MARKET INSIGHTS

The Ex-Dividend Performance of ASX200 Stocks Measured Against the 45-Day Holding Rule (January 2000 – March 2011)

By Dr. Elvis Jarnecic and Yubo Liu
of the University of Sydney

June 2011 • Edition 34

in association with

ASX
AUSTRALIAN SECURITIES EXCHANGE

THE COMPANY

ASX is a multi-asset class, vertically integrated exchange group, and one of the world's top-10 listed exchange groups measured by market capitalisation.

ASX's activities span primary and secondary market services, central counterparty risk transfer, and securities settlement for both the equities and fixed income markets. It functions as a market operator, clearing house and payments system facilitator. It monitors and enforces compliance with its operating rules, promotes standards of corporate governance among Australia's listed companies and helps to educate retail investors.

ASX's diverse domestic and international customer base includes issuers of securities and financial products, investment and trading banks, fund managers, hedge funds, commodity trading advisers, brokers and proprietary traders, market data vendors and retail investors.

By providing its systems, processes and services reliably and fairly, ASX generates confidence in the markets that depend on its infrastructure. This is integral to ASX's long-term commercial success

The Ex-Dividend Performance of ASX200 Stocks Measured Against the 45-Day Holding Rule (January 2000 – March 2011)

Dr. Elvis Jarnecic and Yubo Liu

EXECUTIVE SUMMARY

Main Issues

This study examines the profitability of an ex-dividend based trading strategy across ASX200 stocks. This strategy requires that investors buy shares prior to the ex-dividend days and sell these shares 46 calendar days following the purchase of the shares. Investors receive capital gain, dividend payment and the values of franking credits as their return. This study aims to examine the performance of the ex-dividend trading strategy and investigate the factors that may impact on its profitability. The findings in this study should prove valuable for fund managers who trade around the ex-dividend days and provide them with insights that may enhance the performance of their strategies.

Approach

The research centred on testing six hypotheses relating to whether an ex-dividend trading strategy is impacted by:

- Company size
- Dividend yield
- Trading volumes
- Franking level
- Change in dividend payout
- Entry timing

The sample in this study covers 2753 ex-dividend events between 4 January 2000 and 24 March 2011. Three trading periods are examined in this study. The three entry points include 30 days prior to the ex-dividend day, six days prior to the ex-dividend day, and one day prior to the ex-dividend day. The holding period covers 46 calendar days.

The study assumes that investors were eligible for franking credits. If the value of franking credits could not be utilised, then the results of the ex-dividend trading strategy might be biased.

Key Findings

The results from this study suggest that:

1. The ex-dividend trading strategy was profitable, as the weighted average abnormal returns are statistically positive. Period 1 was shown as the optimal entry point for this trading strategy suggesting investors should enter trading positions before the dividend announcement day. Positive abnormal returns were also found in Period 2 and Period 3.

2. The level of franking credits had a positive impact on the profitability of the ex-dividend trading strategy. Ex-dividend events with high levels of franking credits delivered greater returns for investors.

3. The dividend yield had a similar positive relationship with the abnormal returns in Period 2 and Period 3 providing benefits for investors who selected stocks with higher dividend yields. However, if investors entered the trading positions before the dividend announcement days, then the dividend yield did not have a significant impact on the returns.

4. The Dividend Reinvestment Plan (DRP) was found to be negatively correlated with the abnormal returns of the ex-dividend trading strategy. Ex-dividend events without DRPs were more beneficial for investors.

5. The profitability of the ex-dividend strategy varied across the 12 ASX200 GICS industry sectors. The strategy was not profitable in the Health Care sector, the A-REIT sector, the Telecommunication Services sector, and the Utilities sector. Significant positive abnormal returns were obtained in the remaining eight industry sectors. The best performances of the ex-dividend trading strategy were observed in the Information Technology sector, the Energy sector, and the Industrials sector.

1. Introduction

There have been a significant number of studies on price behaviour around ex-dividend days. Ainsworth et al. (2008) argue that there exists a positive premium around the ex-dividend day. This is also supported by Graham et al. (2003) and Beggs and Skeels (2006). The past literature showed that the dollar drop in price on the ex-dividend day was not equal to the cash dividend. In some cases, the equilibrium drop-off ratio can be less than one for short-term investors (Heath and Jarrow (1988), Murray and Jagannathan (1998), Walker and Partington (1999), and Partington and Walker (2001)). The presence of this price behaviour would be an opportunity for investors to capture profits around the ex-dividend days. This opportunity is contested by Health and Jarrow (1988), who argue that short term traders are not able to generate arbitrage profits on the ex-dividend day. In contrast, Frank and Jagannathan (1998) argue that market makers are able to generate profits in the ex-dividend period. They state that market makers have a comparative cost advantage when handling dividends. In such a case, market makers would purchase stocks and sell shortly after they go ex-dividend. Ainsworth et al. (2008) point out three possible explanations for the price behaviour around the ex-dividend day. Firstly, they suggest that if the taxation rate on dividends is higher than it is on capital gains, then investors would require compensation for holding dividends. This behaviour leads to a drop-off ratio that is less than one, thus compensating for the difference in taxation rate. Secondly, Ainsworth et al. (2008) argue that short-term trades will try to arbitrage away the abnormal returns around the ex-dividend day. However, transaction costs and risks would limit the arbitrage opportunities. These restrictions would result in a drop-off ratio that is not unity. Finally, Ainsworth et al. (2008) suggest that the drop-off ratio is also affected by bid-ask bounces, price discreteness and limit order adjustments; hence the drop-off ratio differs from unity.

Eades et al. (1984) discovered abnormal return behaviour in the days surrounding the ex-dividend day. Their finding is supported by Brown and Clarke (1993) in their study on ex-dividend day stock behaviour in Australia. Brown and Clarke found positive market-adjusted returns around ex-dividend days. Previous research on price behaviour around the ex-dividend day has shown mixed results (Ainsworth et al. (2008)). These results mainly focus on days close to ex-dividend day. In this study, the period of investigation is expanded to examine possible abnormal returns in the ex-dividend period.

Features of the tax system will have direct impacts on this study. Australia has operated an imputation tax system since 1987. In an imputation tax system, a credit is attached to dividends that are paid to investors. The credit refers to the corporate tax that has been paid by the company. This credit is known as the franking credit. With the franking credit, investors are able to offset personal tax obligations. As a result, the double taxation of dividends is removed in the imputation tax system. Dividends with franking credits become more valuable to investors. However, not all of the credits can be utilised by shareholders. Non-residents and tax-exempt residents are unable to take advantage of franking credits (Cannavan et al. (2004), and Spry and Morrison (1999)). This feature makes it difficult to value franking credits. Tax-paying shareholders are likely to value franking credits highly. In contrast, the credits have no value to non-residents and tax exempt residents. In this case, investors who cannot utilise franking credits start to transfer their credits to those who can utilise them (Partington and Walker (1999)). In July 1999, a holding period rule was introduced by the Australian Government (Ainsworth et al. (2008)). Under the holding period rule, investors are required to hold the shares for at least 45 calendar days in order to utilise the attached franking credits. Ainsworth et al. (2008) argue that the 45-day holding period rule effectively limits the arbitrage opportunity of franking credits by short-term investors. In July 2000, further taxation reform took place allowing eligible investors to claim refunds for surplus franking credits.

Ainsworth et al. (2008) have documented positive abnormal returns before the ex-dividend events. Is there a strategy allowing investors to capture profits under the current imputation tax system by taking advantage of abnormal stock returns, dividends, and the value of franking credits? In this study, a buy and hold ex-dividend trading strategy is evaluated. This strategy assumes that investors are eligible to utilise the franking credits attached to dividends. Based on this strategy, investors purchase shares in the ASX200 companies that pay dividends and franking credits around the ex-dividend day, and then sell the stocks after a 46-day holding period (including one settlement day). The holding period is limited due to the 45-day holding rule. In this study, the performance of this ex-dividend trading strategy will be tested across all the ASX200 companies that pay dividends and franking credits. If this trading strategy can be generalised to the ASX200 companies

and provide significant abnormal returns, then it should be valuable for equity fund managers. Fund managers may be able to employ the ex-dividend trading strategy to form portfolios and generate profits around ex-dividend events. In this study, the major factors that determine the abnormal returns of this trading strategy will also be investigated. These results may assist fund managers in identifying the characteristics of stocks that are most suitable for the implementation of this trading strategy, and hence, enable them to select the optimal stocks for their portfolios and enhance their portfolios' performances.

The rest of the paper is structured as follows. Section 2 discusses the related literature. Section 3 presents the hypothesis that will be tested. The sample data and the research methods are discussed in Section 4. Section 5 presents the results and discussions and Section 6 provides the concluding comments.

2. Related Literature

Under an imputation tax system, investors are provided with franking credits that can be used to offset personal income tax obligations. This system effectively removes the double taxation under the classical tax system. As a result, franking credits are valuable to shareholders. Walker and Partington (1999) have shown that one dollar of fully franked dividends is worth more than one dollar. Since there exists a premium with franking credits in the market, the trading behaviour around the ex-dividend day becomes an interesting research field. Armitage et al. (2006) investigated the market value of dividends in the UK. Their results suggest that the dividend drop-off ratio in the UK is greater than one. Lasfer (1995) examined price behaviour around the ex-dividend day. Lasfer argues that a drop-off ratio that is not equal to one does not lead to abnormal returns around the ex-dividend day. Lasfer suggests that ex-dividend price movements are significantly related to the dividend yield, and trading volume has little impact around the ex-dividend day. However, Frank and Jagannathan (1998) and Jakob and Ma (2003) disagree with Lasfer's findings on trading volume. They suggest that order imbalance does exist around the ex-dividend day, and that it is a factor that impacts on the price drop-off ratio. As discussed in previous section, Ainsworth et al. (2008) suggest that investors require compensations for holding dividends, due to difference between tax rates for individuals and those for capital gains. This behaviour would lead to price discreteness and limit order adjustments around the ex-dividend day. In the meantime, short-term traders would enter into the market around the ex-dividend day to arbitrage away excess returns.

The Australian taxation reform in 2000 allows refunds on surplus franking credits. However, the franking credits cannot be utilised by all the shareholders. Only domestic shareholders are eligible for franking credits (Cannavan et al. (2004)). Kato and Loewenstein (1995) studied the ex-dividend stock behaviour in the Japanese market. They concluded that taxation was one of the significant factors influencing ex-dividend price behaviour in Japan. As a result, changes in taxation would impact on price behaviour around the ex-dividend days. This is also supported by Liljeblom et al. (2001). They studied the taxation on domestic and foreign investors in Finland and the impact of differential taxation on ex-dividend day behaviour. They found that the drop-off ratio varies with the level of foreign ownership in Finland. They also observed significant abnormal volumes on the ex-dividend day, which is consistent with Kato and Loewenstein's finding in the Japanese market.

A 45-day holding rule was introduced in 1997 in Australia in order to prevent the trading of franking credits. This rule requires shareholders to hold stocks for at least 45 calendar days (including the ex-dividend day) if they want to be entitled to the franking credits (Ainsworth et al. (2008)). In addition, shareholders are only allowed to hedge 70 percent of their transaction risks through derivatives. Under the new scheme, transaction costs and risk exposures are increased for shareholders who want to trade the franking credits. The impacts of the 45-day holding rule were studied in Bellamy (2002). Bellamy discovered a trend that long-term traders would trade in the cum-dividend period in order to obtain dividend and franking credits. He found that both the abnormal volume and dividend drop-off ratio decreased after the introduction of the 45-day holding rule. Bellamy suggests that the 45-day holding rule prevents the trading of franking credits effectively, particularly with large market-cap companies with high dividend yield. Bellamy's findings are supported by Ainsworth et al. (2008). They state that investors did place positive values on franking credits before the 45-day holding rule was introduced. However, Beggs and Skeels (2006) suggest that the face value of the franking credit has fallen to a value indistinguishable from zero following the introduction of the 45-day holding rule.

Gosnell et al. (1996) study the order imbalance around the dividend announcements. Their results suggest that order flow imbalances are observed when companies announce reduced dividend payments. In addition, immediate increases on selling pressures are found after unfavourable announcements. Although Gosnell et al. (1996) discovered rapid price adjustments to positive announcements, these favourable announcements do not tend to result in significant order flow imbalances. However, negative announcements normally lead to stronger price adjustments, which last for a relatively longer period of time. Besides order flow imbalance, Gosnell et al. (1996) found that the bid-ask spread is also affected by dividend announcements. Their results suggest that unfavourable dividend announcements would widen the bid-ask spread. This would be a result of increased selling pressures in the market. Balachandran and Nguyen (2004) have studied the market reactions to dividend payments. They suggest that dividend increases (decreases) would normally lead to positive (negative) market reactions. An interesting point that Balachandran and Nguyen argued is that, under an imputation tax system, companies which are looking for new investments would prefer to use dividend reinvestment plans (DRP) instead of paying increased cash dividends. In this case, shareholders would still have access to franking credits, while companies would reinvest the equity to finance other projects. The results in Balachandran et al. (2008) suggest that companies with DRP would experience significantly greater drop-offs than non-DRP companies. They did not find significant differences in price reactions between franked and unfranked dividends. However, the size of the dividend has statistically significant impacts on stock price behaviour.

Although previous studies suggest that franking credits are not valuable in the current market, there are still active market reactions around the dividend announcement day and ex-dividend day. There may exist profitable opportunities to trade around those days. Ainsworth et al. (2008) have found positive abnormal returns in stock prices prior to the ex-dividend events in their study. Beggs and Skeels (2006) stated similar arguments in their study on the values of cash dividends and franking credits. It is important to examine the profitability of the ex-dividend trading strategy in this study if a significant value for franking credits is found in the market. The ex-dividend trading strategy would generate returns for investors by taking advantage of the values of cash dividends and franking credits. If this trading strategy can be generalised to the ASX200 stocks and produce significant returns under the current market conditions, then it may be valuable and supportive to equity fund managers in their portfolio management.

3. Hypotheses

H1: The ex-dividend trading strategy generates positive (negative) abnormal returns around the ex-dividend day.

The returns from the ex-dividend trading strategy are expected to be positive if the trading strategy is considered profitable. However, returns might be affected by market movement. In this case, the abnormal return will be examined in Hypothesis 1. The abnormal return controls for the market impact. If the abnormal return is proved to be significantly positive, then it could be concluded that the ex-dividend trading strategy is a profitable strategy around the ex-dividend day.

H2: Abnormal returns are higher (lower) for large (small) companies.

Large companies are likely to have more regular dividend payments than small companies. The levels of franking credits are expected to vary across companies with different market capitalisation. The variations in dividend policy would lead to different price behaviour. Hypothesis 2 aims to test the effects of market capitalisations on the abnormal returns.

H3: Abnormal returns are higher (lower) for fully franked (unfranked) stocks.

Without franking credits, shareholders would not be able to offset income tax obligations. This may lead to a further reduction in returns that are generated based on the ex-dividend trading strategy. Therefore, the proportion of franking credits is expected to impact on the returns of the trading strategy. The ASX200 stocks will be divided into three groups, including fully-franked stock, partially-franked stock, and non-franked stock. Hypothesis 3 aims to investigate the abnormal returns in these three groups. Abnormal returns are expected to be higher for fully franked stocks, as investors would be able to obtain additional abnormal returns from the value of franking credits.

H4: Abnormal returns are higher (lower) for stocks with high (low) dividend yields.

Dividend yield is an indicator of a company's profitability and future investment opportunity. Ainsworth et al. (2008) suggest that dividend yield would have an impact on the drop-off ratios and volumes around ex-dividend days. In this study, the dividend yield will be employed as another variable to examine price movements around ex-dividend day. Hypothesis 4 aims to test the effects of the dividend yield on abnormal returns. High dividend yields would be considered as positive signals for companies. In such a scenario, abnormal returns are expected to be higher when dividend yields are high.

H5: Abnormal returns are higher (lower) when there is an increase (decrease) in cash dividend.

If the dividend yield is proved to impact on the abnormal return in Hypothesis 4, then the change in cash dividend is also expected to have significant effects on the abnormal return. An increase in the cash dividend would reflect positive performance by the company. Hence, the price of the company is expected to rise, leading to higher abnormal returns. This effect will be examined in Hypothesis 5.

H6: Abnormal returns are higher (lower) when there are high (low) volumes before the ex-dividend day.

Ainsworth et al. (2008) suggest that abnormal returns are driven by price pressure. They observed that abnormal volumes exist around ex-dividend days. This finding is also confirmed by Jun et al. (2008) in their study on price and volume around ex-dividend days. Hypothesis 6 aims to test the impact of abnormal volumes on the abnormal returns. High volumes before the ex-dividend day are expected to lead to higher abnormal returns around the ex-dividend day.

H7: Abnormal returns are higher (lower) when shares are acquired in earlier (later) periods before the ex-dividend day.z

Ainsworth et al. (2008) and Jun et al. (2008) have found abnormal volumes and price volatilities around ex-dividend days. The entry point of the trading strategy is expected to have a direct impact on the profitability of the ex-dividend trading strategy. Ainsworth et al. (2008) show that stock prices are likely to rise on average before the ex-dividend day. As a result, shares are expected to be acquired earlier in order to maximise profits. Hypothesis 7 aims to test the sensitivities of the entry points.

4. Data and Research Design

4.1 Data and Sample Period

The sample in this study covers the stocks in the ASX200 over the period between 4 January 2000 and 24 March 2011. The stock daily closing prices for the ASX200, the ASX200 index prices, the ex-dividend dates, the dividend announcement dates, the dividend payments, the level of franking credits, the status of Dividend Reinvestment Plans, the number of outstanding shares, and the components of the ASX200 GICS industry sectors are obtained from the Securities Industry Research Centre of Asia-Pacific (SIRCA). According to the GICS, there are 12 industry sectors for the ASX200, namely the Australia Real Estate Investment Trusts (A-REIT) sector, the Consumer Discretionary sector, the Consumer Staples sector, the Energy sector, the Financials sector, the Financials excluding Property (Fin-x-Prop) sector, the Health Care sector, the Industrials sector, the Information Technology sector, the Materials sector, the Telecommunication Services sector, and the Utilities sector.

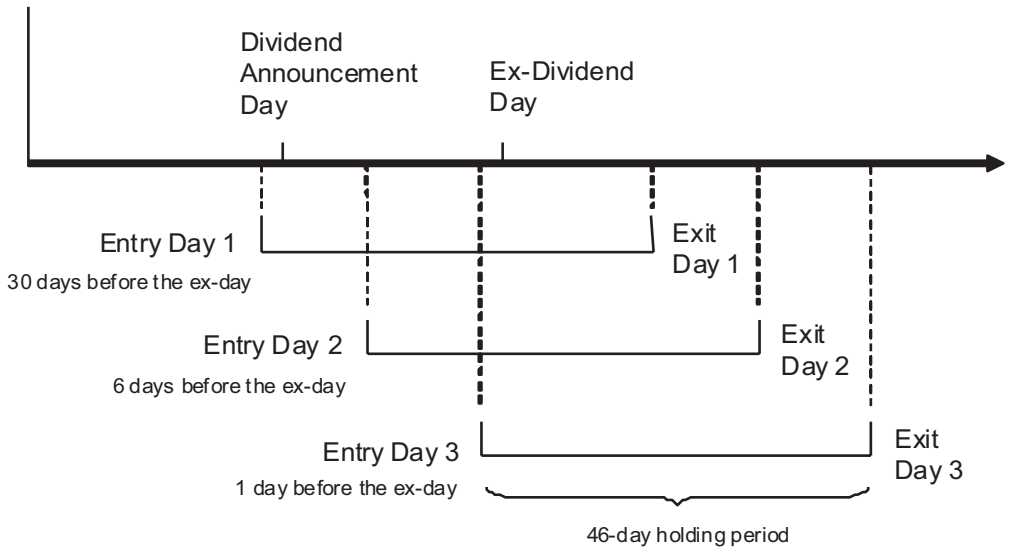
In this sample there are 2753 ex-dividend events. There are 1654 dividends paid with 100 percent franking credits. There are 761 dividends paid with zero percent franking credits, and there are 338 dividends paid with partial franking credits. Stocks that did not offer any dividends during the sample period are excluded, leaving 140 stocks in the sample. GPT Group had a consolidation of securities on 11 May 2010. The consolidation adjusted the stock price on that day. As a result, the returns on the stock prices for the GPT Group in May 2010 would be biased due to the adjustment of the share prices. Therefore, the ex-dividend event for the GPT Group in May 2010 is excluded from the sample.

4.2 Trading Periods

According to the 45-day holding rule, stocks would be held for a period of 46 days (including one settlement day). This is the minimum stock holding period for the entitlement of franking credits. However, the choice of optimal entry and exit periods becomes another issue. Listed companies make dividend announcements before they go ex-dividend. Dasilas and Leventis (2011) have documented significant market reactions to dividend announcement in the market. Companies normally go ex-dividend in a short time period after the dividend announcement. In this case, the first possible entry period would be before the dividend announcement day, and the exit period would be 46 calendar days after the purchase of shares. If the exit point is a non-trading day, then it will be extended to the next closest trading day. It is possible for companies to go ex-dividend more than 46 calendar days after the dividend announcement. In this scenario, the exit period would be extended to the ex-dividend day, so that investors are eligible to receive a dividend. Australian companies are not legally required to announce their dividends or pay their dividends on the same date each year. In reality Australian companies usually (but not always) announce their dividends at the same or a similar time each year. Investors can use a company's dividend announcement and payment history as a reasonable guide to identify the company's likely future dividend announcement dates and future dividend payment dates. A second entry point is the period between the dividend announcement day and the ex-dividend day. Investors could purchase the stocks after the dividend announcement, and sell the stocks after holding them for 46 calendar days. In this entry period, details of the dividends would be known to investors. However, this information would have been priced at the market price. A third entry point is the trading day prior to the ex-dividend day. This is the last day that investors would be eligible to capture cash dividends. Investors could identify the ex-dividend day by observing the dividend record day, which would be provided in the dividend announcement. The ex-dividend day is usually two business days before the dividend record day.

Figure 1 shows the three entry points for the ex-dividend trading strategy. Since the dividend announcement date is normally unknown, for consistency, three entry points are chosen for the ex-dividend trading strategy. The summary statistics of the length between the dividend announcement day and the ex-dividend day indicate that 75 percent of the dividend events in our sample have a dividend announcement day no more than 30 days prior to the ex-dividend day. Therefore, the date for Entry Day 1 is set at 30 days before the ex-dividend day. The second entry point is between the dividend announcement day and the ex-dividend day. The summary statistics show that 75 percent of the ex-dividend events have a dividend announcement day at least six days prior to the ex-dividend day. The date for Entry Day 2 is set at six days before the ex-dividend day. The date for Entry Day 3 is the day before the ex-dividend day. The three corresponding exit days are the dates 46 days after each of the entry days, including one day of settlement.

FIGURE 1: TRADING STRATEGY ENTRY DAYS



4.3 Test Statistics for Abnormal Returns

The critical value for the test statistic ***t*** is obtained based on the following expression:

$$Z = \frac{E(R) - \mu_0}{S(R)/\sqrt{n}}$$

Where ***S(R)*** represents the standard deviation of the total returns of all the trades, and n represents the sample size.

Based on Corrado (1989), R represents the total return of the ex-dividend trading strategy on the ASX200 stocks. The event date is defined as the ex-dividend day. The weighted average return of the ex-dividend event is computed as follows.

$$E(R) = \frac{1}{N}\sum_{i=1}^{N} R_i$$

Where ***E(R)*** represents the average total return of all the trades, ***N*** represents the number of trades that have been made according to the trading strategy.

The computed Z values will be compared with the critical values in the standard normal distribution table. If Z is greater than 2.33, then it indicates that the return is positive at 1 percent level of significance. If Z is greater than 1.645, then it indicates that the return is positive at 5 percent level of significance. If Z is greater than 1.28, then it indicates that the return is positive at 10 percent level of significance.

4.4 Determinants of the Strategy Profit

A regression analysis will be employed in this study to investigate the potential determinants that impact on the returns of the ex-dividend trading strategy. In order to control for the effects of market movements, the abnormal returns will be used in this regression analysis (see similar methods in Ainsworth et al. (2008)). The regression model can be expressed as follows.

$$AR_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 FL_{i,t} + \beta_3 \Delta DIV_{i,t} + \beta_4 DIVY_{i,t} + \beta_5 RVOL_{i,t} + \beta_6 DRP_{i,t} + \varepsilon_i$$

AR_i represents the abnormal returns that are obtained on the ex-dividend trading strategy. It is computed as following:

$$AR_{i,t} = R_{i,t} - RM_t$$

Where **AR_{it}** is the abnormal return of the ex-dividend trading strategy on the dividend payment **i** on day **t, RM_t** is the return on the ASX200 index for the holding period **t**, and **$R_{i,t}$** is the return of the ex-dividend trading strategy on dividend payment i on day t, which is measured as follows.

$$R_{i,t} = \frac{P_{i,t+46} - P_{i,t} + DIV_{i,t} + FC_{i,t}}{P_{i,t}}$$

Where $P_{i,t+46}$ is the exit price, $P_{i,t}$ is the entry price, $DIV_{i,t}$ is the value of dividend, and $FC_{i,t}$ is the value of franking credits. The daily closing prices on the entry and exit days can be used.

Based on the paper of Beggs and Skeels (2006), the value of the franking credit is calculated as follows.

$$FC_{i,t} = DIV_{i,t} \times \frac{T_c}{1 - T_c} \times FL_{i,t}$$

Where $\mathbf{FC_i}$ represents the value of the franking credit attached with the dividend paid, $\mathbf{DIV_i}$ represents the cash dividend payment per share, $\mathbf{T_c}$ represents the corporate tax rate, and $\mathbf{FL_i}$ represents the level of franking credit attached with the dividend paid.

$\mathbf{SIZE_{i,t}}$ represents the market capitalisations of the stock for the ex-dividend event $\mathbf{i}$. It is measured as the number of the outstanding shares of the stock multiplied by the closing price on the ex-dividend day.

$\mathbf{FL_{i,t}}$ represents the level of franking credits attached with the ex-dividend event $\mathbf{i}$, which has a range from 0% (non-franked) to 100% (fully franked).

$\mathbf{\Delta DIV_{i,t}}$ represents the percentage change of dividend payment from the previous dividend payment for the ex-dividend event i. It is measured as follows.

$$\Delta DIV_{i,t} = \frac{DIV_{i,t} - PDIV_{i,t}}{PDIV_{i,t}}$$

Where $\mathbf{DIV_{i,t}}$ is the current dividend paid by the company, and $\mathbf{PDIV_{i,t}}$ is the previous dividend paid by the same company.

$\mathbf{DIVY_{i,t}}$ represents the dividend yield for ex-dividend event i. It is measured as the dividend payment divided by the closing price on the ex-dividend day.

$\mathbf{RVOL_{i,t}}$ represents the relative volume of the stock on the entry day. It is computed as follows:

$$RVOL_{i,t} = \frac{VOL_{i,t}}{EVOL_{i,t}}$$

Where $\mathbf{VOL_{i,t}}$ represents the daily volume of the stock on the entry day, and $\mathbf{EVOL_{i,t}}$ represents the average daily volume of the stock in the current calendar year. This variable would capture the abnormal volumes around the ex-dividend days.

$\mathbf{DRP_{i,t}}$ is a dummy variable that represents the Dividend Reinvestment Plan (DRP). $\mathbf{DRP_{i,t}}$ has a value of one if the dividends participate in DRP, and zero otherwise. Balachandran and Nguyen (2004) found that DRP had an impact on the value of dividends. This possible effect will be captured by the $\mathbf{DRP_{i,t}}$ dummy variable in the analysis.

ε_i is an error term.

The regression results will be informative for discovering the major factors that determine the returns of the ex-dividend trading strategy. Since the trading strategy is based on dividend payments and franking credits around the ex-dividend day, variables, including the dividend yield, and the level of franking credits, are expected to be significant in the regression analysis. With the results, fund managers are able to select the best possible stocks from the ASX200 when they implement the ex-dividend trading strategy.

As shown in the previous section, the total return from the ex-dividend trading strategy is formed by three components, the capital gain profit, the dividend profit, and the franking credit profit. In order to study the effect of each return component, the total return is broken down as follows:

$$R_{i,t} = \frac{P_{i,t+46} - P_{i,t} + DIV_{i,t} + FC_{i,t}}{P_{i,t}} = \frac{P_{i,t+46} - P_{i,t}}{P_{i,t}} + \frac{DIV_{i,t}}{P_{i,t}} + \frac{FC_{i,t}}{P_{i,t}}$$

Where $\frac{P_{i,t+46} - P_{i,t}}{P_{i,t}}$ represents the relative capital gain component as a percentage of the entry stock price, $\frac{DIV_{i,t}}{P_{i,t}}$ represents the relative dividend component as a percentage of the entry stock price, and $\frac{FC_{i,t}}{P_{i,t}}$ represents the relative franking credit component as a percentage of the entry stock price. By taking the percentages, it allows these relative return components to be comparable across various stocks.

5. Results

5.1 Descriptive Statistics

Table 1 shows the descriptive statistics for the 2,753 dividend payments paid by the ASX200 companies between 4 January 2000 and 24 March 2011. The average amount of dividends paid is 17.72 cents per share, giving an average dividend yield of 2.3 percent in this sample. The dividend yields for the majority of the dividend payments are less than 3 percent. The percentiles indicate that 75 percent of the dividends paid have yields equal to or less than 2.84 percent. In terms of dollars, 75 percent of the dividends paid in the sample are equal to or less than 20 cents per share. Among the 2,753 dividend payments in this sample, there are 761 dividends paid without any franking credits attached, and 1,654 dividends paid with full franking credits attached. The remaining dividends in the sample are partially franked. The average level of franking credits in this sample is 65.67 percent. The average size of the ASX200 companies is $9,423 million. BHP is the largest company in the sample, with a market capitalisation of $151,097 million, and Hastie Group is the smallest company in the sample, with a market capitalisation of $264 million. In our sample, large companies tend to pay dividends semi-annually, with franking credits attached, while smaller companies are unlikely to pay dividends as often as large companies.

TABLE 1: SUMMARY STATISTICS

The sample is for the dividends paid between 4 January 2000 and 24 March 2011. The dividend amount represents the dividends paid by the ASX200 stocks in dollars. Dividend yield is measured as the dividend amount divided by the daily last price on the ex-dividend day. The franking levels refer to the percentage of franking credits attached to the dividends paid. The market cap is the current market capitalisations in dollars for the ASX200 stocks.

	Dividend Amount ($)	Dividend Yield (%)	Franking Level (%)	Market Cap (millions)
Mean	0.1772	2.30	65.67	$9,423
Std. Dev.	0.2357	1.38	44.83	$21,180
Min	0.0020	0.06	0.00	$264
25th Percentile	0.0500	1.46	0.00	$1,493
Median	0.1000	2.07	100.00	$2,823
75th Percentile	0.2000	2.84	100.00	$6,599
Max	2.4720	16.22	100.00	$151,097

Figure 2 shows the time-series plots of daily average cumulative abnormal returns around ex-dividend days for the dividends paid in the sample period. The plots in Panel A indicated a climb of cumulative abnormal returns before the ex-dividend day. This may be explained by the dividend announcements, which might be regarded as a positive signal in the market. On the ex-dividend day, a significant reduction in the cumulative abnormal returns was observed from the plots in Panel A, and the stock prices tend to recover after the stocks go ex-dividend. Panel A suggested that a simple buy-and-hold trading strategy around the ex-dividend day without obtaining dividends or franking credits is risky, as the big drop-off on the ex-dividend day may take away a significant proportion of returns gained before the ex-dividend day. In Panel B, the values of dividends and franking credits are added into the cumulative abnormal returns. In this case, the drop-off impact on the ex-dividend day was minimised. This reflected an increase in the cumulative abnormal returns over the period before the stocks go ex-dividend, and the abnormal returns also continued to rise after the ex-dividend day.

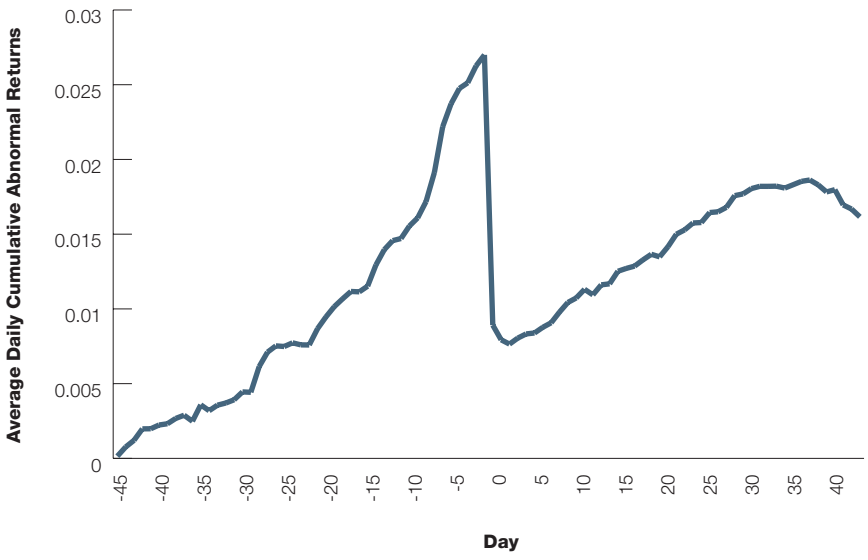
FIGURE 2: AVERAGE DAILY CUMULATIVE ABNORMAL RETURNS

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. This figure shows the plots of daily average cumulative abnormal returns around the ex-dividend days. Time based partitions are based on ex-dividend dates. The plots start from 45 days before the ex-dividend day, and end 44 days after the ex-dividend days, giving a range of 90 days around the ex-dividend day. Equally weighted ex-dividend portfolios are formed for all stocks going ex-dividends in the sample. The cumulative abnormal return from day T1 to day T2 is computed as:

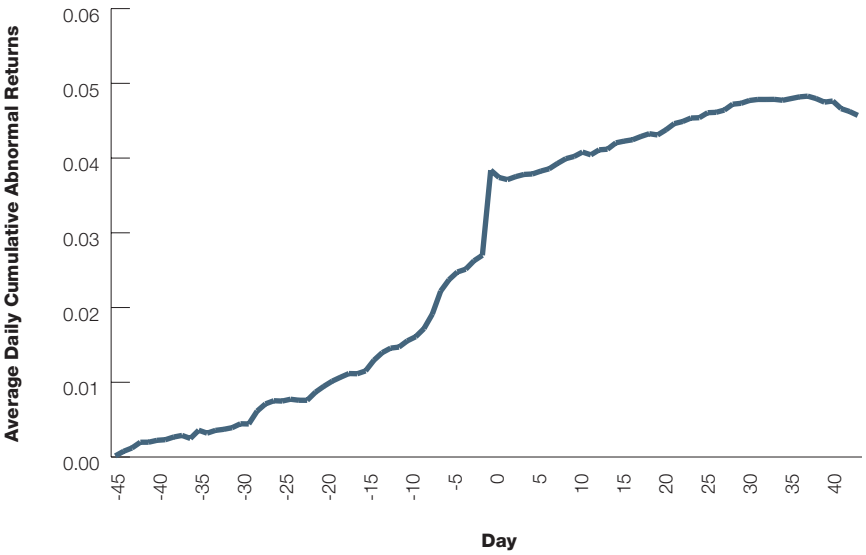
$$CAR_{i,T_1T_2} = \sum_{t=T_1}^{T_2} (ER_{i,t} - MR_t)$$

where $ER_{i,t}$ is the daily return on stock **i** on day **t**, RM_t is the return of the ASX200 index on day **i**. In Panel A, the abnormal return is calculated based on stock prices, the values of dividends and franking credits are excluded. In Panel B, dividends and franking credits are included in the abnormal returns.

Panel A: without dividends and franking credits



Panel B: with dividends and franking credits



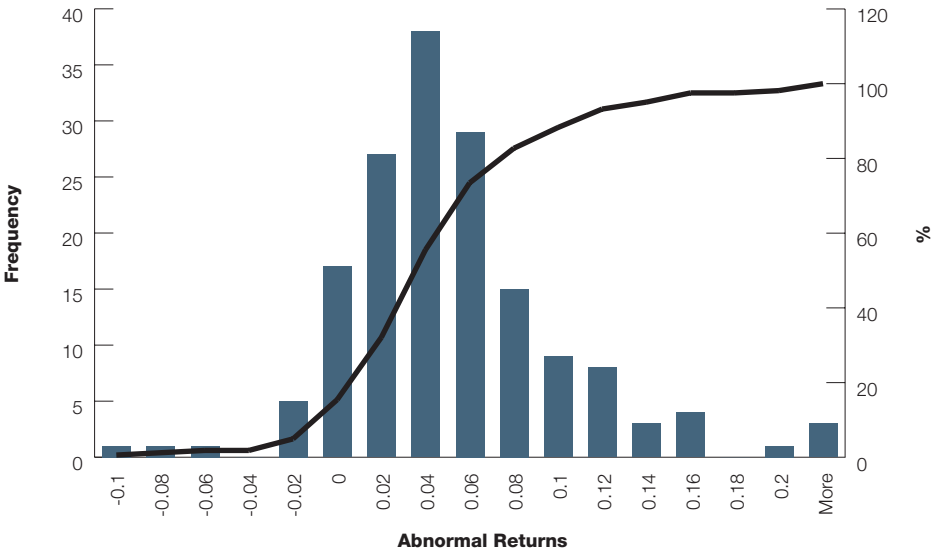
5.2 Abnormal Returns

Figure 3 contains the frequencies for the average abnormal returns for the ASX200 stocks in Periods 1, 2, and 3. Companies that did not pay any dividends during the sample period were excluded from this analysis, leaving 140 companies in this sample. The graphs indicated that the abnormal returns appear to be normally distributed. It was observed that the majority of the returns are positive. In Period 1, 85 percent of the average abnormal returns were greater than zero. In Period 2, 76 percent of the average abnormal returns were positive. In Period 3, 70 percent of the average abnormal returns were above zero. The findings suggested that trading in the earlier period generated higher returns, and thus entering the position before the dividend announcement day was a better entry point.

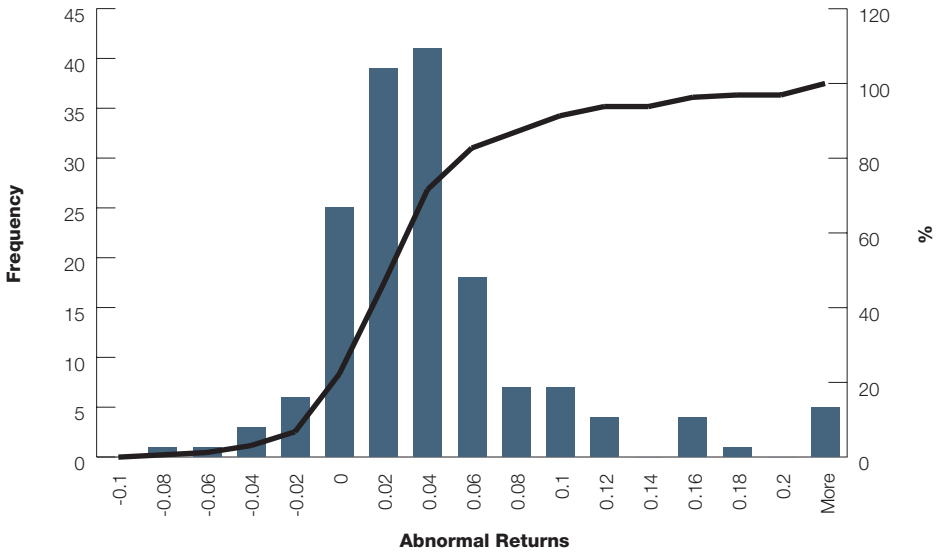
FIGURE 3: ABNORMAL RETURN DISTRIBUTION

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. This figure shows the distributions of average abnormal returns for all the ASX200 stocks in Periods 1, 2, and 3. The histograms indicate the distributions of the abnormal returns. The solid line refers to the cumulative frequency for the abnormal returns.

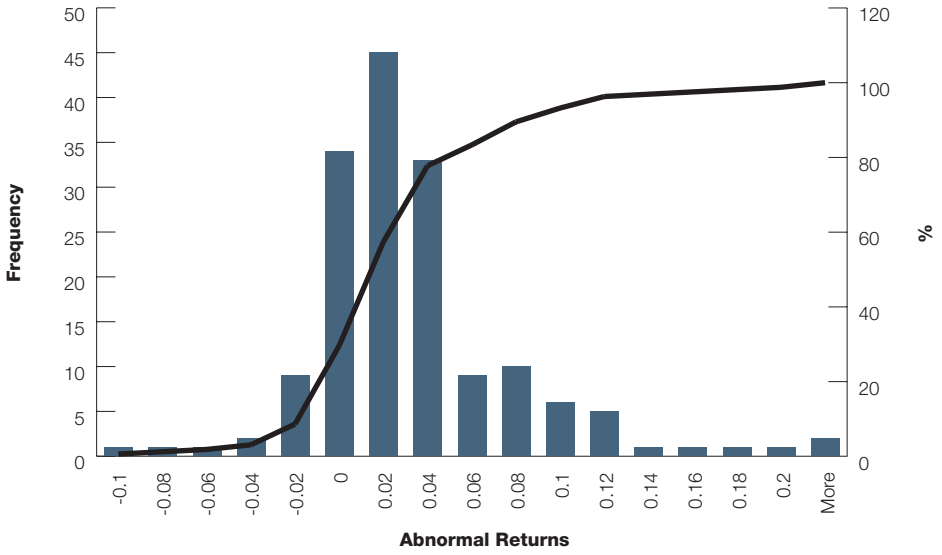
Histogram Period 1



Histogram Period 2



Histogram Period 3



5.2.1 Returns and Market Capitalisation

TABLE 2: RETURNS AROUND EX-DIVIDEND DAY BY MARKET CAPITALISATIONS

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. In Table 2, the dividend payments are ranked into market capitalisation quartiles. In Panel A, the Normal Return is computed as: (Exit Price – Entry Price + Dividend + Franking Credit) / Entry Price. The Abnormal Return is computed as: Normal Return – Market Return. The Div Yield is the average dividend yield for each industry sector. The Div Amt is the average dividends paid in dollars for each industry sector. In Panel B, the normal returns are broken into three components. The Relative Capital Gain is computed as (Exit Price – Entry Price) / Entry Price. The Relative Dividend Profit is computed as: Dividend / Entry Price. The relative Franking Profit is computed as: Franking Credit / Entry Price. Period 1, 2, and 3 indicate three time points to enter the trading positions, including entering 30 days before the ex-dividend day, six days before the ex-dividend day, and one day before the ex-dividend day. ***, **, * denote statistical significance of positive returns at the 1%, 5%, and 10% level.

Panel A: Consolidated Returns

	Normal Returns			Abnormal Returns					
	Period 1	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Div Yield**	**Div Amt ($)**	**Franking Credits**
Low	8.28%***	5.48%***	3.28%***	7.06%***	3.94%***	1.75%**	2.72%	0.078	67.20
2	6.75%***	6.36%***	4.63%***	4.85%***	4.96%***	3.38%***	2.63%	0.110	63.60
3	4.15%***	3.98%***	4.29%***	3.24%***	2.78%***	2.87%***	2.27%	0.124	72.44
High	4.15%***	3.26%***	2.79%***	3.18%***	1.92%***	1.41%***	2.13%	0.286	62.84

Panel B: Return Components

	Relative Capital Gain			Relative Dividend Profit			Relative Franking Profit		
	Period 1	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**
Low	4.69%	2.03%	-0.09%	2.83%	2.71%	2.65%	0.77%	0.74%	0.72%
2	3.54%	3.20%	1.50%	2.61%	2.57%	2.54%	0.60%	0.60%	0.58%
3	1.26%	1.11%	1.41%	2.23%	2.21%	2.22%	0.66%	0.66%	0.66%
High	1.50%	0.63%	0.17%	2.10%	2.08%	2.08%	0.55%	0.55%	0.55%

In Table 2, the dividends paid are grouped into four company size quartiles. The highest quartile group had an average market capitalisation of $22,603 million. In other words, the top 50 companies of the ASX200 accounted for 83 percent of the total market capitalisation of the ASX200. Based on the similar method in Ainsworth et al. (2008), the equally weighted average returns for all the dividend payments in the sample are listed in Table 2. In Panel A, the average dividend yield increased from the lowest quartile group to the highest quartile group. In contrast, the average dollar value of cash dividend decreased from the lowest quartile group to the highest quartile group. The average levels of franking credit for the four quartile groups were similar, staying around 60 percent to 70 percent. All the average normal returns and the average abnormal returns were statistically positive at 1 percent level of significance for all quartile groups. The returns in lower quartile groups were higher than those in higher quartile groups in Period 1. In Period 2 and Period 3, the middle quartile groups outperform the rest of the groups. When comparing across the three holding periods, entering in Period 1 generated greater returns than in Period 2 and Period 3. This result found that entering before the dividend announcement day was as a better strategy. The results also found that the ex-dividend trading strategy generated better returns for relatively smaller

companies, as the returns for the lowest three quartile groups were higher than the highest quartile group. In Panel B, the relative dividend profit decreased from the lowest quartile group to the highest quartile group. This is consistent with the pattern of the average dividend yields in Panel A. A similar pattern was presented for the relative franking profit columns. These findings suggested that dividends and franking credits played a more important part in total returns for smaller companies than for larger companies. The relative capital gains were low for the top 50 companies, indicating that capital gains did not have a major contribution in the total returns. The highest relative capital gain percentage was obtained in the lowest quartile group in Period 1, but it became negative in Period 3. This suggested that dividend announcements caused a rapid increase in prices for smaller companies, and no significant price movements were presented close to the ex-dividend day.

5.2.2 Returns and Franking Credits

TABLE 3: RETURNS AROUND EX-DIVIDEND DAY BY LEVELS OF FRANKING CREDITS

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. In Table 3, the dividend payments are grouped by levels of franking credits. The non-franked group has all the dividends paid with zero percent franking credit. The fully franked group has all the dividends paid with 100 percent franking credits. All the other dividends paid with franking credits greater than zero percent and less than 100 percent are included in the partially franked group. In Panel A, the Normal Return is computed as: (Exit Price – Entry Price + Dividend + Franking Credit) / Entry Price. The Abnormal Return is computed as: Normal Return – Market Return. The Div Yield is the average dividend yield for each industry sector. The Div Amt is the average dividends paid in dollars for each industry sector. The Market Cap is the average market capitalisation for each group. In Panel B, the normal returns are broken into three components. The Relative Capital Gain is computed as (Exit Price – Entry Price) / Entry Price. The Relative Dividend Profit is computed as: Dividend / Entry Price. The relative Franking Profit is computed as: Franking Credit / Entry Price. Period 1, 2, and 3 indicate three points to enter the trading position, including entering 30 days before the ex-dividend day, six days before the ex-dividend day, and one day before the ex-dividend day. ***, **, * denote statistical significance of positive returns at the 1%, 5%, and 10% level.

Panel A: Consolidated Returns

	Normal Returns			Abnormal Returns					
	Period 1	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Market Cap ($million)**	**Div Yield**	**Div Amt ($)**
Non-Franked	4.24%***	2.58%***	2.24%***	2.85%***	1.42%***	1.02%***	4,616	2.57%	0.081
Fully Franked	5.12%***	4.28%***	3.66%***	4.07%***	2.67%***	1.99%***	12,030	2.17%	0.214
Partially Franked	3.52%***	2.38%***	1.90%***	2.69%***	1.53%**	0.98%*	7,484	2.30%	0.212

Panel B: Return Components

	Relative Capital Gain			Relative Dividend Profit			Relative Franking Profit		
	Period 1	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**
Non-Franked	1.69%	0.06%	-0.27%	2.55%	2.52%	2.51%	0.0000	0.0000	0.0000
Fully Franked	2.02%	1.24%	0.64%	2.17%	2.13%	2.12%	0.0093	0.0091	0.0091
Partially Franked	0.82%	-0.30%	-0.77%	2.27%	2.25%	2.24%	0.0044	0.0044	0.0043

Table 3 contains the weighted average returns for the non-franked, fully franked, and partially franked dividends paid during the sample period. In this study, there were 1654 dividend payments that come with 100 percent franking credits, indicating that 60 percent of all the dividends paid were fully franked. There were 761 dividends paid that had zero percent franking credits, and only 338 dividends paid were partially franked. In Panel A, the full-franked companies had the highest average market capitalisation ($12,030 million). In contrast, the average market capitalisations for non-franked and partially franked companies were much lower, $4,616 million and $7,484 respectively. This finding suggested that large companies were more likely to issue franking credits than smaller companies. As a result, the average cash dividend for non-franked companies was also the lowest (8.1 cents per share) among the three groups. Table 3 showed that all three groups of dividends generated positive returns for the three trading periods. According to the results, dividends with partially franked credits gave the lowest returns among the three groups, giving an average normal return of 3.51 percent and an average abnormal return of 2.69 percent abnormal returns for Period 1. Returns in Period 2 and Period 3 were lower than those in Period 1, but they still stayed positive. The non-franked dividend group might produce better trading results than those based on partially franked dividends, giving an average normal return of 4.24 percent and an average abnormal return of 2.85 percent for Period 1. The highest returns were obtained from the fully franked dividend group, giving an average normal return of 5.12 percent and an average abnormal return of 4.07 percent in Period 1. The results indicated that all the returns were statistically positive at 1 percent level of significance except for the abnormal returns for the partially franked group in Period 2 and Period 3. The returns for all three groups suggested that trades in Period 1 produced the best returns among all three trading periods. In Panel B, the relative dividend profit proportions did not experience large variations. For the franking credit profit, its proportions in the fully franked group were more than twice as much as those in the partially franked group. For the capital gains, negative relative capital gain proportions were observed in Period 2 and Period 3, indicating that capital losses were obtained from trading activities. Because the dividend profits and franking credit profits were added onto the capital gains, the consolidated returns stayed positive in Panel A.

5.2.3 Returns and Dividend Yield

TABLE 4: RETURNS AROUND EX-DIVIDEND DAY BY DIVIDEND YIELD

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. In Table 4, the dividend payments are ranked into dividend yield quartiles. In Panel A, the Normal Return is computed as: (Exit Price – Entry Price + Dividend + Franking Credit) / Entry Price. The Abnormal Return is computed as: Normal Return – Market Return. The Dividend Yield is measured as the dividend amount divided by the daily last price on the ex-dividend day. The Market Cap is the average market capitalisation for each of the quartile groups. The Div Amt is the average dividends paid in dollars for each industry sector. In Panel B, the normal returns are broken into three components. The Relative Capital Gain is computed as (Exit Price – Entry Price) / Entry Price. The Relative Dividend Profit is computed as: Dividend / Entry Price. The relative Franking Profit is computed as: Franking Credit / Entry Price. Period 1, 2, and 3 indicate three points to enter the trading position, including entering 30 days before the ex-dividend day, six days before the ex-dividend day, and one day before the ex-dividend day. ***, **, * denote statistical significance of positive returns at the 1%, 5%, and 10% level.

Panel A: Consolidated Returns

	Normal Returns			Abnormal Returns					
	Period 1	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Dividend Yield Means**	**Market Cap ($million)**	**Div Amt ($)**
Low	5.30%***	2.84%***	2.38%***	4.05%***	1.52%***	0.98%**	0.96%	13,229	0.127
2	5.37%***	3.53%***	2.56%***	3.61%***	1.72%***	0.82%**	1.78%	7,278	0.172
3	4.57%***	3.88%***	3.28%***	3.54%***	2.57%***	1.97%***	2.42%	10,621	0.216
High	3.48%***	4.07%***	4.00%***	3.04%***	2.94%***	2.62%***	4.03%	6,567	0.193

Panel B: Return Components

	Relative Capital Gain			Relative Dividend Profit			Relative Franking Profit		
	Period 1	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**
Low	4.01%	1.58%	1.13%	0.99%	0.96%	0.96%	0.30%	0.29%	0.29%
2	3.01%	1.23%	0.28%	1.81%	1.77%	1.75%	0.55%	0.53%	0.52%
3	1.38%	0.76%	0.19%	2.43%	2.39%	2.37%	0.75%	0.74%	0.73%
High	-1.27%	-0.67%	-0.73%	3.91%	3.89%	3.89%	0.85%	0.85%	0.85%

In Table 4, the dividends paid are grouped into dividend yield quartiles. The range of the average dividend yields for these four quartiles is between 0.96 percent and 4.03 percent. In Panel A, the majority of normal returns and abnormal returns were significantly positive at 1 percent level of significance, except for the lowest quartile groups in Period 3. The results in Panel A suggested that the ex-dividend trading strategy might generate higher returns with low dividend yield stocks for Period 1, as the abnormal returns decreased from 4.05 percent for the lowest quartile group to 3.04 percent for the highest quartile group. Interestingly, this finding only appeared in Period 1. In Period 2, the average abnormal return increased from 1.52 percent in the lowest quartile group to 2.94 percent in the highest quartile group in Period 2, and from 0.98 percent in the lowest quartile group to 2.62 percent in the highest quartile group in Period 3. A similar pattern was presented for the normal returns. These patterns suggested that low dividend yield companies may experience rapid price increases in Period 1, leading to greater returns in Period 1 for companies with lower dividend yields. This effect might be explained by the relative capital gains in Panel B. In Panel B, the highest relative

capital gain was observed in the lowest quartile group in Period 1, indicating that a large proportion of total returns were generated from capital gains. For the highest quartile group, relative capital losses were observed in all three periods. Dividends and franking credits made a greater contribution to the total returns in this quartile group. This finding was consistent with the average dividend yield and the average dollar value of dividend in Panel A, where the highest quartile group had relatively higher dividend yield (4.03%) and dollar value of dividend payment (19.3 cents). However, these companies were small companies, as the average market capitalisation is only $6,567 million.

5.2.4 Returns and Industry Sectors

TABLE 5: RETURNS AROUND EX-DIVIDEND DAY BY INDUSTRY SECTORS

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. In Table 5, the dividend payments are grouped according to the ASX industry sectors. The Normal Return is computed as: (Exit Price – Entry Price + Dividend + Franking Credits) / Entry Price. The Abnormal Return is computed as: Normal Return – Market Return. The Div Yield is the average dividend yield for each industry sector. The Div Amt is the average dividends paid in dollars for each industry sector. The Frank is the average level of franking credits. Period 1, 2, and 3 indicate three points to enter the trading position, including entering 30 days before the ex-dividend day, six days before the ex-dividend day, and one day before the ex-dividend day. ***, **, * denote statistical significance of positive returns at the 1%, 5%, and 10% level.

	Normal Return			Abnormal Return					
Industry Sectors	**Period 1**	**Period 2**	**Period 3**	**Period 1**	**Period 2**	**Period 3**	**Div Yield**	**Div Amt ($)**	**Frank (%)**
Cons Disc	4.08%***	3.24%***	2.61%***	2.90%***	1.75%***	1.12%***	2.32%	0.1378	85.28
Energy	6.35%***	5.19%***	4.15%***	5.42%***	3.73%***	2.46%***	1.57%	0.1571	74.70
Financials	3.71%***	2.16%***	1.73%***	2.65%***	1.17%***	0.60%**	2.53%	0.2313	45.13
Health Care	3.98%***	3.15%***	3.17%***	2.85%***	0.96%	1.25%	1.48%	0.1981	71.79
Info Tech	8.03%***	6.20%***	5.30%***	7.11%***	4.08%***	3.33%***	1.73%	0.0792	83.51
Materials	5.58%***	4.63%***	4.24%***	4.45%***	3.19%***	2.85%***	2.04%	0.1648	68.45
Industrials	6.39%***	5.05%***	4.43%***	5.02%***	3.70%***	2.86%***	2.43%	0.1261	74.28
A-REIT	3.90%***	0.91%**	0.62%	2.43%**	0.34%	-0.27%	2.73%	0.0695	7.26
Cons Staples	4.57%***	4.14%***	3.02%***	3.85%***	2.63%***	1.48%**	2.21%	0.2492	91.39
Telecoms	0.58%	1.02%*	1.73%**	0.07%	-0.45%	-0.25%	2.35%	0.0815	65.29
Utilities	1.85%**	1.71%**	1.67%**	0.86%	0.16%	0.25%	3.64%	0.0746	14.42
Fin-x-Prop	3.23%***	3.08%***	2.36%***	2.39%***	1.82%***	1.09%***	2.39%	0.3543	79.86

Table 5 contains the equally weighted average returns for all ex-dividend events across the ASX200 industry sectors. According the Global Industry Classification Standard (GICS), there are 12 industry sectors for the ASX200. According to the results in Table 5, the Utilities sector had the highest average dividend yield, giving a yield of 3.64 percent, while the Health Care sector had the lowest average dividend yield, giving a yield of 1.48 percent. The Financials excluding Property sector had the highest dividend payments, 35.43 cents. The Australian Real Estate Investment Trust (A-REIT) sector offered the lowest dividend payments, an average of 6.95 cents. The A-REIT sector and the Utilities sector had the lowest levels of franking credits attached to their dividends, both under 20 percent. The Financials sector offered the third lowest level of franking credits, an average of 45.13 percent. All the other industry sectors had average levels of franking

credits above 60 percent. The Information Technology sector and the Consumer Staples sector offered the highest levels of franking credits, both above 85 percent. Table 5 showed that the ex-dividend strategy produced positive returns in most of the industry sectors. The trading strategy was not profitable in the Telecommunication Services sector and the Utilities sector, as the abnormal returns were relatively small. Negative returns were observed in the Telecommunication Services sector. The Information Technology sector provided the highest abnormal return in both Period 1 and Period 3, 7.11 percent, and 3.33 percent. The Energy sector generated the second highest abnormal return in Period 1, 5.42 percent. The majority returns in the 12 industry sectors were significant at 1 percent level of significance. There were four industry sectors presenting insignificant positive abnormal returns, namely the Health Care sector, the A-REIT sector, the Telecommunication Services sector, and the Utilities sector. Although the normal returns in these sectors were statistically significant, the abnormal returns became insignificant after controlling for the market factor. This finding reflected the fact that the ex-dividend trading strategy did not beat the market in these four industry sectors, as the abnormal returns were not statistically different from zero. However, the trading strategy generated significant positive abnormal returns in the other eight industry sectors, especially in the Information Technology sector, the Energy sector, the Materials sector, and the Industrials sector. When comparing the returns in the three trading periods, returns were highest in Period 1 and lowest in Period 3. This pattern held for both normal returns and abnormal returns. Furthermore, the abnormal returns for the Health Care sector and the A-REIT sector were statistically significant in Period 1, but became insignificant in Period 2 and Period 3. These findings suggested that entering into trading positions earlier might produce better returns, which is consistent with previous analysis. Hence, Period 1 was the optimal entry point for the ex-dividend trading strategy.

5.2.5 Abnormal Return Components

TABLE 6: REGRESSION ON ABNORMAL RETURN COMPONENTS

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. Table 6 shows the results of the regression analysis on the return components, including capital gains, dividend profits, and franking credit profits. The regression equation is expressed as follows:

$$AR_i = \alpha_0 + \alpha_1 CG_i + \alpha_2 DIV_i + \alpha_3 FC_i + \varepsilon_i$$

α_0 is the intercept term, $\alpha_n, n = 1,2,3$ are the coefficients of the explanatory variables, AR_i (dependent variable) is the abnormal return for ex-dividend event **i**, CG_i (Capital Gain) is the trade profit for the ex-dividend event **i**, computed as the entry price subtracted from the exit price, DIV_i (Div Profit) is the relative dividend profit, computed as the dividend in dollar value divided by the corresponding entry price, FC_i (FC Profit) is the relative franking credit profit, computed as the dollar value of franking credit divided by the corresponding entry price. ***, **, * denote statistical significance at the 1%, 5%, and 10% level. The numbers in parentheses are the standard errors for the corresponding parameter estimates.

Variable	Regression Period 1	Regression Period 2	Regression Period 3
Intercept	-0.013***	-0.012***	-0.012***
	(0.002)	(0.002)	(0.002)
Capital Gain	0.854***	0.758***	0.727***
	(0.007)	(0.008)	(0.008)
Div Profit	1.083***	1.088***	0.957***
	(0.084)	(0.085)	(0.092)
FC Profit	1.404***	0.624***	0.646***
	(0.193)	(0.204)	(0.215)
N	2598	2598	2598
Adj. R2	0.862	0.781	0.744

The regression analysis in this section examines the contribution of each abnormal return component to the total returns. Three regression equations were estimated for Period 1, Period 2, and Period 3 respectively. The estimate results of these three regressions are shown in Table 6. The results showed that all the explanatory variables in the three regression equations were statistically significant at 1 percent level of significance, suggesting that all three components had significant contributions in the abnormal returns. The coefficients of the Div Profit and the FC Profits were greater than one in Period 1, while the Capital Gain variable had a coefficient less than one. The coefficient of the FC Profit variable decreased to 0.624 and 0.646 in Period 2 and Period 3, and the coefficient of the Div Profit variable remained the highest among all three variables. The Div Profit could be regarded as the most important component in the abnormal returns, as it had the most significant impacts on the abnormal returns. The FC Profit variable had the greatest contribution in the abnormal returns in Period 1, but the significance of this contribution became less in the following two periods. The results in this regression analysis suggested that all three components had a significant influence on the abnormal returns. If the investors were not eligible for a refund of franking credits, then the profitability of this ex-dividend trading strategy was reduced.

5.3 Determinants of Abnormal Returns

The regression analysis in this section examines the determinants of abnormal returns from the ex-dividend trading strategy. The regression equation was estimated for Period 1, Period 2, and Period 3. The estimate results are shown in Table 7. There are 2598 ex-dividend events included in this sample. In Period 1, the coefficient for the franking level variable equals 0.0002, which was significant at 1 percent level of significance. It showed a positive impact from the level of franking credits to the abnormal returns. The change of dividend was shown as another significant explanatory variable in Period 1. Its coefficient suggested that an increase of cash dividend from the previous year would lead to an increase in the abnormal return in Period 1. Another significant explanatory variable in Period 1 was the Dividend Reinvestment Plan (DRP) dummy variable. Its coefficient was equal to -0.023. The negative sign of the coefficient suggested that abnormal returns from ex-dividend events without a DRP were expected to be higher than those with a DRP. This indicated that ex-dividend events without DRPs might be preferred for the ex-dividend trading strategy. Interestingly, the market capitalisation variable, the dividend yield variable, and the relative volume variable were not significant in the first regression. These three variables may not determine the final abnormal returns from the ex-dividend trading strategy. The results in the Period 2 were slightly different from those in the first equation. The change of dividend variable became insignificant in the second equation. This might explained by the Efficient Market Hypothesis. When an increase in the cash dividend was announced on the dividend announcement day, the price would be adjusted very quickly. This price movement would be captured by the abnormal returns in Period 1, as shares were acquired before the announcement day. Since the entry point in Period 2 was after the dividend announcement, impacts from the change of dividend might not be carried onto Period 2. The dividend yield variable became significant in the second equation. Its coefficient was equal to 0.9464, which presents a positive impact on the abnormal returns. The DRP and the franking level were still significant in Period 2. The coefficients for these two variables were -0.0111 and 0.0002 respectively. However, the DRP variable was only significant at 10 percent level. The market capitalisation and the relative volume had no direct impacts on the abnormal returns in the second regression equation. The results in the third equation were consistent with those in Period 2. Overall, market capitalisations and relative volumes did not have a significant impact on abnormal returns. The franking level and the dividend yield had positive relations with the abnormal returns. The change of dividend was not a concern in Period 2 and Period 3, but it would have a positive impact on the abnormal returns when shares were acquired before the dividend announcement.

TABLE 7: REGRESSION ESTIMATES

The sample is for the dividends paid by the ASX200 stocks between 4 January 2000 and 24 March 2011. Table 7 shows the results of the regression analysis on the determinants of trading profits. The regression equation is expressed as follows:

$$AR_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 FL_{i,t} + \beta_3 \Delta DIV_{i,t} + \beta_4 DIVY_{i,t} + \beta_5 RVOL_{i,t} + \beta_6 DRP_{i,t} + \varepsilon_i$$

β_0 is the intercept term, $\beta_n, n = 1,2,3,4,5,6$ are the coefficients of the explanatory variables, $AR_{i,t}$ (dependent variable) is the abnormal return for ex-dividend event **i**, $SIZE_{i,t}$ (Market Cap) is the company's market capitalisation for the ex-dividend event **i**, $FL_{i,t}$ (Franking Level) is the level of franking credits for the ex-dividend event **i**, $\Delta DIV_{i,t}$ (ΔDiv) is the percentage change of dividend payment from previous dividend for the ex-dividend event **i**, $DIVY_{i,t}$ (Div Yield) is the dividend yield percentage for the ex-dividend event **i**, $RVOL_{i,t}$ (Relative Volume) is the relative volume on the entry day for the ex-dividend event **i**, $DRP_{i,t}$ (DRP) is the dividend reinvestment plan dummy variable for ex-dividend event **i**. The regression equation is estimated through the three entry points, Period 1, 2, and 3. The three columns refer to the estimates for regressions in each of the periods. ***, **, * denote statistical significance at the 1%, 5%, and 10% level. The numbers in parentheses are the standard errors for the corresponding parameter estimates.

Variable	Regression Period 1	Regression Period 2	Regression Period 3
Intercept	0.0294***	-0.0141**	-0.0135**
	(0.0074)	(0.0063)	(0.0058)
Market Cap	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Franking Level	0.0002***	0.0002***	0.0002***
	(0.0001)	(0.0000)	(0.0000)
ΔDiv	0.0173***	0.0003	-0.0021
	(0.0029)	(0.0024)	(0.0023)
Div Yield	-0.2381	0.9464***	0.9481***
	(0.2073)	(0.1712)	(0.1668)
Relative Volume	0.0029	0.0033	0.0009
	(0.0023)	(0.0022)	(0.0014)
DRP	-0.0230***	-0.0111*	-0.0165***
	(0.0071)	(0.0058)	(0.0057)
N	2598	2598	2598
Adj. R2	0.021	0.015	0.015

5.4 Discussions

1. MARKET CAPITALISATION WAS NOT A SIGNIFICANT EXPLANATORY VARIABLE

The abnormal return analysis in the previous section shows that the abnormal returns in small market cap companies were higher than those in large market cap companies in Period 1. This finding was consistent with Hypothesis 2. One possible reason is that smaller companies are unlikely to pay dividends regularly. In this case, dividend announcements for these companies could be considered as positive signals, thus leading to a possible rapid increase in stock prices after the dividend announcements. However, the results in Period 2 and Period 3 were different, where the highest abnormal returns were observed in the medium market cap companies. This finding disagreed with Hypothesis 2. In the regression analysis, market capitalisation was not shown as a significant explanatory variable, indicating a rejection of Hypothesis 2. This suggested that the size of companies did not influence the abnormal returns of the ex-dividend trading strategy.

2. LEVEL OF FRANKING CREDIT WAS A SIGNIFICANT VARIABLE

When controlling for the level of franking credits, the highest abnormal returns were obtained in those ex-dividend events with fully franked credits. This result supported Hypothesis 3, and it also agreed with the results in the regression analysis on the abnormal return components. This indicated that the value of franking credits had a significant influence on the abnormal returns. This finding was consistent with the results in the regression analysis on abnormal return determinants. The regression estimates suggested that the level of franking credit is a significant variable in all three trading periods. It had a positive sign, suggesting that a higher level of franking credit would generate greater abnormal returns.

3. THE STRATEGY FAVOURED STOCKS WITH A HIGH DIVIDEND YIELD

When controlling for the dividend yield, the abnormal return analysis results showed that companies with lower dividend yields would give higher abnormal returns in Period 1. Interestingly, the results were the opposite in Period 2 and Period 3, where higher abnormal returns were observed in companies with higher dividend yields. The findings were consistent with the regression analysis. The dividend yield was not shown as a significant explanatory variable in the Period 1 regression equation. However, it became a significant explanatory variable in the Period 2 and Period 3 regression equations. Positive signs of the dividend yield variable were observed in Period 2 and Period 3, which was consistent with Hypothesis 4. Stocks with higher dividend yield generated higher abnormal returns. If the investors had entered their trading positions before the dividend announcement day, then the dividend yield factor did not impact on their final portfolio returns.

4. RELATIVE VOLUME DID NOT HAVE SIGNIFICANT EXPLANATORY POWER

The relative volume did not have significant explanatory power in the regression analysis. It did not have a direct impact on the abnormal returns of the ex-dividend trading strategy, which was not consistent with Hypothesis 6. The change of dividend variable was significant in Period 1 only. It did not have a significant impact on abnormal returns in Period 2 and Period 3, which was inconsistent with Hypothesis 5. The regression analysis showed another significant explanatory variable, the Dividend Reinvestment Plan, with a negative sign. This result found that ex-dividend events without a DRP generated higher abnormal returns.

5. THE PROFITABILITY OF THE EX-DIVIDEND TRADING STRATEGY WAS NOT CONSISTENT ACROSS INDUSTRY SECTORS

The profitability of the ex-dividend trading strategy was not consistent across the 12 ASX200 GICS industry sectors. The Information Technology sector provided the highest abnormal returns in Period 1 and Period 3. The Energy sector generated the highest abnormal return in Period 2. The results showed that this ex-dividend trading strategy was not profitable in the Health Care sector, the A-REIT sector, the Telecommunication Services sector, and the Utilities sector. The abnormal returns in the remaining eight industry sectors were significantly positive in all three trading periods. The top three profitable industry sectors were the Information Technology sector, the Energy sector, and the Industrials sector. Overall, significant abnormal returns were observed in this study after controlling for various factors. Hypothesis 1 was supported by this finding. It reflected that the ex-dividend trading strategy generated significant abnormal returns to investors who were able to utilise the value of franking credits.

6. PERIOD 1 WAS THE OPTIMAL ENTRY POINT

This report tests the ex-dividend trading strategy in three trading periods. The results in the previous section found that Period 1 gave the highest abnormal returns, while the lowest abnormal returns were observed in Period 3. This finding was consistent for all control variables. It could be concluded that Period 1 was the optimal entry point for the ex-dividend trading strategy, as capital gains before the ex-dividend events would be captured if shares were acquired earlier.

7. THERE ARE LIMITATIONS ON THE EX-DIVIDEND TRADING STRATEGY.

There are limitations on the ex-dividend trading strategy. Firstly, transaction costs were not included in this study. Investors may have various transaction costs, for which it would be difficult to obtain a proxy for measurement in this study. Furthermore, the ex-dividend trading strategy was not risk-free. Since no hedging positions were constructed, investors might face a capital loss risk during the 46-day holding period. Finally, this study assumed that investors were eligible for franking credits. If the value of franking credits could not be utilised, then the results of the ex-dividend trading strategy might be biased.

6. Conclusions

This study examined the profitability of the ex-dividend trading strategy across the ASX200 stocks. The optimal entry period and the determinants of the profitability were also evaluated in this study. The results showed that:

- The ex-dividend trading strategy generated significant positive abnormal returns in all three trading periods if investors were able to utilise the value of franking credits.
- Period 1 was identified as the optimal entry point, as the highest abnormal returns were always observed in Period 1 by controlling for various factors. Investors who executed their trades before the dividend announcement day enhanced their profitability.

The determinants of the abnormal returns have been evaluated in this study. The results showed that:

- The size of companies and the trading volumes around the ex-dividend day did not have a significant impact on the profitability of the ex-dividend trading strategy.
- Other characteristics did have a significant impact on the profitability of the ex-dividend trading strategy, including:

  i. the level of franking credits,

  ii. the dividend yield,

  iii. the availability of the DRP,

  iv. and their industry sectors.

Companies with higher levels of franking credits were more profitable. This direct relationship also appeared in the dividend yield variable. Higher abnormal returns were observed in companies with higher dividend yields. However, this finding was only true in Period 2 and Period 3. If investors traded in Period 1, then it was not necessary to consider the level of dividend yields as a factor. A negative relationship was found between the DRP variable and the abnormal returns of the ex-dividend trading strategy.

- The profitability of the ex-dividend trading strategy varied across the 12 ASX200 GICS industry sectors. This strategy was not effective in the Health Care sector, the A-REIT sector, the Telecommunication Services sector, and the Utilities sector. However the strategy was profitable across the other 8 ASX200 GICS industry sectors. Stocks from the Information Technology sector, the Energy sector, and the Industrials sector were the most profitable sectors for the ex-dividend trading strategy.

This study has not examined the effectiveness of the buy-write strategy (i.e. the selling of up to 70 percent hedged call options over a stock according to the conditions of the 45-day holding rule) against the ex-dividend performance measurement results of this study. This in-depth examination of the buy-write strategy would be an interesting area of future academic enquiry.

References

Ainsworth, Andrew B., Kingsley Y.L. Fong, David R. Gallagher, and Graham Partington, 2008, Institutional trading around the ex-dividend day, working paper, University of Sydney

Armitage, Seth, Lynn Hodgkinson, and Graham Partington, 2006, The market value of UK dividends from shares with differing entitlements, Journal of Business Finance and Accounting 33, 220-244

Balachandran, Balasingham, and Tuan Anh Nguyen, 2004, Signalling power of special dividends in an imputation environment, Accounting and Finance 44, 277-297

Balachandran, Balasingham, Robert Faff, and Tuan Anh Nguyen, 2008, The ex-date impact of special dividend announcements: A note, International Review of Financial Analysis 17, 635-643

Beggs, David, and Christopher L. Skeels, 2006, Market arbitrage of cash dividends and franking credits, Economic Record 82, 239-252

Bellamy, David E. 2002, An analysis of ex-dividend day abnormal trading volumes and share price changes in the Australian equity market, working paper, University of Queensland

Brown, Philip, and Alex Clarke, 1993, The ex-dividend day behaviour of Australian share prices before and after dividend imputation, Australian Journal of Management 18, 1-40

Cannavan, Damien, Frank Finn, and Stephen Gray, 2004, The value of dividend imputation tax credits in Australia, Journal of Financial Economics 73, 167-197

Dasilas, Apostolos, and Stergios Leventis, 2011, Stock market reaction to dividend announcement: Evidence from the Greek stock market, International Review of Economics and Finance 20, 302-311

Eades, Kenneth M., Patrick J. Hess, and E. Han Kim, 1984, On interpreting security returns during the ex-dividend period, Journal of Financial Economics 13, 3-34

Frank, Murray, and Ravi Jagannathan, 1998, Why do stock prices drop by less than the value of the dividend? Evidence from a country without taxes, Journal of Financial Economics 47, 161-188

Frank, Murray, and Ravi Jagannathan, 1998, Why do stock prices drop by less than the value of the dividend? Evidence from a country without taxes, Journal of Financial Economics 47, 161-188

Gosnell, Thomas F., Arthur J. Keown, and John M. Pinkerton, 1996, The intraday speed of stock price adjustment to major dividend changes: Bid-ask bounce and order flow imbalances, Journal of Banking and Finance 20, 247-266

Graham, John R., Roni Michaely, and Michael R. Roberts, 2003, Do price discreteness and transactions costs affect stock returns? Comparing ex-dividend pricing before and after decimalization, The Journal of Finance 58, 2611-2636

Heath, David C., and Robert A. Jarrow, 1988, Ex-dividend stock price behaviour and arbitrage opportunities, Journal of Business 61, 95-108

Jakob, Keith, and Tongshu Ma, 2003, Order imbalance on ex-dividend days, Journal of Financial Research 26, 65-75

Jun, AeLee, V. T. Alaganar, Graham Partington, and Max Stevenson, 2008, Price and volume behaviour around the ex-dividend day: Evidence on the value of dividends from American depositary receipts and their underlying Australian stocks, International Review of Finance 8, 21-55

Kato, Kiyoshi, and Uri Loewenstein, 1995, The ex-dividend-day behaviour of stock prices: The case of Japan, The Review of Financial Studies 8, 817-847

Lasfer, Ameziane, 1995, Ex-day behaviour: Tax or short-term trading effects, The Journal of Finance 50, 875-897

Liljeblom, Eva, Anders Loflund, and Kaj Hedvall, 2001, Foreign and domestic investors and tax induced ex-dividend day trading, Journal of Banking and Finance 25, 1687-1716

Partington, Graham, and Scott Walker, 2001, A note on transaction costs and the interpretation of dividend drop-off ratios, Accounting and Finance 41, 229-241

Spry, Fiona, and David Morrison, 1999, Dividend and capital streaming, Revenue Law Journal 9, 77-98

Walker, Scott, and Graham Partington, 1999, The value of dividends: Evidence from cum-dividend trading in the ex-dividend period, Accounting and Finance 39, 275-296

Walker, Scott, and Graham Partington, 1999, The value of dividends: Evidence from cum-dividend trading in the ex-dividend period, Accounting and Finance 39, 275-296

Notes

CONTACT DETAILS

AUSTRALIA
David Stocken
Senior Manager, Institutional Sales
+61 2 9227 0934 david.stocken@asx.com.au

ASIA
Andrew Musgrave
Regional Manager, Asia
+61 2 9227 0211 andrew.musgrave@asx.com.au

EUROPE
James Keeley
Regional Manager, Europe
+44 203 009 3375 james.keeley@asx.com.au

NORTH AMERICA
David Ritchie
Regional Manager, North America
+1 312 788 3363 david.ritchie@asx.com.au

Head office ASX Limited
Exchange Centre
20 Bridge Street
Sydney NSW 2000 Australia

Telephone +61 2 9227 0000

www.asx.com.au