3.00%	–10.64%	0.21%
TWDP	6.70%	10.63%	9.48%	–8.19%	–0.35%	–11.12%	7.12%
*DY*1	0.34%	19.43%	28.76%	–6.72%	19.32%	–6.28%	54.85%
*DY*2	–3.73%	13.09%	26.38%	–11.24%	19.96%	–13.91%	30.55%
*DY*3	–2.29%	12.85%	15.58%	–16.43%	7.09%	–14.22%	2.58%
*DY*4	12.15%	10.71%	15.33%	–1.41%	8.70%	–0.09%	45.39%
Difference (*DY*1 – *TWDP*)	–6.36%	8.80%	19.28%	1.47%	19.67%	4.85%	47.73%
t-Statistic	–38.24***	8.68***	20.45***	8.69***	12.46***	18.63***	14.47***
Winning days	–	51	62	55	50	60	278
Trading days	47	61	62	64	56	62	352

*Notes:The TAIEX is the Weighted Average of the Taiwan Stock Exchange (TWSE) and the TWDP is the Taiwan Dividend+ Index which was designed to provide a daily measure of the 30 higher yielding stocks by the FTSE. Since the data on the latter index is only available from 15 January 2007 onwards, Q1 2007 contains only 47 trading days. DY1 portfolios are formed by ranking the expected dividend yield, DY2 portfolios are formed by ranking the current dividend yield, DY3 denotes the portfolios formed by ranking the dividend yield of quarter t–4, and DY4 portfolios are formed by ranking the current dividend yield minus the dividend yield of quarter t–4. We use Model (1) to estimate the dividend yields for the estimation periods (e.g., Q1 2004 - Q2 2006), then adopt the estimated coefficients to calculate the 'expected dividend yield' for the quarter to be estimated (Q3 2006) and rank the expected yields to construct the DY1 portfolio (Q1 2007). Figures in bold text indicate those portfolios with the best performances over the periods. The calculation of the t-Statistic is based upon the paired difference test; ***indicates significance at the 1% level.*

The Persistence of the Portfolio Performances

In terms of practical application, the expected dividend yield portfolio proposed in this study would seem to be particularly suited to those countries or regions where dividends are paid on a quarterly basis; however, for those markets where dividends are paid annually, investors may be more concerned with issues relating to the persistence of the portfolio performance. In order to deal with this, in this subsection, we extend the investment of the constructed portfolio based on expected dividend yields (*DY*1) by periods of 3, 6 and 9 months, to observe whether the performance of these portfolios remains superior to that of the benchmark.

As shown in Table 6, with the exception of Q4 2007, the difference between the returns of the expected dividend yield portfolio (*DY*1) and the benchmark during these three-month extension periods are significantly positive at the 1 per cent level. We also observe that during these three-month extension periods, our constructed portfolios have greater numbers of 'winning' days than the benchmark. On the whole, the performance of the expected dividend yield portfolio remains superior to that of the benchmark during these three-month extension periods.

Table 5**:** Performance Index for Portfolio DY1, for Single Quarter Holding Periods (Q1 2007 to Q2 2008)

	Holding Periods						
	Q1 2007	Q2 2007	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q1 2007 - Q2 2008
Sharpe ratios							
TWDP	10.49	8.77	3.02	–8.44	–9.26	1.50	–1.73
*DY*1	–13.89	10.59	18.10	–4.34	5.69	11.42	10.76
Treynor index							
TWDP	19	25	12	–48	–38	8	–10
*DY*1	–32	42	119	–26	47	72	106

Notes: Using the approach of Brzeszczynski and Gajdka (2007), we calculate the Sharpe ratio based on the formula $S = (d_1/ Sd_1) \cdot \sqrt{n}$ *, where* d_1 *is the mean daily difference between the accumulated return of the portfolio (or market) and the risk-free asset over the n day period, and* Sd_1 *is the sample standard deviation of the daily differences in the accumulated returns. The risk-free rate for the Taiwan market is the return of the one-year Taiwan government treasury bill (*rf_1*). The formula for the Treynor index is similar to that for Sharpe ratio, but substitutes the portfolio's beta for the sample standard deviation in the Sharpe ratio (market beta is equal to 1). TWDP is the Taiwan Dividend+ Index, which was designed to provide a daily measure of the 30 higher yielding stocks by the FTSE, and DY1 portfolios are formed by ranking the expected dividend yield..*

Table 6**:** Accumulated Returns for Portfolio DY1, for Single Quarter Holding Periods Over the Extension Period (Q1 2007 to Q2 2008)

Portfolios	Holding Periods					
	Q1 2007	Q2 2007	Q3 2007	Q4 2007	Q1 2008	Q2 2008
TWDP	6.70%	10.63%	9.48%	–8.19%	–0.35%	–11.15%
*DY*1	0.34%	19.43%	28.76%	–6.72%	19.32%	–6.28%
Portfolio 3-month extension	–	19.36%	17.76%	–13.95%	16.85%	–6.60%
Portfolio 6-month extension	–	–	20.03%	–12.56%	4.91%	–6.66%
Portfolio 9-month extension	–	–	–	–11.70%	7.71%	–12.59%
Difference (*DY*1 [Ext. 3 month] – *TWDP*)	–	8.73%	8.28%	–5.76%	17.20%	4.55%
t-Statistic[b]	–	9.76***	21.90***	–5.43***	11.48***	19.77***
Winning days	–	52	62	23	50	61
Trading days	–	61	62	64	56	62

*Notes:TWDP is the Taiwan Dividend+ Index, which was designed to provide a daily measure of the 30 higher yielding stocks by the FTSE. DY1 refers to the portfolio constructed based on the expected dividend yield. We use the DY1 portfolio in Q1 2007 to calculate the returns of the Q2 2007, Q3 2007 and Q4 2007 periods in order to determine whether the performance of DY1 also holds for the extension period, and repeat this step for the other periods. The calculation of the t-Statistic is based upon the paired difference test; ***indicates significance at the 1% level.*

The Extension of the Sample Period

Given that the primary benchmark, the Taiwan Dividend$^+$ Index (TWDP), has a history of only one-and-a-half years, we also use the Taiwan Weighted Average Index (TAIEX) as an alternative benchmark to further examine the Q1 2003 to Q4 2007 sample periods. The results, which are presented in Table 7, show that in the 20 quarterly periods between January 2003 and December 2007, the portfolio returns are 1.6983 for the portfolio based upon the expected dividend yield, 1.4242 for that based upon the current dividend yield, 0.9622 for the portfolio based upon the dividend yield in the previous year, and

1.4301 for that based upon the changes in dividend yields. We find that the performance of the expected dividend yield portfolio is consistently the best, followed by the portfolio based upon the changes in dividend yields.

Table 7**:** Accumulated Returns for Portfolios DY1 DY2, DY3, DY4, for Single Year Holding Periods, 2003 to 2007

Portfolios	Holding Periods (years)					
	2003	2004	2005	2006	2007	2003-2007
TAIEX	25.19%	0.89%	5.79%	17.85%	7.86%	57.58%
*DY*1	40.38%	2.22%	48.46%	34.14%	44.63%	169.83%
*DY*2	33.52%	–1.43%	45.02%	40.61%	24.70%	142.42%
*DY*3	16.71%	–10.50%	45.31%	30.65%	14.05%	96.22%
*DY*4	40.25%	2.89%	35.36%	34.34%	30.17%	143.01%
Difference (*DY*1 – *TAIEX*)	15.19%	1.33%	42.67%	16.29%	36.77%	112.25%
t-Statistic	2.65***	0.46	9.44***	7.29***	13.05***	14.89***
'Winning' days	109	103	169	165	171	717
Trading days	245	246	243	244	243	1,221

*Notes:The TAIEX is the Weighted Average of the Taiwan Stock Exchange. DY1 denotes the portfolio constructed based on expected dividend yield; DY2 denotes the portfolio constructed based on current dividend yield; DY3 denotes the portfolio constructed based on the dividend yield for quarter t−4; and DY4 denotes the portfolio constructed based on current dividend yield minus the dividend yield for quarter t−4. Bold numbers indicate the portfolio with the best performance over that period. We use adjusted daily stock prices data to calculate the single quarter holding period returns of the portfolios, summing the returns of the four quarters into returns for a single year.The calculation of the t-Statistic is based upon the paired difference test; *** indicates significance at the 1% level.*

Finally, we examine the results of investment on a yearly basis, from which we find that, amongst all types of portfolios, the portfolio returns based on expected dividend yield are higher than those of the benchmark, particularly in the years 2003, 2005 and 2007. As regards the differences between the rates of return for each of the portfolios, with the exception of 2004, for all other years the difference is statistically significant at the 1 per cent level. Furthermore, from the total of 1,221 trading days, the 'winning days' amount to 717 days, which is about 58.72 per cent of the total. From the perspective of an investor, these might also be described as 'smiley' days.

CONCLUSION

From around the turn of the century, topics relating to the exploration of strategic transactions based upon dividend yields have given rise to a wealth of studies in the area of financial management. For example, McQueen, Sheilds and Thorley (1997), Visscher and Filbeck (2003) and Brzeszczyński and Gajdka (2007) used an approach which involved ranking the current dividend yields, and then verifying whether a high dividend yield was equivalent to a high rate of return. In contrast, this study takes the view that high dividend yield may simply be attributable to the manipulation of managers, or to falls in the stock prices of firms. Therefore, in this study, we adopt the use of expected dividend yields, to replace current dividend yields, which would seem to be more consistent with the prospective profits of firms.

Our empirical results demonstrate that during the period from Q1 2007 to Q2 2008, when Taiwan first began reporting its high dividend index, the performance of our constructed expected dividend yield portfolio is not only superior to that of the new benchmark, but also better than that of the current

dividend yield portfolio. From our use of the Sharpe ratios and the Treynor index as additional measures of the performance of the portfolios, we also conclude that the risk-adjusted performance of the portfolios remains superior to that of the benchmark.

Furthermore, using the Taiwan Weighted Average Index as an alternative benchmark, and expanding the samples to include sub-periods running from Q1 2003 to Q4 2007, we consistently obtain similar results. Finally, from our further examination of the performance of the portfolios using three-month extended investment periods, the performance of the expected dividend yield portfolio remains superior to that of the newly-introduced benchmark.

From their investigation of 'explicit dividend yields', McQueen, Sheilds and Thorley (1997) found that a trading strategy which involved the use of dividend yields was capable of beating the benchmark. In this study, we have adopted the use of 'implicit dividend yields' to supplement their approach; that is, we argue that in those cases where the current dividend yields of the top ranking firms apparently have significant information content, we can use our expected dividend yield model to effectively exclude those firms whose dividend yield ranking is inconsistent with their perceived profitability, thereby obtaining a portfolio, the performance of which is superior to that of the benchmark.

Finally, it is worth noting that the findings of this article are based on dividend signaling hypothesis; however, the indicators of dividend signaling include not only dividend yield, but also dividend changes, dividend payout ratios, stability of dividend payments and so on. Therefore, whether the portfolio performances are also better than market performance indicators will be one of the focuses of future research.

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