

Capital Gains Tax Managed Funds and the Value of Dividends.

Abstract

The taxation of capital gains for Managed Investment Funds in New Zealand was dramatically changed in October 2007, putting these entities on a similar footing to private investors. Prior to this change most private investors were not taxed on capital gains from investments in New Zealand and Australian companies whereas Managed Funds were taxed on these gains. New Zealand company dividends carry imputation tax credits and thus had a tax advantage for Managed Funds before October 2007.

After the change the value of dividends relative to capital gains declined for Managed Funds. Since other investors in New Zealand stocks were little affected by the capital gains tax change a decline in the market value of dividends would only be expected in stocks where Managed Funds were the marginal investors. There is evidence that the value of dividends declined after the tax change. However, this evidence is statistically weak, except in the case of stocks with high dividends per share.

Introduction

Prior to October 2007 New Zealand Managed Funds were generally¹, taxed on gains arising from the sales of shares whereas individual investors were exempt from such taxes in the case of investments in New Zealand and Australian stocks. A Bill was tabled on the 17th May 2006 aimed at amending this position and came in to effect on the 1st October 2007. According to the government, "This long overdue reform puts the tax treatment of different types of share investment on an equal footing, introducing greater fairness and reducing distortions in investment decisions" (<http://taxpolicy.ird.govt.nz/news/archive.php?year=andview=440>, accessed 11 June 2008).

The impact of this change is likely to tilt the preference of Managed Funds towards capital gains. Therefore, if Managed Funds are the marginal investors in stocks we expect the value of the dividends to be lower following the change in legislation. The drop in share price, when a share goes ex-dividend, is analysed before and after the legislation in order to determine whether the relative value of dividends and capital gains changed. The results provide evidence that the value of dividends has declined for the high dividend per share stocks, consistent with Managed Funds being the marginal investors in such stocks.

Bell and Jenkinson (2002) find an analogous result in the UK where the removal of tax credits for pension funds reduced the value of dividends for such funds. Bell and Jenkinson argue that pension funds were the marginal investors for high-yielding stocks as it was these stocks which suffered the largest decline in the value of

¹ Managed funds which are passive are exempt whereas private traders who are classified as traders are charged on their capital gains.

dividends relative to capital gains. We follow their method in examining the ex-dividend behaviour of New Zealand stocks prior to and following October 2007.

The paper is organised as follows: Section 2 describes the taxation of share returns in New Zealand before and after the legislative change. The literature relating to share behaviour around ex-dividend dates is then reviewed in Section 3. Section 4 presents the hypotheses, describes the data sample and the research method adopted. The results are presented in Section 5 and the conclusions are reported in Section 6.

2. The tax environment

An imputation system replaced a classical system of taxing dividends in New Zealand in 1988 and a primary objective of the change was to encourage companies to increase their dividend payout. A general feature of the tax system is that profits arising from sales of shares are not, in the main, subject to tax in New Zealand. The exception to this, prior to October 2007, related to shares that were bought and sold, by share traders this included Managed Funds and some private individuals. Cash distributions to both individual investors and Managed Funds, were subject to income tax but had an imputation tax credit attached². Before October 2007, this would have encouraged Managed funds to focus on high dividend yield stocks and avoid investing in low yield stocks where returns would principally be in the form of capital gains.

The differential taxation of Managed Funds and individuals was considerably reduced from October 2007³ when entities, meeting certain requirements, could elect to become Portfolio Investment Entities (PIEs) and realise their capital gains on New Zealand and Australian shares free of tax. Most New Zealand Managed Funds were

² A fully-imputed dividend would not be subject to further taxation when received by a Managed Fund, but would be subject to further taxation when received by a private investor with a tax rate of 39%.

³ Following on from the 2006 Taxation (Annual Rates, Savings Investment, and Miscellaneous Provisions) Bill.

eligible to become PIEs and according to the December 2006 Ernst and Young Tax Watch Brief, “This regime offers a significant advantage to investors over the current tax treatment which has biased investors against collective investment since they would have been taxed on amounts that could otherwise have been tax-free capital gains if they invested directly. These changes not only remove this bias, but because the PIE can now make as many trades as it likes in relation to New Zealand and Australian equities without putting its tax-free status at risk, collective vehicles will now (in many situations) be a more attractive option than direct investment.”

The new tax regime also allows profits earned by a PIE to be taxed at the ultimate investors’ marginal tax rates (Portfolio Investor Rate) rather than at a statutory rate of 33%.⁴ Thus investors with lower tax-rates (19.5% at the time) can now benefit from having their marginal tax rate applied to PIE profits. If the individual’s tax rate is above 33% they are allowed to restrict the applicable tax rate to 33%. The 33% corporate tax rate was reduced to 30% from April 1st 2008 thus increasing the tax benefit to higher rate tax payers. Prior to the changes private investors would have earned reduced income from investing in Managed Funds. This is due to the capital gains tax and, for low rate tax payers, the imposition of a tax rate higher than their marginal tax rate. Following the changes, Managed Funds offer tax benefits and convenient diversification.

3. Ex-dividend studies

In a risk-neutral world without taxes, transaction costs and settlement costs, the drop in the share price when a stock goes ex-dividend is expected to equal the value of the dividend paid on that stock. However, following the initial study of Campbell and Beranek (1955), a considerable number of empirical studies show that the ex-dividend

⁴ The corporate tax rate was changed from 33% to 30% on April 1st 2008.

drop-off ratio (the drop in share price divided by the dividend paid) is frequently less than one.

Elton and Gruber (1970), amongst others, argue that the differential taxation of dividends and capital gains explains an ex-dividend drop-off ratio of less than one. Their argument is that investors value dividends less than capital gains because dividends are taxed more severely. Bell and Jenkinson (2002) employ an ex-dividend study to examine a change in UK dividend taxation from a system where dividends were taxed less severely for one class of investor, pension funds. When legislation removed the pension funds' access to imputation tax credits, Bell and Jenkinson report a significant decrease in the valuation of dividends for high dividend yield stocks. This is consistent with differential taxation influencing share prices around ex-dividend dates. However, Armitage *et.al.* (2006) describe Bell and Jenkinson's results as weak and find no evidence of a change in dividend valuation consequent to the change in taxation of UK pension funds.

The current study is like the Bell and Jenkinson (2002) study, dividends in New Zealand were taxed less severely than capital gains for one investor class, Managed Funds, and subsequently the tax disadvantage of capital gains was eliminated. Like Bell and Jenkinson, we employ an ex-dividend study to examine this change. However, as Armitage *et.al.* (2006) point out, there can be difficulties detecting dividend valuation changes in an ex-dividend study due to the high level of noise in ex-dividend data.

The differential taxation explanation for a drop-off ratio less than one was questioned by Kalay (1982). He advanced the short-term trading hypothesis, suggesting that the tax disadvantage of dividends can be avoided by trading about the ex-dividend date. High-tax (low-tax) investors can sell (purchase) the share on the last cum-dividend

date, avoiding (capturing) the dividend and then buy back (sell) the share on the ex-dividend date. Unless the resulting drop-off ratio is one there will be an arbitrage opportunity for investors who are equally taxed on dividends and capital gains. However, the arbitrage involves transaction costs and because the ex-dividend price is unknown there is also risk. Consequently, arbitrage will only force the drop-off towards one as far as the limit imposed by transaction costs. The empirical evidence based on the short-term trading hypothesis is mixed with Eades, Hess and Kim (1984), Lakonishok and Vermaelen (1986), Michaely (1991), Fedina and Grammatikos (1993) and Siddiqi (1997) finding evidence to support it while Lakonishok and Vermaelen (1983), Poterba and Summers (1984), Kaplanis (1986), Booth and Johnston (1984) and Menyah (1993) fail to support it.

A model which incorporates taxes, transactions costs, ex-dividend price risk, short-term traders, long term traders and varying tax rates for the market participants was provided by Boyd and Jaganathan (1994). The resulting equilibrium is, in their words, messy and implies a non-linear relation between drop-off ratios and dividend yields. One clear result is that short-term traders are only likely to be trading high dividend yield stocks. Boyd and Jaganathan also introduce a new regression approach to estimating the drop-off ratio and conclude that a value of one is a good rule of thumb for the drop-off ratio.

Subsequent explanations for a drop-off less than one were based on market microstructure effects. Frank and Jagannathan (1998) found a drop-off ratio less than one in Hong Kong which could not be explained by differential taxation as stock returns were tax free. They offered an explanation based on prices bouncing from the bid price to the ask price on going ex-dividend. However, the results of Kadapakkam (2000) suggest that the explanation was slow settlement procedures inhibiting

arbitrage. With the introduction of electronic settlement to Hong Kong, the settlement period was reduced from three weeks to one day. After this change the drop-off ratio was not significantly different to one.

Another microstructure explanation was offered by Bali and Hite (1998) who suggested that tick sizes effects reduced drop-off ratios. However, this is refuted by the evidence of Graham et al. (2003) and Jacob and Ma (2004). The extra transactions costs in dealing with odd-lots is also advanced as an explanation for reduced drop-off ratios in the case of stock dividends and is supported empirically for New Zealand by Anderson et al. (2001).

Published evidence on drop-off ratios in New Zealand is not extensive. Bartholdy and Brown (1999) provide regression estimates of New Zealand drop-off ratios prior to the introduction of imputation. Across samples, their estimates range from 0.41 to 0.84 for taxable dividends, and from 0.84 to 1.07 for a special class of non-taxable dividends. The latter values being those more likely to reflect dividend valuations under an imputation tax system. Australia and New Zealand share close economic ties and have similar imputation tax systems. The evidence from Australia suggests a drop-off ratio under imputation of one, for example, see Hathaway and Officer (2004), Bellamy and Gray (2005) and Beggs and Skeels (2006). However, Walker and Partington (1999) study the simultaneous trading of Australian stocks cum-dividend and ex-dividend, which eliminates most of the noise that afflicts traditional ex-dividend studies and they find a drop-off ratio of 1.20.

The foregoing discussion shows that several explanations have been offered for the magnitude of ex-dividend drop-off ratios, but no generally accepted position has been reached. In particular the impact of taxes remains contentious. The change to the

taxation of Managed Funds provides a natural experiment to investigate the role, if any, of taxation in ex-dividend valuation.

4. Method Hypotheses and Data

Modeling the drop-off ratio

This study examines both a direct measure and a regression estimate of the ex-dividend drop-off ratio. Elton and Gruber (1970) relate the direct measure of the drop-off ratio to the taxes and derive the following equilibrium for long term investors.

$$\frac{P_{cum} - P_{ex}}{D_t} = \frac{(1 - T_i)}{(1 - T_g)} \quad (1)$$

Where P_{cum} is the shares' closing price on the cum-dividend day, P_{ex} is the closing price on the ex-dividend day, T_i is the investor's tax rate on dividends T_g is the investor's tax rate on capital gains, D_t is the dividend at time t .

Adapting Elton and Gruber's (1970) model to allow for the effect of imputation tax credits requires grossing up the dividend to its pre-corporate tax value. This is achieved through dividing the dividend by one minus the corporate tax rate ($1 - T_c$) and the resulting equilibrium for the drop-off ratio is:

$$\frac{P_{cum} - P_{ex}}{D_t} = \frac{(1 - T_i)}{(1 - T_g)(1 - T_c)} \quad (2)$$

In this model the market value of dividends depends on the marginal investor's tax rates on capital gains and dividends, and the corporate tax rate. The equilibrium in equation 2 assumes that investors receive imputation tax credits at the full corporate tax rate. The tax credits are also known as franking credits and those credits which apply at the full corporate tax rate are said to be fully franked.

The paper focuses on the ex-dividend drop-off ratio for investors domestic to New Zealand. If, however, overseas investors are the marginal investors in New Zealand stocks, then domestic tax changes are unlikely to affect the drop-off ratio. In terms of the theoretical analysis that follows, the drop-off ratios for overseas investors are likely to mirror the values that we compute for unfranked dividends.

Assume the date is prior to October 2007, when the corporate tax rate was 33% and Managed Funds paid income and gains tax at the rate of 33%. Then, from equation 2, the upper limit on expected drop-off ratio for long term investments by Managed Funds would equal $0.67/(0.67)^2$, or 1.492. This drop-off ratio is an upper limit since the calculation assumes that the effective capital gains tax is the full statutory rate. In reality the capital gains will be deferred for some period of time thus reducing the present value of the taxes and hence the effective capital gains tax rate. Following October 2007 the capital gains tax reduces to zero, and other taxes remain the same, in which case the drop-off ratio would change from 1.492 to $0.67/0.67$ or 1. The drop-off ratio for long term private investors taxed at 33% on income would be 1 both before and immediately after October 2007. Drop-off ratios by investor tax rate and regime are presented for long term investors in Table 1, Panel A. Note that the Post October 2007 drop-off ratios in Table 1, Panel A are computed assuming the 30% corporate tax rate which prevailed after April 1, 2008.

New Zealand companies pay their dividends fully franked, partially franked,⁵ or unfranked (no imputation credits). If the dividend is unfranked the taxation of that dividend will be identical to that under a classical tax system. For long term investors, therefore, the drop-off ratio for unfranked dividends is given by equation 1. Given statutory rates of tax, the drop-off ratio for unfranked dividends paid to private

⁵ We do not model partially franked dividends as there are very few cases in the data.

investors would be equal to one minus their marginal tax rate, or 0.67 at a 33% tax rate. This drop-off ratio would be unaffected by the tax change. The upper limit on the expected drop-off ratio for an unfranked dividend paid to Managed Funds would have been one given T_i equal to T_g prior to October 2007, and equal to one minus T_i , or 0.67 subsequently.

As Partington and Walker (2001) point out in the context of New Zealand it is important to consider the impact of transaction costs when interpreting drop-off ratios. They argue that a mixture of dividend arbitrageurs and long-term investors are likely to be present in the New Zealand market, and that transactions costs are critical to the dividend valuations of the arbitrageurs. As a consequence they demonstrate that a wide range of equilibrium drop-off ratios are possible depending upon the dividend yield and transactions costs, and whether the marginal trader in a stock is trading for the long-term or short-term. Partington and Walker's model relates to pre-imputation data, but Walker and Partington (1999) derive the following equilibrium drop-off ratio under imputation allowing for transaction costs (α) as a percentage of the share price:

$$\frac{P_{cum} - P_{ex}}{D_t} = \left[\frac{1 - T_i}{(1 - T_c)(1 - T_g)(1 - a)} \right] - \left(\frac{2a}{1 - a} \right) \frac{P_{cum}}{D_t} \quad (3)$$

The main impact of transactions costs on the equilibrium drop-off ratio arises from the second term on the right hand side of equation 3. This term is a function of the inverse dividend yield and its effect can substantially reduce the equilibrium drop-off ratio, particularly for low dividend yields. The tax rates T_i and T_g will normally be equal since short-term traders are typically taxed on capital gains in the same way as income. Consequently the first term in equation 3 reduces to $1/(1-\alpha)$. The mean dividend yield in the franked sample that we study is 2.7%.and with round trip transactions cost of half a percent the equilibrium drop-off ratio for managed funds is

1.11 before October 2007 and 0.62 immediately afterwards. For private individuals engaged in short-term trades with gains taxed as income and transactions costs of half a percent, the equilibrium drop-off ratio is 1.11 before and after the tax change. The effect of varying the level of transaction costs is shown in Panel B of Table 1.

We note that the values of the equilibrium drop-off ratios presented above may be upward biased. First, they do not account for the discounting of the cash flows that arise from the delay in receipt of both dividend payments and the cash flows associated with taxes, including tax credits and tax payments. With one exception these discounting effects are likely to be small enough to be ignored. The exception, as noted earlier, is where a long period passes before realisation of capital gains. This can substantially reduce the effective tax rate on these gains. Second, no explicit allowance was made for discounting due to the uncertainty of the ex-dividend price, although for short-term traders this can be factored into the transactions costs variable.

Regression models for the drop-off ratio

Frank and Jagannathan's (1994) regression has become a standard approach to estimating the drop of ratio and is given by equation 4.

$$\frac{P_{i,cum} - P_{i,ex}}{P_{i,cum}} = \alpha + \beta \frac{D_{i,ex}}{P_{i,cum}} + \varepsilon \quad (4)$$

Where i indexes the event and β is the estimate of the drop-off ratio.

Following Bell and Jenkinson (2002) and Hodgkinson et al. (2006) we include an interaction variable which is the product of $D_{i,t}$ and a dummy variable (POST), which takes a value of one if the ex-dividend date occurred following 1 October 2007 and is otherwise zero. If the dividend drop-off ratio is significantly lower following 1

October 2007, we expect the coefficient for this variable to be significantly less than zero. A second interaction variable is included to control for the presence of unfranked dividends. The interaction variable is equal to the product of $D_{i,t}$ and a dummy variable (NIL), which takes a value of one if the dividend is not franked but is otherwise equal to zero. The resulting model is as follows:

$$\frac{P_{i,cum} - P_{i,ex}}{P_{i,cum}} = \alpha + \beta \frac{D_{i,ex}}{P_{i,cum}} + \beta_{post}(POST \cdot \frac{D_{i,ex}}{P_{i,cum}}) + \beta_{nil}(NIL \cdot \frac{D_{i,ex}}{P_{i,cum}}) + \varepsilon_i \quad (5)$$

Hypotheses

If Managed Funds were the dominant marginal investors across stocks in the New Zealand market, then there should be a market wide decline in drop-off ratios as a consequence of the reduced tax advantage of dividends post October 2007. However, given their tax disadvantage relative to other investors it seems unlikely that Managed Funds would be the marginal investors across all stocks, and in this case a decline in drop-off ratios would not apply to all stocks. Whether there is an impact market wide, therefore depends upon the extent to which Managed funds are the marginal investor. However, if there is a market wide impact the hypothesised direction is unambiguously downwards.

As a dollar of dividends prior to October 2007 was worth substantially more than a dollar in capital gains to Managed Funds it is likely that they would have preferred to invest in high-yielding stocks. High yielding stocks would also have presented an opportunity to Managed Funds for dividend arbitrage. Therefore, we hypothesise that the decline in the drop-off ratio will be greater for high yield stocks than for low yield stocks.

We also examine the drop-off ratio conditioned on the magnitude of dividends per share. This is done for two reasons. First Managed funds might be attracted by the

absolute quantity of dividends and second cleaner dividend valuations can be obtained for larger dividends per share. For small absolute dividends the measurement of value can be confounded by the bid ask spread and thus changes in value can be difficult to detect. We hypothesise that the decline in the drop-off ratio will be greater for high dividend per share stocks than for low dividend per share stocks.

Ex-dividend data is notorious for the presence of outliers. Therefore in the statistical testing we anticipate that more reliable results will be obtained from tests on medians rather than means.

Sample

The period of analysis is from January, 2000 to June, 2009. The initial sample included all New Zealand stocks, excluding financial stocks, available on *Thomson Analytics* database and amounted to 130 stocks, which represents a substantial majority of the market. PIE companies were excluded, leaving 120 stocks. Just under a half of the remaining companies paid little or no dividends during the period of analysis and were excluded, which left 66 usable stocks.

The sample originally comprised 859 ex-dividend events but an absence of share price data, particularly on the ex-day reduced the sample to 644 ex-dividend day events. Of the 644 observations 10 relate to partially imputed dividends which were omitted from the analysis and 35 relate to unfranked dividends and form a separate group for part of the analysis. The remaining observations relate to fully franked dividends. Sub-samples were created for high and low-yielding stocks and stocks paying high and low dividends per share. The cut-off points for forming these samples were the median of the cum-dividend yield and the median dividend per share.

5. Results

Table 2 provides descriptive statistics of the full sample (Table 2a) and compares drop-off ratios for the the sub-samples (Table 2b) before and after October 2007. The post October 2007 samples contains a relatively small number of observations because they cover less than two years' data. The dividend yields reported in the table are based on the dividend yields by event $Di,ex/Pi,cum$ and do not represent annual yields. For the sample of fully franked stocks (Table 2a) the dividend yields are very similar across the two periods. However, the mean and median for dividends per share are lower following the tax change. The full sample shows a decrease in the dividend drop-off ratio following October 2007, which, for the median, is quite substantial and significant at the ten percent level. For the unfranked stocks the sample size after the tax change is so small as to preclude sensible analysis.

In table 2b the drop off ratios decline after the tax change across all sub-samples and the decline in the median ranges from 23 percent to 33 percent of the pre-change value. The difference in the median is significant at the 10% level for low dividend yield stocks and significant at the 5% level for high dividend per share stocks. The significance of the decline for low dividend yields and the lack of significance of the decline for high dividend yields does not sit well with our hypothesis that high dividend yield stocks would experience the strongest decline in dividend valuations.

Before reporting the regression results we note that there is more work to be done here, for example using robust regression to reduce the effect of outliers. Conclusions with regard to the regression coefficients are therefore tentative. The results for the OLS estimation of equation 5 are presented in Table 3. It is apparent that the best fit is obtained for the high dividend per share sample and the poorest fits are for the low dividend yield and low dividend per share sample. All the estimates of the drop-off

ratios prior to the tax change (β) are not significantly different from one, except in the case of low dividends per share, where the estimate is significantly less than one. However, for the β_{POST} coefficient which captures the change in the drop-off ratio following October 2007, the only significant co-efficient is for the high dividend per share sample and it is negative as hypothesised. The estimates for β_{NIL} are negative and significant except in the case of low dividend yields and low dividends per share. This is as expected reflecting a lower valuation for unfranked dividends.

6. Conclusions

Prior to October 2007 Managed Funds were required to pay taxes on profits earned from the sale of shares. This requirement was removed on October 1st 2007, putting Managed Funds on an equal footing with private investors. Prior to the change it was in the interests of Managed Funds to invest in stocks paying high cash dividends thus reducing taxes and in particular avoiding taxation on capital gains. It was therefore expected, for those stocks where Managed Funds were the marginal investor, that the value of dividends relative to capital gains would decrease following October 2007. This paper provides evidence that the removal of the capital gains tax has decreased the relative value of dividends. However, the evidence is statistically weak except for stocks with high dividends per share and this suggests that Managed Funds were likely to have been the marginal investor in these stocks. Our evidence also suggests that unfranked dividends have a lower value than franked dividends, which adds weight to the case that taxes affect the value of dividends. However, we make two caveats, first more work needs to be done in relation to the regression analysis. Second, in common with many studies that analyse one-off events, we run the risk that we have not controlled for all aspects of history relevant to the event. Our results are consistent with the hypothesis that the tax change reduced the value of some

dividends, but we cannot rule out the alternative that we are observing correlation rather than causality.

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Table 1: Equilibrium drop-off ratios prior to and following October 2007

Panel A: Long Term Investors

	Managed Funds			Direct private investment		
Fully franked						
Pre October 2007						
<i>Private investors marginal tax rate</i>	19.5%	33%	39%	19.5%	33%	39%
Equilibrium drop-off ratio	1.493	1.493	1.493	1.201	1.000	0.910
Post October 2007						
Equilibrium drop-off ratio ¹	1.150	1.000	1.000	1.150	0.957	0.871
Unfranked						
Pre October 2007						
Equilibrium drop-off ratio	1.000	1.000	1.000	0.805	0.670	0.610
Post October 2007						
Equilibrium drop-off ratio	0.805	0.700	0.700	0.805	0.670	0.610

Panel B: Short-term Trades

Dividend Yield 2.7%	Transaction costs (%)				
	0	0.25	0.5	0.75	1
Managed Funds	Equilibrium Drop-off Ratios				
Fully Franked					
Pre October 2007	1.493	1.303	1.113	0.922	0.729
Post October 2007	1.000	0.812	0.623	0.433	0.242
Unfranked					
Pre October 2007	1.000	0.817	0.633	0.448	0.262
Post October 2007	0.670	0.486	0.301	0.115	-0.071
Private Trades pre & post²					
Fully Franked	1.493	1.303	1.113	0.922	0.729
Unfranked	1.000	0.817	0.633	0.448	0.262

Notes: 1. The imputation tax credit and corporate tax rate was reduced from 33% to 30% from the 1st April 2008. The new rates are used in this table for Post October 2007 equilibrium drop-off ratios.

2. The equilibrium for short-term private trades is unaffected by the October 2007 tax change.

Table 2a: Descriptive statistics for the dividend yield, dividend per share and dividend drop-off ratio for the fully-franked and unfranked samples

FULLY FRANKED: FULL SAMPLE				
	Number	mean	median	Stdev
PRE				
D/Po	511	0.027	0.025	0.014
Dividend	511	0.108	0.075	0.168
Drop-off ratio	511	0.886	0.966	0.966
POST				
D/Po	87	0.028	0.026	0.013
Dividend	87	0.086	0.070	0.058
Drop-off ratio	87	0.833	0.710	0.931
Test statistics		0.49	155640*	
UNFRANKED: FULL SAMPLE				
PRE				
D/Po	26	0.032	0.024	0.021
Dividend	26	9.804	0.050	14.067
Drop-off ratio	26	0.347	0.500	1.328
POST				
D/Po	9	0.023	0.024	0.008
Dividend	9	7.722	0.060	5.964
Drop-off ratio	9	1.448	1.304	0.745
Test statistics		1.24	504	

Note:

The test statistics are the t-test and Mann-Whitney tests for the alternative hypothesis: the PRE drop-off ratio is significantly greater than the POST drop-off ratio.

*(**) indicates that the null hypothesis is rejected at a 10% (5%) level.

Table 2b: Descriptive statistics for the dividend drop-off ratio classified by dividend yield and dividend per share

	Number	mean	median	Stdev
Panel A: HIGH DY				
Pre drop-off ratio	255	0.888	1.000	0.694
Post drop-off ratio	43	0.838	0.762	0.851
Test statistics		0.370	38622	
Panel B: LOW DY				
Pre drop-off ratio	256	0.884	0.924	1.178
Post drop-off ratio	44	0.827	0.646	1.014
Test statistics		0.330	39288*	
Panel C: HIGH DPS				
Pre drop-off ratio	252	0.894	0.991	0.720
Post drop-off ratio	43	0.759	0.762	0.628
Test statistics		1.270	38264**	
Panel B: LOW DPS				
Pre drop-off ratio	259	0.878	0.952	1.158
Post drop-off ratio	44	0.894	0.630	1.157
Test statistics		-0.140	39795	

Note:

The test statistics are the t-test and Mann-Whitney test: the tests are one sided.

*(**) indicates that the null hypothesis is rejected at a 10% (5%) level.

Table 3: Regression results for the scaled model

The following equation is estimated for both the full sample and the two subsamples stratified by the median dividend per share, where $P_{i,t-1}$ and $P_{i,t}$ are the closing prices on the cum-dividend and ex-dividend days, respectively. $D_{i,t}$ is the net dividend at time t . POST is a dummy variable which takes the value of one if the ex-dividend occurred after 1 October 2007 and is otherwise zero. NIL is a dummy variable which takes the value of one if the dividend is fully franked and is otherwise zero.

$$\frac{P_{i,t-1} - P_{i,t}}{P_{i,t-1}} = \alpha + \beta \frac{D_{i,t}}{P_{i,t-1}} + \beta_{post}(POST \cdot \frac{D_{i,t}}{P_{i,t-1}}) + \beta_{nil}(NIL \cdot \frac{D_{i,t}}{P_{i,t-1}}) + \varepsilon_t$$

	FULL SAMPLE	LOW DY	HIGH DY	LOW DPS	HIGH DPS
Intercept	-0.001 (0.002)	0.001 (0.004)	-0.001 (0.004)	0.003 (0.003)	-0.005 (0.003)
β_1	0.909 (0.066)	0.763 (0.202)	0.923 (0.116)	0.645 ^{@@@} (0.110)	1.119 (0.078)
β_{POST}	-0.006 (0.082)	-0.104 (0.154)	0.001 (0.108)	0.219 (0.132)	-0.185* (0.098)
β_{NIL}	-0.253* (0.113)	0.213 (0.213)	-0.341** (0.148)	0.324 (0.214)	-0.596*** (0.121)
N	633	316	317	314	314
R-squared (adj)	23.5%	5.00%	16.10%	12.70%	38.80%
F-statistic	65.59	5.47	21.27	16.18	68.33

Notes:

Standard errors are presented in parentheses

*(**)(***) indicate whether the coefficient is significantly different from zero at the 5% (1%) (0.1%) confidence level.

@(@@)(@@@) indicate whether the coefficient is significantly different from one at the 5% (1%) (0.1%) confidence level.

The interaction variables are both subject to one-sided tests.