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## Dividend yield investment strategies in the Taiwan stock market

### Abstract

This study examines the feasibility of investment strategies based on dividend yields in the current stock dividend market. The data gathered from Taiwan listed companies from 2003 to 2007 shows that the performance of pure cash dividend yield portfolio investment during the second year proved significantly superior to those of market indices and a series of dividend yield portfolio. This result has two implications. First, the dividend yield ranking conveys a future profitability signal in the Taiwan market. Second, the behavior of investors manifests a sense of underreaction whereby response to the real value of the listed companies is gradually produced a few months after dividends have been declared. Finally, the empirical results are robust to the factors, such as: the 2008 financial storm, other definitions of dividend yield, various numbers of constituent firms, changes in portfolio weights, and consideration of transaction costs, etc.

**Keywords:** dividend, dividend yield, trading strategies.

**JEL Classification:** G11.

### Introduction

Recently, the adoption of trading strategies based upon dividend yields has been raising issues of interest and importance in the field of financial management. The view of “high dividend yields are equivalent to high returns” also won the support of the academic society<sup>1</sup>. For example, the study of McQueen, Sheilds, and Thorley (1997) showed that the rate of return on dividend portfolios in the U.S. is higher than the market indices. Also, the study done by Visscher and Filbeck on Canada (2003) and the research authored by Brzeszczyński and Gajdka (2007) on Poland confirmed the existence of the same phenomenon even in risk adjustments. However, these results are merely confined to cash dividends. In contrast, this study adopts dividend strategies under a diversified market to re-examine whether the investment strategies based on cash dividends do possess outstanding benefits. The rationale behind this approach is that researchers are essentially acknowledging the fundamental proposition of the dividend-signaling hypothesis; that is, that managers 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.

Simply put, investors may also accept stock dividends except for cash dividends. The underlying rationale is that investors can identify the “Pecking Order” theory of Myers (1984), namely, high-

growth companies will prefer to use internally generated cash to meet future investment demand. Such companies will distribute stock dividend to substitute cash dividend. As a result, investors would prefer stock dividends compared to cash dividends in terms of average except when prosperity starts to decline. The result suggests that most investors acknowledge that capital income is better than dividend income. However, this assumes that investors consider stock dividends as real dividends, not as stock splits<sup>2</sup>. To sum up, prior to investigating whether “a high cash-dividend-yield portfolio is equivalent to a high rate of return”, it is imperative that all kinds of the portfolios of dividend yield be surveyed.

Conforming to the possible dividend preference of investors, this study therefore constructs various dividend yield portfolios. It must be clearly noted that stock dividends, or the combination of cash dividends and stock dividends are added apart from the basic cash dividends. Empirically, these kinds of style investments are commonly seen in stock markets. According to Barberis and Shleifer (2003), investors often classify stocks as small cap dividend, value stocks, technology stocks, public livelihood, and other concepts. For many investors, this method of classification does not only capture the information they need, but it also allows them to invest in accordance with their own investment habits. The underlying rationale is that they believe the per-

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<sup>1</sup> In contrast, numerous literatures claim, “high dividend yield does not mean high returns”. For example, Miller and Modigliani (1961) indicate that under the assumption of a perfect capital market, dividend policies are irrelevant to the values of firms. Moreover, Filbeck and Visscher (1997) and Ap Gwilym, Seaton, and Thomas (2005) could not find a favorable sequence for dividend portfolios in the British market.

<sup>2</sup> Strictly speaking, stock dividends do not in essence increase in value, but instead, they merely rearrange the composition of the owners’ equity accounts. However, some researchers propose different viewpoints, arguing that if future earnings growth does not make up for the reduction in retained earnings, not only will the subsequent distribution of cash dividends be restricted, but the legitimacy of any future stock splits will also be questioned by outsiders (Grinblatt et al., 1984; Rankine and Stice, 1997a, 1997b). Based on this assumption, they contend that under a condition of asymmetric information, managers will disclose private information by the distribution of stock dividends (particularly those distributed from retained earnings) in order to convey a better future outlook for the firm’s performance.

performances of these style investments will be superior to those of market indices. Likewise, investors with specific preferences also believe that the ranking of dividend yields may reveal the information content of future profitability.

In a narrow sense, the information content of dividends refers to dividend changes or dividend growth rate. As such, in assuming that investors trust the stock information they receive, the above-mentioned definitions can also serve as indicators in selecting stocks. Empirically, Aharony and Dotan (1994) and other scholars have long discovered that the greater the magnitude of dividend changes, the higher unexpected profits in the next period. Thus, this study shall incorporate this particular point and examine whether investment strategies are capable of surpassing the general dividend yield portfolios.

When examining dividend yield portfolios, some researchers ignore the returns on low dividend yield portfolios. According to Graham and Kumar (2006), most investors who prefer high dividend yield are older individuals with lower income. In contrast, those who prefer low dividend yields are institutional investors and the young ones. Say for instance the investment returns of investors are higher than those of senior citizens, and then the return on "low dividend yield" portfolio may exceed the "high dividend yield" portfolio. Thus, before making an in-depth analysis, we also need to confirm if the difference in the returns between the two types of investors conform to the expectations of white-haired investors.

Finally, in screening the constituent firms, some literature contends that dividend yields with the addition of other variables are superior to dividend yields alone. For example, Koch and Sun (2004) show that the addition of earnings changes to dividend changes is more likely to capture the reaction of markets upon dividend signaling. In other words, if the corporate dividends increase results in a subsequent increase in the published quarterly earnings, then the market response is obviously positive for such consistency. In addition, Fama and French (1992) also confirm that small firms tend to generate higher long-term returns as opposed to large firms. To sum up, this study adopts several variables like earnings growth and firm size as indicators in dividend yield portfolio to reconstruct the portfolios of constituent firms and to observe whether the performances of these portfolios conform to the findings of the literature.

Besides following the direction taken by the studies done by Visscher and Filbeck (2003) and Brzeszczyński and Gajdka (2007), this study is also unique in a way that it points out two different manifestations in portfolio returns. First, it develops

the "Winner Day" concept; that is, it computes the number of days in which the daily-accumulated returns are higher than those of market indices during the investment period. Due to the financial changes in 2008, we believe that investors have intensified their requirements in terms of risk exposure. Specifically, investors do not only pay attention to the final rate of return during the investment period but also take note of daily changes in stock prices because more than just directly affecting their work attitude, this information directly influences their investment confidence in the future. Second, in calculating the rate of return, this study adopts the unadjusted stock prices that investors are most familiar to calculate capital gains, in addition to the dividends during the investment period. This method is the most transparent of all and even non-seasoned investors can testify to this fact.

Based on the actual market practices stated above, the result of this study indicates that the performance of dividend yield portfolios is better than that of market indices – Taiwan's Weighted Price Index. In addition, it also has the following advantages: First, the structural process of portfolios is fairly transparent and occurs only once a year, thereby saving a lot of working time. Second, the cost is substantially low since transactions are held only once a year. Third, the average return rate is higher than market indices and the Beta value is lower than 1, thereby delivering a superior mean-variance performance. As a whole, the merits of the dividend yield portfolio in this study resemble that of Fundamental Index (Arnott, Hsu, and Moore, 2005)<sup>1</sup> although this indicator is actually used in large-scale funds. In contrast, the dividend yield portfolios in this research cater to the needs of small funds. Therefore, the main contribution of this research is to provide a useful reference on dividend-yield-based mutual funds to other countries, especially those with dividend strategies in diversified markets.

The portfolio returns of the above dividend portfolio, just like the financial events of dividend initiations (Michaely et al., 1995), earnings announcements (Ball and Brown, 1968; Bernard and Thomas, 1990) and stock splits (Dharan and Ikenberry, 1995; Ikenberry et al., 1996), will generate positive abnormal rate of return with regard to long-term post-event return. Therefore, the focus of this research is to determine how the rate of abnormal return could

<sup>1</sup> Fundamental index is presented by Arnott, Hsu, and Moore (2005) who use gross revenue, equity book value, gross sales, gross dividends, cash flow, and total employment as weights to construct a non-capitalization-based index. They claim that the fundamentals-weighted consistently provide higher returns and lower risks than the traditional cap-weighted equity market indexes while retaining many of the benefits of traditional indexing (p. 83).

be identified within the portfolio structural process, rather than construct a perfect model to analyze the rate of abnormal return under the assumption of efficient market.

The remainder of this paper is organized as follows. A description of our study design and data are provided in Section 1, followed by the empirical results and related analyses in Section 2. Finally, the conclusions drawn from this study are presented in the last section.

## 1. Study design and data description

As far as the Taiwan market is concerned, most listed firms issue their yearly dividend announcements towards the end of June, while the ensuing ex-dividend and ex-right are arranged before the start of November. Investors with specific preferences may choose to enter the market anytime after the stock information has been disclosed. This study focuses on the portfolio investment choices on the first trading day of the following year and adopts the strategy of buy and hold until the end of December.

If the newly announced dividend information presents favorable future returns, the investors will hurriedly enter the market in July as soon as they receive relevant information by the end of June. Nevertheless, this study shows that portfolios do not manifest outperformance by January of the following year. For this result, we speculate that the investors experienced a lag in acknowledging information. Generally, conservative investors may cast doubt upon the initial information of dividend changes, and therefore need to have additional up-to-date information to verify the sustainability of the firms' profitability. This information may well be the subsequent financial report in the third quarter. Specifically, if an earnings increase occurs in the subsequent quarter after the declaration of an increase in the dividend, investment professionals will then be confident that the previous dividend information conveys an increase in future earnings. At this point, investors begin to have faith in the investment plan for the coming year insofar as the dividend information is concerned. As for the theory of behavioral finance, Edwards (1968) documents that people are conservative in incorporating the impact of new evidence. Barberis et al. (1998) indicate that investors underreact to dividend announcements stemming from conservative biases and overreact to a string of earnings news due to heuristic representation. Moreover, Koch and Sun (2004) confirm that after a firm increases its dividends, the investors would only take the signal as permanent when the quarterly earnings show positive growth. Thus, when investors underreact to the trends of past earnings performance like the signal

of dividend announcements, they actually predict future momentum in returns.

In computing the portfolio returns, this study adopts unadjusted daily stock prices to calculate capital gains. If the dividends are stock dividends, the stock value at the end of the year is converted into cash dividends. This is combined with cash dividends (assuming the firm has paid) in obtaining the returns of the portfolio. Using daily data has two advantages: First, we can calculate the daily-accumulated returns of portfolio and market indices, and gather information on "Winner Days". Second, by using only the monthly information in computing for annual performance, the portfolio performance may tend to be overestimated given that institutional investors can manipulate the quotes of specific constituent firms. In contrast, the daily information can alleviate the above-mentioned effects. In reality, however, the unadjusted stock price also has its own shortcomings. For example, an increase or decrease in the listed company's paid-in capital can affect the portfolio returns. To take the more conservative stance, this study eliminates all constituent firms who reduced their capital funds on that same year, and further uses the ex-right and ex-dividend adjustments widely acknowledged in the academic circle to cross-validate the dividend information.

Generally, the dividend is divided by the stock price of the previous year to obtain the dividend yield. However, companies with a promising future profitability may have experienced a dramatic increase in its stock price during the previous year. This leads to a dip in the company's dividend yield. To avoid this phenomenon, the average stock price for the year is used as the denominator. However, compared to traditional practices, it only achieves a similar performance. Based on this result, we go through the data and find out that portfolio price of constituent firms during the previous year is higher than the average stock price for the year. The dividend yield in this case ends up lower. Nevertheless, this is a common occurrence in the entire high dividend yield group. In terms of results, only small portions of the constituent firms are substituted. Accordingly, to streamline the process of selecting stock, this study adopts the traditional approach in calculating the dividend yield.

As for the number of constituent firms, this study selects the Top 30. The rationale is that the portfolios are more dispersed. In addition, they cater to the habits of stock-specific investors and are generally known to have dividend-yield-based funds. However, this study also worked on the Top 20 and Top 10 for the purpose of confirming whether they can affect the results of this study. As far as the weights of constituent firms are concerned, we give priority

to price-weighted approach and use equal-weighted one for the robust tests. This is because if the latter is used, then the investments of small-scale constituent firms in the portfolio will be larger such that it might increase the volatility of portfolio returns. Based on financial theories, dividend yield portfolio investors will look forward to a weaker volatility of portfolio performance where the beta value of CAPM is lower than 1.

Traditionally, the trading strategies based on dividend yields refer to using cash dividend portfolios. As for the risk preference of investors, just as investors' risk tolerance changes over time, their preference for cash dividend and stock dividend may also change. Basically, unsophisticated investors may show a time-varying sentiment for choosing dividend category. This study attempts to thoroughly visualize the potential dividend preference of investors and formed 5 types of trading strategies in the process:

DY1	Portfolio of pure cash dividend yields limited to constituent firms with paid cash dividends for that same year and which are classified according to cash dividends yield.
DY2	Portfolio of cash dividend yields limited to constituent firms with paid dividends for that same year and which are classified according to cash dividend yield.
DY3	Portfolio of dual dividend yields limited to constituent firms with paid dividends for that same year and which are classified according to the sum of cash dividend yield and stock dividend yield.
DY4	Portfolio of stock dividends yields limited to constituent firms with paid dividends for that same year and which are classified according to stock dividend yield.
DY5	Portfolio of pure stock dividends yields limited to portfolio constituent firms with paid stock dividends for that same year and which are classified according to stock dividend yield.

When comparing the performances of portfolios, this study adopts TAIEX and TW50 as market indices. The TAIEX is the Price-Weighted Average of the Taiwan Stock Exchange, while TW50 is a Capitalization-Weighted ETF fund which includes the top 50 market shares in the Taiwan Stock Exchange. The Sharpe ratio serves as the performance index in this study to measure the overall portfolio risk of the Top 30 firms. Owing to the substantial drop in the number of constituent firms for the portfolio scale of the Top 20 and Top 10 firms, the market risk is measured through the use of Treynor Index that serves as the risk-adjusted measure of portfolio performances.

The common practice of dividend policy adopted by Taiwan stock-listing companies indeed is unique. Prior to 1998, Taiwanese companies had grown accustomed to paying stock dividends, with hardly any firms paying cash dividends. The problem of diluting the firms' EPS along with the stock dividend policy is essentially alleviated during the period of prior to 1998 with high growth rates in the market. However, in 1998, Taiwan government brought effect a new tax law, which imposed 10 per cent levy upon earnings retained. Since then, Tai-

wanese companies were confronted with the optimal dividend payouts in a number of choices. In particular, they had to decide whether the remaining earnings would be distributed in the form of cash dividends, or stock dividends, or a combination of both<sup>1</sup>. Generally the firms in the traditional industries were more mature companies and would therefore often choose to pay cash dividends or a mixture of large cash dividends and small stock dividends. In contrast, small or electronics-industry firms would usually choose to pay stock dividends or a mixture of small cash dividends and large stock dividends.

The research data used in this study is obtained from the Taiwan Economic Journal (TEJ) database<sup>2</sup>. Examining whether the returns of Top 30 portfolios outpaced other portfolios requires more than 60 observations. Since the observations before year 2000 are insufficient, our sample period runs from 2003 to 2007. On the other hand, dividend information in 2001 was used to estimate the dividend yields of various stocks. We also added data from the 2008 global financial crisis to boost our study. In view of this, the actual period data used runs from January 2001 to 2008.

The selection criteria for the data are described as follows: (i) the firm must be listed on the Taiwan Stock Exchange (TWSE); (ii) firms with incomplete financial data, preferred shares or TDRs are excluded from the sample; (iii) firms belonging to the non-financial industries; firms within the financial industry are excluded essentially because their financial structure differs from that of other industries; (iv) firms which do not make dividend payouts are excluded from the sample; (v) to conform to the retained earnings hypothesis, stock dividends from capital surplus are excluded (Grinblatt et al., 1984; Rankine and Stice, 1997a, 1997b); and (vi) individual stocks with capital reductions are excluded since capital reduction will only cause the firm's capital gain to be over-estimated.

Based on the above-mentioned principles, Table 1 shows the sample distribution of dividend payouts. The total sample size is 3,646; among which, the number of cash dividends, stock dividends and dual dividends are 737, 225 and 1,634, respectively. The total number of observations where no dividends are

<sup>1</sup> In Taiwan, the highest corporate tax is 25 per cent and the highest individual income tax is 40 per cent. From 1988 onwards, if a company chose to retain all of its current post-tax earnings, the real corporate tax would be increased to a maximum of 32.5 per cent. According to the tax law in Taiwan, individual income tax can be partially offset by the corporate tax already levied; however, if the marginal individual tax of the key stockholders is higher than their marginal corporate tax, since capital gains are free of tax in Taiwan, they would prefer to have a lower proportion of cash dividends and a higher proportion of current earnings.

<sup>2</sup> The TEJ database is one of the main economics resources in Taiwan from which many researchers extract their financial data.

paid is 1,050. In the year 2001, the total sample size is 521 and the number of observations for cash dividends and dual dividends are 82 and 183 respectively. In contrast, the number of observations in 2006 increased by 657, while cash dividends and dual dividends likewise increased substantially to 178 and 301, respectively. On the other hand, the

sample size of stock dividends in 2001 is only 65. This figure was further reduced to 12 in 2006. In this regard, it is worth noting that the sample size of dual dividends gradually and consistently increases over the years but the trend was brought to a halt in 2005. The number of observations for cash dividends showed steady growth beyond 2003.

Table 1. Sample distribution of dividend payouts

Year	Sample size	Cash dividends		Stock dividends		Dual dividends <sup>b</sup>		No dividends	
		No.	%	No.	%	No.	%	No.	%
2001	521	82	15.74	65	12.48	183	35.12	191	36.66
2002	581	106	18.24	47	8.09	246	42.34	182	31.33
2003	613	102	16.64	45	7.34	298	48.61	168	27.41
2004	628	123	19.58	30	4.78	313	49.84	162	25.80
2005	646	146	22.60	26	4.02	293	45.36	181	28.02
2006	657	178	27.09	12	1.83	301	45.81	166	25.27
Total	3646	737	20.21	225	6.17	1634	44.82	1050	28.80

Note: <sup>a</sup> The listed company sample consists of industry shares. Firms with incomplete financial data, preferred shares, or TDR are eliminated. <sup>b</sup> Dual dividends refer to the cash and stock dividends of the company issued on the same financial year.

As for the sample size of dividend yield portfolios, year 2001 in Table is a case in point. The sample sizes of DY1 (pure cash dividend yield portfolio), DY2 (cash dividend yield portfolio), DY3 (dual dividend yield portfolio), DY4 (stock dividend yield portfolio), and DY5 (pure stock dividend yield portfolio) are 82, 265, 183, 248, and 65, respectively. Moreover, the sample size of DY2 is the sum total of DY1 and DY3, while the sample size of DY4 is the sum total of DY3 and DY5. With regard to the portfolio compositions of DY1 to DY5, the Top 30 constituent firms were drawn from the dividend yield sequence based on the research design.

Next, this paper adopts firm size and earnings per share variables to explain the future returns of dividend yield portfolio. The firm size refers to the total assets of the company at the end of the period. Gene-

rally speaking, most small-scale companies emerge during the growth stage of the industry cycle. Vis-à-vis large-scale companies, the former may have even more opportunities for investment growth. Hence, it is easier for their EPS level to increase. As Table 2 shows, the average firm size in DY1, DY2, DY3, DY4, and DY5 are \$806M, \$909M, \$540M, \$527M, and \$581M, and their average EPS are 2.46, 3.15, 6.10, 5.81, and 1.28. Based on these data, except for the EPS of DY5 (pure stock dividend yield portfolio), the constituents of DY1 (pure cash dividend portfolio) have larger scales and lower EPS. Accordingly, this paper expects the future return variables of the portfolio to be lower. Nevertheless, whether or not future returns and performance are better than other dividend yield portfolios is a subject which follow-up studies can examine.

Table 2. Analysis of the Top 30 Dividend yield portfolio

Year	Avg. firm size <sup>a</sup>					Avg. EPS				
	DY1 <sup>b</sup>	DY2	DY3	DY4	DY5	DY1	DY2	DY3	DY4	DY5
2001	614	378	194	192	799	1.37	1.60	4.36	4.58	1.85
2002	606	915	206	206	843	1.89	2.12	4.23	4.16	0.68
2003	836	997	218	192	684	2.11	2.95	5.45	4.36	1.43
2004	838	626	862	820	345	3.03	4.48	6.58	5.92	1.26
2005	392	1089	724	716	455	2.62	3.87	7.62	7.49	1.00
2006	1550	1450	1037	1037	359	3.73	3.90	8.37	8.37	1.48
Average	806	909	540	527	581	2.46	3.15	6.10	5.81	1.28

Note: <sup>a</sup> Firm size refers to the total assets of the firm at the end of the period (unit is in million dollars). <sup>b</sup> DY1, DY2, DY3, DY4, DY5 denote the portfolios formed by pure cash dividend yield, cash dividend yield, dual dividend yield, stock dividend yield, and pure stock dividend yield, respectively. The portfolios of pure cash (or stock) dividend yield include the firms that only distribute cash (or stock) dividend in a financial year, whereas the portfolios of cash (or stock) dividend yield include the firms that may distribute both cash and stock dividends. This paper uses only cash (or stock) dividend yield to make the ranking list.

Finally, it is worth noting that because of the quarterly data of dividends in the U.S, the researchers had to combine the dividend data of four quarters

and incorporate them with the annual financial information. Hence, the main problem may be the inconsistent timing of dividend events that makes it

difficult to assess the impact of the dividend data of the entire portfolio on the rate of return the following year. In view of this, the annual dividends data in Taiwan eliminate this problem. In fact, it proves more appropriate in examining the relationship between dividends yield and future profitability.

## 2. Empirical results and analysis

**2.1. Dividend yield portfolio.** It is common knowledge that only a few mutual funds can beat market indices since the latter have superior mean-variances based on CAPM model. Based on this conception, the performance of dividend yield portfolio cannot possibly be superior to those of market indices like TAIEX and TW50 both in theory and market efficiency, particularly the portfolios of cash dividend yield with a Beta value lower than 1 in CAPM.

Table 3 shows that from 2003 to 2007, the returns on DY1 to DY5 appeared as follows: 131.61%, 137.80%, 135.97%, 128.51% and 119.86%. In contrast, the returns of TAIEX and TW50 are 86.15% and 59.20%, respectively. These data indicate that aside from TW50, all dividend yield portfolios out-

performed TAIEX. On the other hand, the Sharpe ratio indicates that only DY1 (pure cash dividend yield portfolio) and DY2 (cash dividend yield portfolio) outperformed TAIEX, while the rest of the dividend yield portfolios with their enormous variations present a phenomenon that conforms to the financial principle that high returns mean high risk.

These results reveal that the returns of DY1 are lower than those of DY2. Nonetheless, the Sharpe ratio of DY1 proved to be the highest. In this regard, the portfolio of dividend yield is assigned as the portfolio basis and we examined whether it exceeds the returns of TAIEX by using the t-value. Table 3 shows that the t-values are significantly negative in 2003 and 2005, while those of the remaining 3 years are significantly positive. More importantly, the data in Table 3 indicate that the samples appeared significantly positive during the entire period. This means that statistically speaking, the performance of DY1 in Taiwan market is superior to those of market indices and therefore echoes the findings of Visscher and Filbeck (2003) and Brzezczynski and Gajdka (2007).

Table 3. Returns for portfolios DY1, DY2, DY3, DY4, DY5, for single year holding periods (2003-2007)

Portfolios <sup>a</sup>	Holding periods (years)						Sharpe ratios <sup>c</sup>
	2003	2004	2005	2006	2007	2003-2007	
TAIEX <sup>b</sup>	33.08%	4.91%	10.88%	26.10%	11.18%	86.15%	0.46
TW50	20.68%	2.54%	6.11%	17.90%	11.97%	59.20%	0.36
DY1	32.67%	14.84%	9.73%	46.59%	27.78%	131.61%	<b>0.73</b>
DY2	36.96%	20.82%	-0.67%	46.02%	34.67%	137.80%	0.59
DY3	27.82%	-11.84%	80.47%	34.26%	5.26%	135.97%	0.15
DY4	30.50%	-13.64%	82.55%	34.22%	-5.12%	128.51%	0.11
DY5	38.95%	-17.77%	37.58%	56.07%	5.03%	119.86%	0.22
Difference (DY1 – TAIEX)	-0.41%	9.93%	-1.15%	20.49%	16.60%	45.46%	
t-statistic <sup>d</sup>	-12.94***	34.10***	-4.18***	19.49***	30.87***	15.83***	

Notes: <sup>a</sup> In our effort to simulate reality, the portfolio rate of return in this study is based on the capital gains, obtained from unadjusted prices, plus the dividends of constituent firms. In case the dividends are stock dividends, the unpaid dividends are multiplied by the year-end stock price. On the other hand, we use return index to calculate the rate of return for TAIEX, but include both capital gain and cash dividends in computing the rate of return for TW50. <sup>b</sup> The TAIEX is the Price-Weighted Average of the Taiwan Stock Exchange; TW50 is a mutual fund, which includes the top 50 market shares in the Taiwan Stock Exchange; DY1, DY2, DY3, DY4, DY5 denote the portfolios formed by pure cash dividend yield, cash dividend yield, dual dividend yield, stock dividend yield, and pure stock dividend yield, respectively. The portfolios of pure cash (or stock) dividend yield include the firms that only distribute cash (or stock) dividend in a financial year, whereas the portfolios of cash (or stock) dividend yield include the firms that may distribute both cash and stock dividends, but we only use cash (or stock) dividend yield to make a ranking list. <sup>c</sup> Sharpe ratio was calculated based on the formula:  $S = (d_i / Sd_i)$ , where  $d_i$  is the mean daily difference between the portfolio (or market) accumulation return and the risk-free rate for the 1232 days of full period (2003-to-2007), and  $Sd_i$  is the sample standard deviation of the daily differences of accumulation return. The risk-free rate for the Taiwan market is the return of the one-year Taiwan Government Treasury Bill ( $r_f$ ). Bold numbers indicate the best performance among the portfolios for the full period. <sup>d</sup> The calculation of the t-statistic is based upon the paired difference test; \*\*\* indicates significance at the 1% level.

What makes the performance of DY1 better than those of market indices? Aside from illustrating how portfolio investment opportunities suit the trading habits of investors in Research Design section, this study also points out the following factors: First, the market portfolio of constituent firms in January coincides with the “January Effect” which may lead to overloading of overestimated stocks and under-

loading of underestimated stocks during the reconstruction of portfolios. In addition, market returns will be even lower if mean-reverting occurs in the constituent firms on year-end (Hsu, 2004; Treynor, 2005). The dividend yield portfolios in this study resemble the fundamental index and they are not subject to the “January Effect”. Second, the dividend data included in this study indicate that the yearly average

of DY1 rose to 9.15% while TAIEX only reached about 3.86% from 2003 to 2007. With a Beta value of 0.82, DY1 is capable of delivering a superior mean-variance performance. During the sample period, the capital gain of DY1 was equal to the rate of return for TAIEX. The addition of the dividend rate of return emphasized even more the difference in the two rates of return. Third, the investment growth rate in Taiwan has declined rapidly for the past years. In fact, the interest rate on savings deposit is as low as 2%. Adding to this is the severe decline in birth rate from 300,000 to 200,000 or even lower per year, and this fact ultimately leads to ageing population structural problems. As a result, more investors may possibly shift to DY1. In general, the empirical results of this study show that if all factors remain the same, the future performance of dividend yield portfolio may still be superior to that of market indices<sup>1</sup>.

**2.2. Dividend signal portfolio.** The dividend-signaling hypothesis states that dividend signals convey the information content of future profitability. Since this hypothesis is widely confirmed in literatures, this study attempts to apply the hypothesis by introducing a series of portfolios and examining whether they perform well than market indices. Apart from the dividend changes (DY6) and divi-

dend growth rate (DY7), which are commonly seen in constructing portfolios. To this, we added the portfolio of dividend yield changes (DY8) and dividend yield growth rate (DY9). Table 4 presents the rate of return for DY6 to DY9 in the period from 2003 to 2007 as follows: 97.62%, 120.69%, 106.81%, and 115.27%. This data means that the rate of return of any given dividend yield portfolio outpaced TAIEX. Even based on Sharpe ratios, all but DY8 still outperformed TAIEX. These results indicate that the general application of the portfolio of dividend signals will outperform market indices just like DY1 (pure cash dividend yield portfolio). The only thing is that DY7, which demonstrated the best performance, still could not outperform DY1.

It should be noted that we were not able to fully assert whether DY7 clearly underperforms DY1. This shortcoming may be attributed to the selected time period of the samples. Say for instance, the performance of the two portfolios failed to show clear discrepancies if excluding the data of year 2003. Thus, in terms of dividend investment strategies, this study recommends an in-depth analysis on the development of dividend signal hypothesis and traditional yield portfolios.

Table 4. Returns for portfolios DY6, DY7, DY8, DY9, for single year holding periods (2003-2007)

Portfolios <sup>a</sup>	Holding Periods (years)						Sharpe ratios <sup>c</sup>
	2003	2004	2005	2006	2007	2003-07	
TAIEX <sup>b</sup>	33.08%	4.91%	10.88%	26.10%	11.18%	86.15%	0.46
DY6	17.59%	9.86%	13.61%	39.09%	17.47%	97.62%	0.51
DY7	16.21%	14.48%	13.45%	50.17%	26.38%	120.69%	<b>0.63</b>
DY8	20.50%	11.23%	7.92%	57.09%	10.07%	106.81%	0.40
DY9	15.56%	9.76%	13.60%	58.69%	17.66%	115.27%	0.57
Difference (DY7 - TAIEX)	-16.87%	9.57%	2.57%	24.07%	15.20%	34.54%	
t-statistic <sup>d</sup>	-22.85***	33.25***	12.75***	19.76***	30.98***	7.47***	

Notes: <sup>a</sup> In our effort to simulate reality, the portfolio rate of return in this study is based on the capital gains, obtained from unadjusted prices, plus the dividends of constituent firms. In case the dividends are stock dividends, the unpaid dividends are multiplied by the year-end stock price. On the other hand, we used return index to calculate the rate of return for TAIEX. <sup>b</sup> The TAIEX is the Price-Weighted Average of the Taiwan Stock Exchange; The portfolios of DY6, DY7, DY8, DY9 all derive from pure cash dividend, where the portfolios is formed by dividend change, dividend growth rate, dividend yield change, and dividend yield growth rate, respectively. <sup>c</sup> Sharpe ratio was calculated based on the formula:  $S = (d_i / Sd_i)$ , where  $d_i$  is the mean daily difference between the accumulated return of the portfolio (or market) and the risk-free rate for the 1232 days of full period (2003-2007), and  $Sd_i$  is the sample standard deviation of the daily differences of accumulation return. The risk-free rate for the Taiwan market is the return of the one-year Taiwan Government Treasury Bill ( $r_f$ ). Bold numbers indicate the best performance of portfolios for the full period. <sup>d</sup> The calculation of the  $t$ -statistic is based upon the paired difference test; \*\*\* indicates significance at the 1% level.

**2.3. Examining the superiority of high dividend yield.** From the time the Stock Exchange was established, investors have paid close attention to the

rankings found in market information, such as: revenue growth rate of the Top 10 stocks, earnings growth rate or total assets and dividend yield. However, the question remains whether the performance of the firms with top ranking dividend yields is indeed better than firms among the bottom ranks? To address this doubt, we categorized the samples based on the dividend yield rankings for that year and created a portfolio for every 30 units, the rest were discarded. Then by applying

<sup>1</sup> In the course of our research, the results remained unchanged despite our attempts to reduce the portfolio scale to Top 20 and Top 10, and also by using adjusted stock values and by changing the weight of equal-weighted. In Taiwan, the round trip cost for stock transaction is 0.585%. Thus, considering the total cost of the yearly one-time transaction, the performance of dividend yield portfolio is still superior to that of the benchmark.



the t-value, we examined whether the rate of return of the Top 30 firms was higher than the rest of the portfolios for that year. The results of this investigation are shown in Table 5, where the

answer is yes to each and every given year. In other words, the dividend yield portfolio may pose as a better option for investors who prefer high dividends.

Table 5. Returns for portfolios of the yield level based on pure cash dividend, for single year holding periods (2003-to-2007)

Portfolios <sup>a</sup>	Holding periods				
	2003	2004	2005	2006	2007
DY1 (Pure cash dividend)					
Top 30 <sup>b</sup>	32.67%	14.84%	9.73%	46.59%	27.78%
Second 30	24.49%	9.17%	4.95%	23.49%	22.27%
Third 30	-	10.60%	-0.73%	37.78%	21.19%
Forth 30	-	-	-	44.77%	17.81%
Difference (Top 30 – Sec. High return in year)	8.18%	4.24%	4.78%	1.82%	5.51%
t-Statistic <sup>c</sup>	12.43***	4.13***	22.03***	7.17***	29.49***
Samples	82	106	102	123	146

Notes: <sup>a</sup> In our effort to simulate reality, the portfolio rate of return in this study is based on the capital gains, obtained from unadjusted prices, plus the dividends of constituent firms. In case the dividends are stock dividends, the unpaid dividends are multiplied by the year-end stock price. <sup>b</sup> Top 30, Second 30, Third 30, Forth 30 denote the portfolios formed by pure cash dividend yield Top 30, 31-60, 61-90, and 91-120, respectively. Italic numbers indicate the returns of portfolios that are close to that of Top 30 in the period. <sup>c</sup> The calculation of the t-statistic is based upon the paired difference test; \*\*\* indicates significance at the 1% level.

**2.4. Double signal dividend yield portfolio.** In the real world, investors are not only influenced by the dividend yield ranking but by the latest financial indicator as well. In this regard, we use 5 more indicators to improve the performance of DY1 (pure cash dividend yield portfolio), namely: EPS changes (DY10), gross sales revenue change (DY11), size of the firm (DY12), dividend payout ratio (DY13), Tobin's q (DY14). Generally speaking, we believe that an increase in the earnings per share or gross sales revenue change is favorable to the future stock price. Likewise, an increase in the dividend payout ratio will produce similar effects (Arnott and Asness, 2003; McManus et al., 2004; Ap Gwilym et al., 2006; Zhou and Ruland, 2006). On the other hand, a reduction in the firm size will yield more favorable results to the future stock price (Fama and French, 1992; Berk, 1997; Arnott, Hsu, and Moore, 2005). The same forecasts apply to Tobin's q index (Lang and Litzenberger, 1989; Badrinath and Kini, 1994; Zhou and Ruland, 2006). The firm size refers to the natural log value of the current book value of total assets during the 3<sup>rd</sup> Quarter, while Tobin's q is the sum of the firm's market value and book value of debts divided by the book value of total assets.

In managing the portfolio performance, this study directly excludes the 10 constituent firms of DY1 according to each type of financial index and creates another group composed of the Top 20 portfolios. The rates of return for DY10 to DY14 as seen in Table 6 are 117.60%, 135.64%, 144.18%, 120.10% and 145.56%, respectively. Apparently, the rate of return of DY11, DY12, and DY14 are higher than the benchmark portfolio (DY1). Moving on, only

DY13 underperformed vis-à-vis DY1 as indicated in the results of Sharpe ratio and Treynor index. To sum up, using the double signal method aside from the dividend payout ratio can increase the DY1 value<sup>1</sup>.

Furthermore, Table 6 shows that DY12 and DY14 have the highest Sharpe ratio and Treynor index, respectively. To be consistent, the Sharpe ratio is used as the final measurement index. In this regard, the following analysis on rate of return focused on the comparison of DY12 and DY1. Table 6 also indicates that although the difference in the rate of return in 2004 and 2007 is negative, the latter's t-value is significantly positive. This means that the difference in average rate of return is positive, even if the rates of return on several trading days, including the last trading day, are negative. Most importantly, in terms of the overall sample period, the difference in the rate of return is significantly positive. Generally speaking, the result proves that under the benchmark portfolio DY1, the performance of derivative portfolios is more capable of outperforming market indices particularly DY12. Nevertheless, so far, no discussions have been made on whether this result still holds in a weak global economy.

<sup>1</sup> According to many studies, high dividend payout ratios indicate high future profitability or future returns. However, the result of this study shows that high dividend payout ratio with weakened dividend rates is directly related to future rate of return. In other words, the low dividend payout ratio in the dividend portfolio investment strategy can possibly contribute to the future rate of return. Nevertheless, this empirical question is beyond the scope of this study.

Table 6. Returns for portfolios DY10, DY11, DY12, DY13, DY14, for single year holding periods (2003-to-2007)

Portfolios <sup>a</sup>	Holding periods							Sharpe ratios <sup>c</sup>	Treyner index <sup>c</sup>
	2003	2004	2005	2006	2007	2003-07			
DY1 <sup>b</sup>	32.67%	14.84%	9.73%	46.59%	27.78%	131.61%	0.73	9.22	
DY10	29.54%	12.28%	14.36%	42.10%	19.32%	117.60%	0.76	9.71	
DY11	34.08%	11.05%	12.63%	52.03%	25.85%	135.64%	0.75	9.61	
DY12	36.52%	12.82%	13.13%	56.32%	25.39%	144.18%	<b>0.78</b>	9.79	
DY13	33.86%	10.57%	5.92%	35.73%	34.02%	120.10%	0.56	7.66	
DY14	29.23%	26.54%	5.86%	65.41%	18.52%	145.56%	0.77	<b>12.75</b>	
Difference (DY12 – DY1)	3.85%	-2.02%	3.40%	9.73%	-2.39%	12.57%			
t-statistic <sup>d</sup>	12.51***	-3.49***	14.41***	23.60***	5.08***	19.58***			

Notes: <sup>a</sup> In our effort to simulate reality, the portfolio rate of return in this study is based on the capital gains, obtained from unadjusted prices, plus the dividends of constituent firms. In case the dividends are stock dividends, the unpaid dividends are multiplied by the year-end stock price. On the other hand, we use return index to calculate the rate of return for TAIEX, but include both capital gain and cash dividends in computing the rate of return for TW50. <sup>b</sup> DY1 denotes the portfolios formed by pure cash dividend yield, where the portfolios of pure cash dividend yield include the firms that only distribute cash dividend in a financial year. The portfolios of DY10, DY11, DY12, DY13, and DY14 all derive from pure cash dividends. We first use pure cash dividend yield to select constituent firms, and then use the variables including EPS change, Gross sales revenue change, Size, Payout ratios, and Tobin's q to exclude 10 firms from the 30-firm portfolio, where Size<sub>t</sub> denotes a firm's total asset, measured as the natural logarithm of the total asset at the end of year t; Tobin's q denotes a proxy variable for the opportunities for investment growth, measured as the sum of market value and book value of debts divided by assets. <sup>c</sup> Sharpe ratio was calculated based on the formula:  $S = (d_1 / S_{d_1})$ , where  $d_1$  is the mean daily difference between the portfolio (or market) accumulation return and the risk-free accumulation for 1232 days of full period (2003-to-2007), and  $S_{d_1}$  is the sample standard deviation of the daily differences of accumulation return. The risk-free rate for the Taiwan market is the return of the one-year Taiwan Government Treasury Bill ( $rf_t$ ). The formula of Treynor index is similar to that of Sharpe ratio, but using the portfolio's beta (market beta is equal to 1) to substitute the sample standard deviation of Sharpe ratio. Bold numbers indicate the best performance among the portfolios for the full period. <sup>d</sup> The calculation of the t-Statistic is based upon the paired difference test; \*\*\* indicates significance at the 1% level.

**2.5. The financial crisis of 2008.** Long-term performance seeker may not pay close attention to short-term performance but they are very sensitive to the fluctuations in stock prices. In light of this, we first observe the rate of return in 2008. Table 7 shows the rates for TAIEX, DY1, DY10, DY11, DY12, and DY14 are -41.82%, -24.72%, -24.90%, -41.99%, -12.08% and -39.96%, respectively. In this case, the difference between DY12 and TAIEX expanded to 29.74%. The difference in the rate of return in the entire sample is close to three-fold. DY12 has the highest value under the Sharpe ratios and Treynor index. The remainder of the portfolios, except for DY11, outperformed the market indices. Thus to some degree, the pure cash dividend yield

portfolio (DY1) and its derivative portfolios may be a simple and effective investment strategy regardless of economic condition.

This study further checked the differences in the return rate of DY12 and TAIEX. The result was positive regardless of the year as shown in Table 7. Finally, allow us to observe the considerable interest shown by investors on Winner days. Out of 1,479 trading days, 1,146 or 77.48% of the trading days are said to be Smile Days of investors. So far, the findings in this study show that "high dividend yield is equal to high future rate of return", a phenomenon that is quite popular in a market with diversified dividend policies.

Table 7. Returns of portfolios DY1, DY10, DY11, DY12, and DY14 for single and multiple-year holding periods (2003-2008)

Portfolios <sup>a</sup>	Holding periods						Sharpe ratios <sup>c</sup>	Treyner index <sup>c</sup>
	2008	2007-08	2006-08	2005-08	2004-08	2003-08		
TAIEX <sup>b</sup>	-41.82%	-30.64%	-4.54%	6.34%	11.25%	44.33%	0.06	0.87
DY1	-24.74%	3.04%	49.63%	59.36%	74.20%	106.87%	0.39	6.86
DY10	-24.90%	-5.58%	36.52%	50.88%	63.16%	92.70%	0.37	6.67
DY11	-41.99%	-16.14%	35.89%	48.52%	59.57%	93.65%	0.24	3.79
DY12	-12.08%	13.31%	69.63%	82.76%	95.58%	132.10%	<b>0.53</b>	<b>10.39</b>
DY14	-39.96%	-21.44%	43.97%	49.83%	76.37%	105.60%	0.33	5.68
Difference (DY12 – TAIEX)	29.74%	43.95%	74.17%	76.42%	84.33%	87.77%		
t-statistic <sup>d</sup>	27.52***	32.29***	36.19***	30.55***	32.39***	26.37***		

Table 7 (cont.). Returns of portfolios DY1, DY10, DY11, DY12, and DY14 for single and multiple-year holding periods (2003-2008)

Portfolios <sup>a</sup>	Holding periods						Sharpe ratios <sup>c</sup>	Trenor index <sup>c</sup>
	2008	2007-08	2006-08	2005-08	2004-08	2003-08		
Winner days	247	482	720	853	1072	1146		
Trade days	247	492	739	985	1231	1479		

## Conclusion

Recently, the investment strategies based on dividend yield have attracted the attention of institutional investors and gray-haired individual investors. However, many researchers still question the validity of “high dividend yield equals high future returns” in the real investment world. For example, Black and Scholes (1974, p. 2) indicated 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 wherein marginal changes in a corporation’s dividend policy would have no effect on the price of its stock”.

Regardless of economic condition, this study proves that the performance of pure cash dividend yield portfolio and derivative portfolio is better than market indices and other types of portfolios. Furthermore, the results are robust to the factors including the definition of other dividend yield, the number of various constituent firms, the changes in portfolio weights, the definition of other dividend information, and the measurement of transaction costs.

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These results imply that during the time when the company announces its dividends, the investors may think that this does not signal a permanent increase in gains. They wait until the next quarter following the announcement to verify the authenticity of the message and to gradually initiate investment activities (Koch and Sun, 2004). As regards the timing of investment, dividend yield portfolios that enter the market during the subsequent year are said to be capable of capturing the momentum in style investment. And finally, as far as the frequency of dividend information is concerned, previous literatures made use of monthly bullet-point information to find out the superiority of dividend yield portfolios. Quite the opposite, this study used the comprehensive daily data and learned that 77.48% of the trading days yielded performances that are better than market indices during the sample period 2003-2008.

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