DIVIDEND PAYOUTS AND COMPANIES PERFORMANCE IN TAIWAN

Chun-Fan You*, *Ai-Chi Hsu*, *Ta-Li Shih*

Abstract

This study examines whether companies performance based on dividend yield are effective in the stock-dividend-prevailing markets. Besides adopting various dividend yield rankings, this study incorporates some financial variables to build portfolios. Empirical results show that for the 2003 to 2007 period, cash dividend companies yielded significantly higher annual returns than stock dividend companies, market indices, and other types of dividend yield. The results remain significant after risk adjustments. Finally, the findings of this study are robust various factors, such as the 2008 financial tsunami, and the performance of companies over multiple years. Those results imply that the cash-dividend-yield ranking is an indicator of future returns in the Taiwan market.

Keywords: Cash Dividends, Stock Dividends, Dual Dividends, Dividend Yield

*Department of Finance, TransWorld University, Taiwan
Tel: +886 5 533-4463
Email: steveyou@twu.edu.tw
**Department of Finance, National Yunlin University of Science and Technology, Taiwan
Tel: +886 5 534-2601
Email: hsuac@yuntech.edu.tw
***Department of Finance, National Yunlin University of Science and Technology, Taiwan
Tel: +886 5 534-2601
Email: g9320820@yuntech.edu.tw

1. Introduction

Many studies posit that a high dividend yield is unrelated to a high return. For example, Miller and Modigliani (1961) adopted a perfect capital market assumption in which dividend strategies are unrelated to company value. On the other hand, Filbeck and Visscher (1997), and ap Gwilym et al. (2005) found no evidence favoring dividend-yield portfolios in the British market. Strictly speaking, stock dividends do not increase company value; they merely rearrange the composition of equity accounts. However, some studies suggest that if future earnings growth does not make up for the reduction in retained earnings, the subsequent distribution of cash dividends will be restricted and outsiders will question the legitimacy of any future stock splits (Grinblatt et al., 1984; Rankine and Stice, 1997a, 1997b). Based on this assumption, researchers have contended that given asymmetric information, managers disclose private information by distributing stock dividends (particularly those distributed from retained earnings) to convey an optimistic signal for future earnings.

Trading strategies based on cash dividend yield have been widely applied in the financial market. The thought that high dividend yields lead to high future returns has also won the support of the academic society. For example, McQueen, et al. (1997) found that the return on dividend-yield companies in the U.S. is higher than that of market indices. Visscher and Filbeck (2003), and Brzeszczyński and Gajdka (2007) observed the same phenomenon in the Canadian and Polish markets, even with risk adjustments. However, their findings are limited to cash dividends. This study focuses on the Taiwan market, in which dividend policies are diverse. For example, the year 2006 sample in this study consists of 657 dividend payout firms, including 178 cash dividend, 12 stock dividend, 301 dual dividend, and 166 no dividend payout firms. Thus, it remains unclear whether trading strategies based on cash dividend yield are effective.

Generally speaking, investors may accept stock dividends in addition to cash dividends. The rationale for this practice might be related to Myers' (1984) pecking order theory. In other words, investors assume that companies with vast investment opportunities are more likely to distribute stock dividends. These companies favor internally generated cash to support future investment needs. In the actual practice of dividend policies, however, stock dividend payouts are popular among investors except in times of recession. This is because most investors prefer capital income to cash dividends. However, this assumes that investors regard stock dividends as real dividends, and not stock splits.

Therefore, to investigate the long-held notion that high dividend yields leads to high future returns, this study surveys whether cash dividend portfolios outperform stock dividend portfolios.

Why are dividend-yield portfolios so popular in the stock market? According to Barberis and Shleifer (2003), investors often divide stocks into various categories, such as small cap stocks, value stocks, technology stocks, and public service stocks. Categorizing helps many investors obtain valuable information and make investment decisions according to their habits. Investors believe that such categorized investments will outperform market indices. Similarly, investors who favor dividends often believe that high-dividend-yield portfolios reveal information about future returns.

Assuming that cash dividend-yield portfolios outperform as expected, the relationship between future returns and the dividend signaling hypotheses is worth noting. What is the difference in performance among portfolios based on dividend yield, dividend changes, and dividend growth rates? Aharony and Dotan (1994), along with other researchers, showed that higher dividend changes are associated with higher unexpected future returns. The current study attempts to determine what kind of dividend information is beneficial to investors by investigating real transactions. Therefore, the secondary objective of this study is to determine whether cash-dividend-yield ranking information is more helpful than traditional dividend signal information.

Most studies on dividend-yield portfolios ignore the return of low-dividend-yield portfolios. Graham and Kumar (2006) discovered that investors who favor high dividend yield are predominantly seniors with lower income. Conversely, institutional investors along with the younger generation tend to favor low dividend yield. If institutional investors obtain higher return than seniors, then low-dividend-yield portfolios may yield a higher return than high-dividend-yield portfolios. Therefore, this study also analyzes whether or not trading strategies based on high dividend yield match the expectations of silver-haired investors.

Many studies assert that a trading strategy that combines dividend yield with other financial variables is superior to dividend yield alone. For example, Koch and Sun (2004) showed that it is easy to capture the market's response to dividend signaling with dividend changes and earnings changes. In other words, if a dividend increase leads to a raise in the following quarter's earnings, the market tends to evaluate this consistency positively. Fama and French (1992) confirmed that small firms tend to generate higher long-term returns than large firms. The final objective of this study is to use dual signals (ranking dividend yields along with various financial indicators) to organize constituent stock portfolios and determine if the performance of these portfolios agrees with previous findings.

Using the method described above, this study shows that cash dividend-yield portfolios are more effective than the TAIEX market index. Cash dividend-yield portfolios also have the following advantages: First, portfolios are selected only once a year, which saves time. Second, cash dividend-yield portfolios have lower trading costs because transactions happen only once a year. Third, cash dividend-yield portfolios have a higher average yearly return than market indices. The beta value is also below 1, indicating superior mean-variance performance. These advantages are similar to the fundamental index proposed by Arnott, et al. (2005). Arnott et al. (2005) proposed fundamental indexation that incorporates six items—gross revenue, equity book values, gross sales, gross dividends, cash flow, and total employment—as weights to establish a non-capitalized index. They claimed that the fundamentals-weighted index provides consistently higher returns and lower risks than the traditional cap-weighted equity market indices while preserving the benefits of traditional indexing (p.83). However, their index was implemented in large funds, whereas dividend-yield portfolios are better suited to small funds. Therefore, the primary contribution of this study is that it provides material references for countries dividend-yield-based mutual funds in a diverse market climate.

The empirical results of this study show that, similar to the financial events of dividend initiations (Michaely et at., 1995), earnings announcements (Ball and Brown, 1968; Bernard and Thomas, 1990) and stock splits (Dharan and Ikenberry, 1995; Ikenberry et al., 1996), will generate a positive abnormal return under a long-term post-event. However, this study examines how to construct a dividend-yield portfolio to locate a consistent abnormal return. This study does not attempt to construct a perfect model explaining the occurrence of this kind of abnormal return.

The rest of the study is as follows. Section 2 presents the study design. Section 3 describes the data used in this study. Section 4 presents and analyzes the results, and Section 5 offers the conclusion.

2. Study design

The following six items are relevant to the empirical analysis in this study: trading strategies and investment timing, return and dividend yield calculation methods, numbers and weights of constituent stocks, dividend-yield portfolio types, market indices and performance indices, and difference tests on return.

2.1. Trading strategies and investment timing

This study investigates dividend-yield portfolios, which are similar to equity funds. People generally purchase funds for long-term investments, and

financial marketing advertisements often present 1-5-year fund performance figures. As a result, this study chooses simple trading strategies specific to buying and holding, and measures the corresponding portfolio return annually or multi-annually. For simplification, the return for multiple years is the sum of annual returns, dispensing with the issue of re-investment.

As for investment timing, this study uses the first trading day a year after dividend announcement as the starting day for the portfolio. In reality, if the latest dividend information is positive to the future return, investors can enter the market at the beginning of July in the announcement year. This is because, in the Taiwan market, most dividend information can be collected by the end of June. However, a July portfolio's performance in the dividend announcement year does not outperform a January portfolio in the following year. The behavioral finance approach yields similar results. For example, Edwards (1968) confirmed that the investing public has a very conservative reaction towards new evidence entering the market. Barberis et al. (1998) pointed out that a conservative bias causes investors to respond slowly to dividend announcements. Koch and Sun (2004) confirmed that after a firm increases its dividends, investors only view the signal as permanent when the following quarterly earnings show positive growth. Thus, dividend-yield portfolios entering the market immediately after dividend announcement may perform worse than were expected because investors may underreact to the trends of past earnings performance.

2.2. Return and dividend yield calculation methods

This study calculates capital income using unadjusted stock prices. For stock dividends, the stock price at the end of the investment year is converted to cash dividends, which are combined with cash dividends (if issued) to calculate the total portfolio return. In practice, however, unadjusted stock prices also have some flaws. For example, an increase or decrease in the listed company's paid-in capital can affect portfolio returns. Adopting a more conservative stance, this study eliminates all sample firms that reduced their capital funds in the same year, and further uses the ex-right and ex-dividend adjustments widely used in the academic circle to cross-validate dividend information.

Generally speaking, dividend yield is obtained by dividing dividends by the stock price at year-end. However, for companies with a promising future return outlook, the stock prices at the end of the year may rise significantly, making their dividend yields relatively low. This study uses the annual average price per share as the denominator to prevent this from happening, but this only result in similar performance compared to traditional methods. A data review shows that the portfolio prices of sample companies at year-end are indeed higher than the annual average prices, resulting in a lower dividend yield. However, this is common in companies with high dividend yields; only a small portion of the constituent stocks have been replaced. As a result, to simplify stock selection, this study still applies the traditional calculation for dividend yields.

2.3. Numbers and weights of constituent stocks

This study selects the top 30 dividend-yield firms to create a sample. The rationale behind this decision is that these portfolios are more dispersed, cater to the habits of stock-specific investors, and generally have dividend-yield-based funds. However, this study also examines the top 20 and top 10 firms for to determine whether this selection affects the results of this study. As far as the weights of constituent firms are concerned, this study prioritizes the price-weighted approach and uses an equal-weighted approach for the robust tests. The former is consistent with investment habits of general investors. Therefore, if the latter is used, then the investments of small-scale constituent firms in the portfolio would be larger, and might increase the volatility of portfolio returns.

2.4. Dividend-yield portfolio types

Trading strategies based on dividend yield often refer to cash dividend portfolios. However, just as the risk tolerance levels of investors change over time, their preferences for cash dividend and stock dividend may also change. Unsophisticated investors may exhibit a time-varying sentiment for choosing a particular dividend category. Based on potential dividend preferences, this study proposes the following 5 different trading strategies: Exhibit 1 summarizes the variables considered in the study.

Variable	Description
DY1	Cash dividend-yield portfolio: Limited to constituent companies with paid cash dividends for that same year, ranked by cash dividend yield.
DY2	Non-pure cash dividend-yield portfolio: Limited to constituent companies with paid dividends for that same year, ranked by cash dividend yield.
DY3	Dual dividend-yield portfolio: Limited to constituent companies with paid dividends for that same year, ranked by the sum of cash dividend yield and stock dividend yield.
DY4	Non-pure stock dividend-yield portfolio: Limited to constituent companies with paid dividends for that same year, ranked by stock dividend yield.
DY5	Stock dividend-yield portfolio: Limited to constituent companies with paid stock dividends for that same year, ranked by stock dividend yield.

Exhibit 1.Summary of the study's variables

2.5. Market indices and performance indices

This study adopts TAIEX and TW50 (a exchange-traded fund that includes the top 50 market shares in the Taiwan Stock Exchange) as its market indices. The former is a benchmark for the performance of Taiwan's equity funds. The latter is more widely preferred by investors. Since investors with dividend-yield portfolios have a risk appetite similar to the TW50, this study also categorizes the TW50 as a market index. This study uses the Sharpe ratio as a performance index to measure the overall portfolio risk of the top 30 companies. Due to a substantial drop in the number of constituent firms for the portfolio scale for the top 20 and top 10 firms, this study measures market risk using the Treynor Index, which serves as a risk-adjusted measure of portfolio performance.

2.6. Difference tests on return

This study employs a paired difference test and monthly cumulative returns to determine the significance of the return difference between cash dividend-yield portfolios and market indices. This is because normality is a better approximation for short horizons (like one month) than for one-year horizons, where skewness becomes increasingly important (Fama, 1998, p 294).

3. Basic descriptive data

Prior to 1998, many Taiwanese companies paid stock dividends with hardly any cash dividends. This approach essentially alleviated the dilution of firms' earnings per share (EPS) for that period, when growth rates were high. In 1998, the Taiwan government implemented a new tax law imposing a 10 percent levy upon any earnings retained. Taiwanese listed companies faced the problem of optimal dividend payouts under different situations. In particular, they had to decide whether to distribute the remaining earnings as cash dividends, stock dividends, or a combination of both.[18] Generally speaking, companies in traditional industries were mature and thus chose to issue either cash dividends or a combination of large amounts of cash dividends and a small amount of stock dividends. In contrast, small companies or electronics companies typically chose stock dividends or combinations of large amounts of stock dividends and a small amount of cash dividends due to great investment opportunities. After Taiwan's economic growth stagnated in 2000, investors began evaluating companies that issued large amounts of stock dividends in a low regard. Since then, company dividend policies have shifted to issuing cash dividends or increasing cash dividend ratios, along with reducing stock dividend ratios.

Based on this background, this study uses over 60 observations to test whether the return of the top 30 portfolios is higher than those of other portfolios. Since observations before year 2001 do not provide sufficient information, the sample period in this study is 2001-2005. The corresponding investment period is from 2003 to 2007. This study also investigates the performance of dividend-yield portfolios during the financial crisis of 2008. The actual empirical period covers the time period from 2001 to 2008. The research data used in this study was selected from the Taiwan Economic Journal (TEJ) based on the following criteria:

1. The company is listed in the Taiwan Stock Exchange (TWSE).

[18] In Taiwan, the highest corporate tax is 25% and the highest individual income tax is 40%. If companies retain after-tax earnings in their entirety within a period, the corporate income tax can be increased to 32.5%. 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 shareholders exceeds their marginal corporate tax, since capital gains are free of tax in Taiwan, they prefer to decrease the proportion of cash dividends and increase the proportion of current earnings.

2. Companies with incomplete financial data, preferred shares, or TDRs were excluded from the sample.
3. Companies in the financial industry were excluded because their financial structure differs from others.
4. Stocks that do not issue dividends were excluded.
5. To be consistent with the earnings retained hypothesis, stock dividends from capital surplus were excluded (Grinblatt et al., 1984; Rankine and Stice, 1997a,1997b).
6. Stocks with capital reduction were excluded to avoid overestimating capital income.

Table 1 shows the sample distribution of dividend payouts based on the screen criteria above. The sample size is 3646 dividend payout firms, including 737 cash dividend, 225 stock dividend, and 1634 dual dividend payout firms. The number of observations with no dividend payouts is 1050. For the year 2001, the sample contains 521 dividend payouts, with 82 and 183 cash dividends and dual dividends, respectively. In contrast, the number of observations in 2006 increased to 657. Cash dividends and dual dividends increased substantially of 178 and 301, respectively. On the other hand, the sample contains only 65 stock dividends for 2001. This figure dropped to 12 in 2006. Note that the sample size of dual dividends gradually and consistently increased over the years, but this trend halted in 2005. The number of observations for cash dividends showed steady growth beyond 2003.

The year 2001 in Table 1 is a good example of the sample size of dividend-yield portfolios. The sample sizes of DY1 (cash dividend-yield portfolio), DY2 (non-pure cash dividend-yield portfolio), DY3 (dual dividend-yield portfolio), DY4 (non-pure stock dividend-yield portfolio), and DY5 (stock dividend-yield portfolio) are 82, 265, 183, 248, and 65, respectively. The DY2 sample includes the total of DY1 and DY3, while the DY4 sample includes the total of DY3 and DY5. Regarding the portfolio compositions of DY1 to DY5, this study selects the top 30 sample firms based on their dividend yield ranking, as described in the research design section.

This study also adopts firm size and earnings per share (EPS) variables to explain the future returns of dividend-yield portfolios. Firm size represents the total assets of the company at the end of the period. Generally speaking, small-scale companies emerge during the growth stage of the industry cycle. Compared to large-scale companies, small companies may have even more opportunities for investment. Hence, it is easier for their EPS level to increase.

As Table 2 shows, the average firm sizes in DY1, DY2, DY3, DY4, and DY5 samples are \$806M, \$909M, \$540M, \$527M, and \$581M, respectively, with average EPS levels of 2.46, 3.15, 6.10, 5.81, and 1.28. Except for the EPS of DY5 (stock dividend-yield portfolio), these data show that the constituents of DY1 (cash dividend-yield portfolio) have larger scales and lower EPS levels. Therefore, the DY1 portfolio should have lower future returns. Nevertheless, whether or not future returns and performance are better than other dividend-yield portfolios remains a subject for further research.

Finally, due to the quarterly data of dividends in the U.S, the researchers combine the dividend data of four quarters and correlate this data to annual financial information. Hence, the main problem may be the inconsistent timing of dividend events, which makes it difficult to assess the effect of the dividend data of the entire portfolio on the return for the following year. The annual dividend data in Taiwan eliminates this problem. In fact, this type of data is more appropriate for examining the relationship between dividends yield and future return.

Table 1. Sample distribution of dividend payouts

Year	Sample Size[1]	Cash dividends		Stock dividends		Dual dividends[2]		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:
[1] The listed company sample consists of industry shares. The sample does not include firms with incomplete financial data, preferred shares, or TDR.
[2] Dual dividends refer to the cash and stock dividends of the company issued on the same financial year.

Table 2. Analysis of the top 30 dividend-yield portfolio

Year	Avg. Firm Size[1]					Avg. EPS				
	DY1[2]	DY2	DY3	DY4	DY5	DY1	DY2	DY3	DY4	DY5
2001	215	132	68	67	280	1.37	1.60	4.36	4.58	1.85
2002	211	318	72	71	293	1.89	2.12	4.23	4.16	0.68
2003	284	339	74	65	232	2.11	2.95	5.45	4.36	1.43
2004	267	200	275	262	110	3.03	4.48	6.58	5.92	1.26
2005	129	358	238	235	150	2.62	3.87	7.62	7.49	1.00
2006	505	473	338	338	117	3.73	3.90	8.37	8.37	1.48
Average	269	303	177	173	197	2.46	3.15	6.10	5.81	1.28

Note:
[1] Firm size represents the total assets of the firm at the end of the period (in millions of U.S. dollars).
[2] DY1, DY2, DY3, DY4, and DY5 refer to top 30 portfolios selected based on cash dividend yield, non-pure cash dividend yield, dual dividend yield, non-pure stock dividend yield, or rankings of stock dividend yield. Cash (stock) dividends refer to companies with paid cash (or stock) within the financial year, while non-pure cash (non-pure stock) dividends do not limit companies to distributing a specific kind of dividend. Dual dividends refer to companies with both paid cash dividends and stock dividends.

4. Empirical results and analysis

4.1. Performance of various dividend-yield portfolios

Only a few outstanding funds managers and reckless speculators dare to challenge market indices, which have superior mean-variances based on the capital asset pricing model (CAPM). Therefore, dividend-yield portfolios, and particularly those with a beta value lower than 1 in the CAPM, cannot perform better than market indices like the TAIEX and TW50.Only a few outstanding funds managers and reckless speculators dare to challenge market indices, which have superior mean-variances based on the capital asset pricing model (CAPM). Therefore, dividend-yield portfolios, and particularly those with a beta value lower than 1 in the CAPM, cannot perform better than market indices like the TAIEX and TW50.

However, Table 3 shows that the returns of DY1 to DY5 from 2003 to 2007 were 131.61%, 137.80%, 135.97%, 128.51%, and 119.86%, respectively. In comparison, the returns of TAIEX and TW50 were 86.15% and 59.20% during the same period. These data indicate that aside from TW50, all dividend-yield portfolios outpaced TAIEX. However, the Sharpe ratio indicates that only DY1 (cash dividend-yield portfolio) and DY2 (non-pure cash dividend-yield portfolio) outperformed TAIEX, while the remaining dividend-yield portfolios agree with 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, DY1 is assigned as the fundamental portfolio, and its t-value is used to examine the difference in returns between DY1 and TAIEX. Table 3 shows that though there was a significant negative t-value in 2003, significant positive t-values appeared in three years. Most importantly, the overall sampling period was significantly positive. The performance of DY1 in the Taiwan market is superior to that of market indices, echoing the findings of Visscher and Filbeck (2003), and Brzeszczyński and Gajdka (2007).

To be consistent with market practice, the portfolio rate of return in this study is based on capital gains obtained from unadjusted prices plus the dividends of constituent firms. When the dividends are stock dividends, the no-paid allotments are multiplied by the year-end stock price. On the other hand, this study uses the return index to calculate the rate of return for TAIEX, but includes both capital gain and cash dividends in computing the rate of return for TW50. TAIEX refers to the Price-Weighted Average of the Taiwan Stock Exchange; TW50 is the Taiwanese 50 ETF fund. The constituent stocks of the TW50 are from the top 50 companies in terms of market value. Why did DY1 perform better than market indices? The following are a few possible explanations: First, the market portfolio of constituent firms in January coincides with the "January Effect," which may lead to overloading of overestimated stocks and underloading of underestimated stocks during portfolio reconstruction. In addition, if constituent stocks become mean-reverting at the end of the year, then market returns will be adjusted downward (Hsu, 2004; Treynor, 2005). In contrast, the dividend-yield portfolios in this study are similar to fundamental indexation and less subject to the January Effect. Second, according to the return on dividend yield in this study, the average annual dividend yield of DY1 was 9.15% in 2003-2007, while TAIEX reached only 3.86%. In addition, the

beta value of DY1 was only 0.82, yielding an outstanding performance after risk adjustments. Third, Taiwan's investment growth dropped quickly, causing bank savings rates to fall below 2%. Based on a simultaneous severe decline in the birth rate from 300,000 to 200,000 or even lower per year, this ultimately leads to aging population structural problems. As a result, more investors may shift to DY1. Fourth, according to the CAPM, stocks with excessively high dividend yields are undervalued. As a result, investors will continue to buy these stocks until the prices have been adjusted to the market price line. These results imply that, if all factors remain the same, cash dividend-yield portfolios may continue to outperform market indices.

This study also attempts to reduce portfolio scales to top 20 or top 10, to use adjusted stock prices, or to change weights to equal weights, but the results did not change. In Taiwan, the cost of an entire stock transaction is 0.585%. Consequently, even if the total transaction costs of a buying and selling transaction once per year are taken into account, the performance of dividend-yield portfolios remains better than market indices.

Table 3. Performance of various dividend-yield portfolios in 2003-2007

portfolios	Investment period						
	2003	2004	2005	2006	2007	2003-07	Sharpe ratio[1]
TAIEX	33.08%	4.91%	10.88%	26.10%	11.18%	86.15%	0.47
TW50	20.68%	2.54%	6.11%	17.90%	11.97%	59.20%	0.39
DY1	32.67%	14.84%	9.73%	46.59%	27.78%	131.61%	**0.72**
DY2	36.96%	20.82%	-0.67%	46.02%	34.67%	137.80%	0.58
DY3	27.82%	-11.84%	80.47%	34.26%	5.26%	135.97%	0.13
DY4	30.50%	-13.64%	82.55%	34.22%	-5.12%	128.51%	0.09
DY5	38.95%	-17.77%	37.58%	56.07%	5.03%	119.86%	0.22
Difference in return (*DY*1 – T*AIEX*)	-0.41%	9.93%	-1.15%	20.49%	16.60%	45.46%	
t-Statistic[2]	-2.36**	11.21***	-1.32	3.93***	6.67***	3.89***	

Note:
[1.] The Sharpe ratio formula is $S = (d_i / S_{di})$. In this formula, d_i is the average difference between the monthly return and the risk-free return for the i^{th} dividend-yield portfolio (or market indices); the period of measurement comprised 60 months as the sampling period; S_{di} refers to the standard deviation of the difference in monthly return and risk-free return. The risk-free rate for the Taiwan market is the return of the one-year Taiwan Government Treasury Bill (rf_t). Bold numbers indicate the best performance among the portfolios for the full period.
[2.] The calculation of the t-statistic is based upon the paired difference test; *, **, and *** respectively indicate significance at the 10%, 5%, and 1% levels.

4.2. Performance of different cash dividend-yield portfolios

Until this point, it is inconclusive whether dividend signals future profit. However, based on the dividend-signaling hypothesis, this study uses a series of portfolios to test whether portfolios based on the dividend-signaling hypothesis perform better than simple cash dividend-yield portfolios. In terms of portfolio construction, in addition to the commonly used dividend change (DY6) and dividend growth rate (DY7) portfolios, this study adds the dividend-yield change (DY8) and dividend-yield growth rate (DY9) portfolios. Table 4 shows that the respective returns for DY6 through DY9 from 2003-2007 were 97.62%, 120.69%, 106.81%, and 115.27%. These figures show that all dividend-yield portfolios have a lower return than DY1 (cash dividend-yield portfolios). Even based on Sharpe ratio, DY1 has a higher value than the other portfolios in Table 4. These results show that the portfolios that apply dividend signals are, like DY1, superior to market indices. However, even DY8 (dividend-yield change portfolios), which had the best performance, did not exceed DY1.

4.3. Performance of high dividend-yield portfolios

From the time the Stock Exchange was established, investors have preferred ranked market information, such as the top 10 revenue growth rates, earnings growth rates, total capital rankings, and even dividend yield rankings. However, it remains unclear whether the performance of the firms with top-ranking dividend yields is indeed better than that of bottom-ranked firms. To answer this question, this study first ranks annual dividend yields, forming a portfolio using every 30 observations and discarding the

remainder, and then applies the t test to determine whether returns for the top 30 were higher than the other portfolios.

Table 4. Performance of various cash dividend-yield portfolios in 2003-2007

portfolios	Investment period						
	2003	2004	2005	2006	2007	2003-07	Sharpe ratio[1]
DY1[2]	32.67%	14.84%	9.73%	46.59%	27.78%	131.61%	**0.72**
DY6	17.59%	9.86%	13.61%	39.09%	17.47%	97.62%	0.50
DY7	16.21%	14.48%	13.45%	50.17%	26.38%	120.69%	0.39
DY8	20.50%	11.23%	7.92%	57.09%	10.07%	106.81%	0.62
DY9	15.56%	9.76%	13.60%	58.69%	17.66%	115.27%	0.56

Note:[1] Bold numbers indicate the best performance among the portfolios for the full period.

Table 5. Returns of various dividend yield levels under cash dividend-yield portfolios

portfolios	Investment period				
	2003	2004	2005	2006	2007
Cash dividend-yield portfolio					
top 30	32.67%	14.84%	9.73%	46.59%	27.78%
Sec. 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 in return (Rate of return for the annual top 30 minus the next-higher rate of return)	8.18%	4.24%	4.78%	1.82%	5.51%
t-Statistic[1]	3.15***	1.28	5.06***	1.08	8.50***
Samples	82	106	102	123	146

Note:
[1] The calculation of the t-statistic is based upon the paired difference test; *, **, and *** respectively indicate significance at the 10%, 5%, and 1% levels.

Table 5 shows that the answer was "Yes" for over half of the sample periods. These results show that, in terms of trading strategies based on cash dividend-yield portfolios, it may be best to favor high dividend-yield groups.

4.4. Performance of various dual signal dividend-yield portfolios

In the real world, in addition to dividend yield rankings, the latest financial indices also affect investor behavior. Therefore, this study uses 5 more indicators to improve the performance of DY1, namely, EPS changes (DY10), gross sales revenue changes (DY11), firm size (DY12), dividend payout ratio (DY13), and Tobin's q (DY14). Based on investor intuition, an increase in the EPS or gross sales revenue change is likely favorable to the future stock price. An increase in the dividend payout ratio also produces 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 firm size will yield more favorable results to the future stock price (Fama and French, 1992; Berk, 1997; Arnott, et al., 2005). The same forecasts apply to Tobin's q index (Lang and Litzenberger, 1989; Badrinath and Kini, 1994; Zhou and Ruland, 2006). Firm size refers to the natural log value of the current book value of total assets at the end of year, 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 (Fama and French, 2002; Zhou and Ruland, 2006).

To conveniently test the performance of dual signal dividend-yield portfolios, this study removes 10 constituent stocks from DY1 based on different financial indices, forming a top 20 portfolio. Table 6 shows that the returns for DY10 through DY14 were 117.60%, 135.64%, 144.18%, 120.10%, and 145.56%, respectively. Note that DY11, DY12, and

DY14 had higher returns than the original fundamental portfolio (DY1). In terms of the Sharpe ratio and the Treynor index, only DY13 performed worse than DY1. In summary, aside from dividend payout ratios, dual signals can increase the added value of DY1.[19]

In addition, Table 6 shows that DY12 had the highest Sharpe ratio and Treynor index. The following difference analysis compares DY12 and DY1. Table 6 shows that though the differences in return for subtracting DY1 from DY12 in 2004 and 2007 are negative, both t-values are insignificant. In contrast, the t-value is significant for the other three years. Finally, differences in returns are also significantly positive for the overall sample period. These results suggest that, compared to the fundamental portfolio DY1, these portfolios have even greater opportunity to exceed market indices, particularly DY12. However, it remains unclear whether this performance sustains in a recession period.

4.5. Performance of cash dividend-yield portfolios during financial crisis and multiple years

Long-term investors are relatively insensitive to changes in short-term return, but highly sensitive to abnormal fluctuations in stock prices. As a result, these investors may panic and close bullish positions early. Consequently, this study focuses on the financial crisis of 2008. To be consistent with market practice, the portfolio rate of return in this study is based on the capital gains obtained from unadjusted prices plus the dividends of constituent firms. When the dividends are stock dividends, the no-paid allotments are multiplied by the year-end stock price. On the other hand, this study uses return index to calculate the rate of return for TAIEX. The firm size refers to total company assets, measured according to the natural log of total company assets at the end of year; Tobin's q refers to the proxy variable for company investment growth opportunities, with market value added to book debt then divided by total assets. Tobin's q refers to the proxy variable for company investment growth opportunities, with market value added to book debt then divided by total assets.

Table 7 shows that the respective rates of return for TAIEX, DY1, DY10, DY11, DY12, and DY14 in 2008 were -41.82%, -24.74%, -24.90%, -41.99%, -12.08%, and -39.96%. The difference in the annual return for DY12 and TAIEX reached 29.74%, while the difference during the sampling period of 2003-2008 was almost 3 times higher. DY12 had the highest Sharpe ratio and Treynor index. This study also tests the difference between DY12 and TAIEX. Table 7 shows that the difference was significantly positive both in 2008 and in any set of multiple years. Accordingly, the thought that high dividend yield equals high future returns does hold true for cash dividend yield portfolios, regardless of changes in economic conditions. This is particularly true for dual signal combinations using cash dividend yield and firm size.

4.6. Performance of dividend-yield portfolios and predicted dividend-yield portfolios

The results above seem to be an appropriate reference for countries attempting to developing small-scale dividend-yield-based funds. However, intelligent readers and exceptional fund managers may believe that predicted dividend-yield portfolios can outperform current dividend-yield portfolios. The former portfolios represent a January portfolio in the dividend announcement year, and the latter portfolios represent the same portfolio but in January of the following year. When listed companies announce dividend rates far exceeding market standards, the market generally responds positively. Consequently, if securities analysts can accurately predict the following dividend yield rankings, their portfolios can intuitively produce greater performance. This study uses the cash dividend-yield related portfolios of DY1 (cash dividend yield), DY6 (dividend change), DY7 (dividend growth rate), DY8 (dividend yield change), and DY9 (dividend yield growth rate) to determine whether this is true. Table 8 shows that none of the predicted dividend-yield portfolio outperformed the dividend-yield portfolios in this study. It is possible that those portfolios may easily capture the abnormal short-term return following dividend yield announcements. However, since investors underestimate the post-event long-term profits, performance suffers at the end of the year. Therefore, this study also analyzes quarterly return. Aside from the second quarter, in which a peak period for dividends was announced, current dividend-yield portfolios were obviously better than predicted dividend-yield portfolios. Therefore, as far as investment strategies are concerned, results indicate that rather than using econometric models to forecast dividend yield, the current dividend yield is an easier and more effective tool.

[19] A significant body of literature indicates that high dividend payouts are linked to high future returns. However, the results of this study show that high dividend payouts actually weaken the relationship between dividend rates and future rates of return. Hence, in terms of trading strategies based on dividend-yield portfolios, lowering dividend payout rates may increase future rates of return. However, this exceeds the scope of this study.

Table 6. Performance of cash dividend-yield portfolios using various dual signals from 2003-2007

portfolios[1]	Investment period							
	2003	2004	2005	2006	2007	2003-07	Sharpe ratio	Treynor index[2]
DY1	32.67%	14.84%	9.73%	46.59%	27.78%	131.61%	0.72	8.91
DY10	29.54%	12.28%	14.36%	42.10%	19.32%	117.60%	0.76	8.52
DY11	34.08%	11.05%	12.63%	52.03%	25.85%	135.64%	0.74	7.47
DY12	36.52%	12.82%	13.13%	56.32%	25.39%	144.18%	**0.77**	**11.28**
DY13	33.86%	10.57%	5.92%	35.73%	34.02%	120.10%	0.56	6.30
DY14	29.23%	26.54%	5.86%	65.41%	18.52%	145.56%	0.76	9.18
Difference in return (*DY*12 – *DY1*)	3.85%	-2.02%	3.40%	9.73%	-2.39%	12.57%		
t-Statistic[3]	2.55**	-0.71	2.90**	4.68***	0.87	4.06***		

Note:
[1] To be consistent with market practice, the portfolio rate of return in this study is based on the capital gains obtained from unadjusted prices plus the dividends of constituent firms. When the dividends are stock dividends, the no-paid allotments are multiplied by the year-end stock price.
[2] The formula of Treynor index is similar to that of Sharpe ratio, but the former uses 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.
[3] The calculation of the t-statistic is based upon the paired difference test; *, **, and *** respectively indicate significance at the 10%, 5%, and 1% levels.

Table 7. Performance of cash dividend-yield portfolios during the financial crisis and in multiple years

portfolios	Investment period							
	2008	2007~08	2006~08	2005~08	2004~08	2003~08	Sharpe ratio	Treynor index
TAIEX	-41.82%	-30.64%	-4.54%	6.34%	11.25%	44.33%	0.05	0.81
DY1	-24.74%	3.04%	49.63%	59.36%	74.20%	106.87%	0.40	6.96
DY10	-24.90%	-5.58%	36.52%	50.88%	63.16%	92.70%	0.38	6.80
DY11	-41.99%	-16.14%	35.89%	48.52%	59.57%	93.65%	0.22	3.58
DY12	-12.08%	13.31%	69.63%	82.76%	95.58%	132.10%	**0.55**	**10.78**
DY14	-39.96%	-21.44%	43.97%	49.83%	76.37%	105.60%	0.31	5.39
Difference in rate of return DY12 – TAIEX	29.74%	43.95%	74.17%	76.42%	84.33%	87.77%		
t-Statistic[1]	6.95***	7.63***	8.20***	6.78***	7.21***	6.15***		

Note:
[1] The calculation of the t-statistic is based upon the paired difference test; *, **, and *** respectively indicate significance at the 10%, 5%, and 1% levels.

Table 8. Performance of dividend-yield portfolios and predicted dividend-yield portfolios from 2003-2008

portfolios[1]	Investment period							
	2003	2004	2005	2006	2007	2008	2003-08	Sharpe ratio[3]
DY1[2]	32.67%	14.84%	9.73%	46.59%	27.78%	-24.74%	106.87%	**0.39**
DY1*	23.48%	20.58%	-1.58%	62.77%	38.28%	-42.23%	101.30%	0.22
DY6	17.59%	9.86%	13.61%	39.09%	17.47%	-31.73%	65.89%	**0.18**
DY6*	31.64%	22.91%	2.03%	35.77%	26.53%	-45.65%	73.23%	0.11
DY7	16.21%	14.48%	13.45%	50.17%	26.38%	-19.52%	101.17%	**0.41**
DY7*	22.83%	32.11%	-4.39%	44.78%	9.90%	-40.11%	65.12%	0.13
DY8	20.50%	11.23%	7.92%	57.09%	10.07%	-4.91%	101.90%	**0.35**
DY8*	34.93%	18.73%	-5.90%	76.63%	7.81%	-41.10%	91.10%	0.16
DY9	15.56%	9.76%	13.60%	58.69%	17.66%	-9.91%	105.36%	**0.44**
DY9*	24.18%	30.71%	-12.25%	57.88%	26.75%	-26.52%	100.75%	0.31

Note:
[1] To be consistent with market practice, the portfolio rate of return in this study is based on the capital gains obtained from unadjusted prices plus the dividends of constituent firms. When the dividends are stock dividends, the no-paid allotments are multiplied by the year-end stock price.
[2] DY1 refers to the top 30 portfolios selected based on rankings of cash dividend yield. Cash dividends refer to companies with only paid cash within a financial year; DY6, DY7, DY8, and DY9 are top 30 portfolios derived from cash dividends and then selected based on rankings of dividend changes, dividend growth rates, dividend yield changes, or dividend yield growth rates. *: indicates dividend-yield portfolios formed and based on a predicted dividend yield.
[3] The Sharpe ratio formula is $S = (d_i / S_{di})$. In this formula, d_i is the average difference between the monthly return and risk-free return for the i^{th} dividend-yield portfolio (or market indices); the period of measurement comprised 60 months as the sampling period; S_{di} refers to the standard deviation of the difference in monthly return and risk-free return. The risk-free rate for the Taiwan market is the return of the one-year Taiwan Government Treasury Bill (rf_t). Bold numbers indicate the best performance among the portfolios for the full period.

5. Conclusion

Trading strategies based on cash dividend-yield portfolios have recently attracted numerous elderly and institutional investors. The excellent performances of these portfolios also attract attentions in literature and in practice. However, in reality, scholars remain are often suspicious that high dividend yield will not high future returns. 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".

In contrast, the current results show that, in the 2003-2008 period, cash dividend-yield portfolios and their derivatives performed better than market indices and other portfolios regardless of the economic environment. These results are robust to other dividend yield definitions, different constituent stock quantities, changes in portfolio weighting, other definitions of stock prices, or transaction cost considerations. Finally, these portfolios also outperform predicted dividend yield or portfolios, which enter the market early. These results suggest that the trade strategies of cash dividend-yield portfolio in the Taiwan market have matured particularly for dual signal portfolios using dividend yield and financial variables.

References

1. Aharony, J., and A. Dotan, 1994, Regular dividend announcements and future unexpected earnings: An empirical analysis. Financial Review 29, pp. 125-151.
2. Ap Gwilym, O., J. Seaton, and S. Thomas, 2005, Dividend yield investment strategies, the payout ratio, and zero-dividend stocks. The Journal of Investing 62, pp. 69-74.
3. Ap Gwilym, O., J. Seaton, K. Suddason, and S. Thomas, 2006, International evidence on the payout ratio, earnings, dividends and returns. Financial Analysts Journal 62, pp. 36-53.
4. Arnott, R. D., and C. S. Asness, 2003, Surprise! higher dividends = higher earnings growth. Financial Analysts Journal 59, pp. 70-87.
5. Arnott, R. D., J. Hsu, and P. Moore, 2005, Fundamental indexation, Financial Analysts Journal 61, pp. 83-99.
6. Badrinath, S. G.., and O. Kini, 1994, The relationship between securities yields, firm size, earnings/price ratios and Tobin's q. Journal of Business Finance & Accounting 21, pp. 109-131.
7. Ball, R., and P. Brown, 1968, An empirical evaluation of accounting income numbers. Journal of Accounting Research 6, pp. 159-178.
8. Barberis, N., and A. Shleifer, 2003, Style investing. Journal of Financial Economics 68, pp. 161-199.

9. Barberis, N., A. Shleifer, and R. Vishny, 1998, A model of investor sentiment. Journal of Financial Economics 49, pp. 307-343.
10. Berk, J. B., 1997, Does size really matter? Financial Analysts Journal 52, pp. 12-18.
11. Bernard, V., and J. Thomas, 1990, Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. Journal of Accounting and Economics 13, pp. 305-340.
12. Black, F., and M. Scholes, 1974, The effects of dividend yield and dividend policy on common stock prices and returns. Journal of Financial Economics 1, pp. 1-22.
13. Brzeszczyński, J., and J. Gajdka, 2007, Dividend-driven trading strategies: evidence from the Warsaw Stock Exchange. International Advances in Economic Research 13, pp. 285-300.
14. Dharan, B., and D. Ikenberry, 1995, The long-run negative drift of post-listing stock returns. Journal of Finance 50, pp. 1547-1574.
15. Edwards, W., 1968, Conservatism in human information processing. In: Kleinmutz, B (Ed.), Formal Representation of Human Judgement. Wiley, New York.
16. Fama, E. F., 1998, Market efficiency, long-term returns, and behavioral finance. Journal of Financial Economics 49, pp. 283-306.
17. Fama, E. F., and K. R. French, 1992, The cross-section of expected stock returns. Journal of Finance 47, pp. 427-465.
18. Fama, E. F., and K. R. French, 2002, Testing trade-off and pecking order predictions about dividends and debt. Review of Financial Studies 15, pp. l-33.
19. Filbeck, G., and S. Visscher, 1997, Dividend yield strategies in the British stock market. European Journal of Finance 3, pp. 277-289.
20. Graham, J. R., and A. Kumar, 2006, Do dividend clienteles exist? Evidence on dividend preferences of retail investors. Journal of Finance 61, pp. 1305-1336.
21. Grinblatt, M. S., and R.W. Masulis, and S. Titman, 1984, The valuation effects of stock splits and stock dividends. Journal of Financial Economics 13, pp. 461-490.
22. Hsu, J. C., 2004, Cap-weighted portfolios are sub-optimal portfolios. Journal of Investment Management 4, pp. 1-10.
23. Ikenberry, D., G. Rankine, and E. Stice, 1996, What do stock splits really signal? Journal of Financial and Quantitative Analysis 31, pp. 357-377.
24. Koch, A. S., and A. Sun, 2004, Dividends changes and the persistence of past earnings changes. Journal of Finance 59, pp. 2093-2116.
25. Lang, L., and R. H. Litzenberger, 1989, Dividend announcements: Cash flow signaling vs. free cash flow hypothesis. Journal of Financial Economics 24, pp. 181-192.
26. McManus, I. D., O. ap Gwilym, and S. H. Thomas, 2004, The role of payout ratio in the relationship between stock returns and dividend yield. Journal of Business, *Finance and Accounting* 31, pp. 1355-1387.
27. McQueen, G., K. Shields, and S. R. Thorley, 1997, Does the 'Dow-10 investment strategy' beat the Dow statistically and economically? Financial Analysts Journal 53, pp. 66-72.
28. Michaely, R., R. Thaler, and K. Womack, 1995, Price reactions to dividend initiations and omissions: overreaction or drift? Journal of Finance 50, pp. 573-608.
29. Miller, M., and F. Modigliani, 1961, Dividend policy, growth, and the valuation of shares. Journal of Business 34, pp. 411-433.
30. Myers, S., 1984, The capital structure puzzle. Journal of Finance 39, pp. 575-592.
31. Rankine, G., and E. K. Stice, 1997a, Accounting rules and the signaling properties of 20 percent stock dividends. The Accounting Review 72, pp. 23-46.
32. Rankine, G., and E. K. Stice, 1997b, The market reaction to the choice of accounting method for stock splits and large stock dividends. Journal of Financial and Quantitative Analysis 32, pp. 161-182.
33. Treynor, J., 2005, Why market-valuation-indifferent indexing works. Financial Analysts Journal 61, pp. 65-69.
34. Visscher, S., and G. Filbeck, 2003, Dividend-yield strategies in the Canadian stock market. Financial Analysts Journal 59, pp. 99-106.
35. Zhou, P., and W. Ruland, 2006, Dividend payout and future earnings growth. Financial Analysts Journal 62, pp. 58-69.