Buybacks versus Ordinary Dividends: Marginal Investor reactions to Cash-return Announcements

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Abstract

This paper examines the stock price effect in New Zealand of announcements of increases in dividends and of share repurchases from 1993 to 2009. The results from this paper are related to the soft substitution hypothesis of Aharoni, Brown and Wang (2011) on Australian data. Consistent with prior research on these topics it is found that the marginal investor responds positively to both forms of announcement. Further to this, it is discovered that dividend-increase announcements result in a greater positive effect on the stock price than both the initial or follow-up-detail buyback announcements; and, the initial announcement of a repurchase leads to a more positive stock price reaction than the announcement that follows with additional details regarding the characteristics of the repurchase. The preference of the marginal investor from firms that distribute cash through both mechanisms is also examined. The results from this section support the rest of the paper in that investor reactions to a dividend increase-announcement are more positive than initial buyback announcements. However, the investors from this set of firms have a greater preference for dividend increases over repurchases, compared to firms that only use one form of distribution.

Key words: Event Study, Dividends, Stock Repurchases, Abnormal Returns

JEL Category: G14, G35

1. Introduction

In the United States prior to 2003, it was apparent that firms returning cash to shareholders were increasingly choosing to shift away from dividend payments in favour of repurchasing shares (Fama and French, 2001; Grullon and Michaely, 2002; Skinner, 2008). This was indicative of an increasing preference among U.S. investors for share repurchases relative to dividend payments. Recently, however, the opposite phenomenon has been found to exist in Australia (Aharoni, Brown and Wang, 2011).

It is strongly likely that the underlying driver in both countries is taxation policy. Evidence to that effect is provided by Chetty and Saez (2005) for the U.S where dividends have traditionally been taxed at both company level and the hands of the shareholder (double taxation), causing capital gains tax to be a relatively lighter impost. In Australia, however, capital gains from the sale of shares have been taxed at investors' personal income tax rates since 1985 (Australian Tax Office, 2011a), while a system of franking credits ensures that profits paid out as dividends are taxed only once. In New Zealand the taxation of dividends is similar, except that franking credits are called imputation credits; but New Zealand has had no capital gains tax.[1] These similarities and differences give rise to a natural experiment based on tax treatments. Are New Zealander investors, given the absence of a capital gains tax, like American investors in preferring share repurchases, or are they more like the Australians in showing some preference for dividends?

The above research question concerns the two versions of the possible relation between share repurchases and dividends. In the United States, the substitution hypothesis was developed to account for the observed preference for repurchases there, while Aharoni et al (2011) developed the soft substitution hypothesis to account for the Australian phenomenon. Both hypotheses are discussed in Section 2.

We conduct a simple event study analysis of investor reactions to share repurchase announcements and to dividend announcement made by companies listed on the New Zealand Stock Exchange. The basic premise is that the marginal investor making the last trade on the announcement day provides evidence indicative of how the different types of cash disbursement are valued. This evidence in event studies is the announcement day abnormal

[1] New Zealand has no capital gains tax on the sale of shares; unless an investor is buying and selling shares frequently for profit, in which case the realised capital gain will be taxed at their personal income tax rate (Emigrate NZ).

return. The study uses announcements of earnings-and-dividend increases. In New Zealand dividends and earnings are almost universally announced simultaneously. The sample of ordinary dividend announcements in this paper is restricted to those which involve a DPS and an EPS which are both larger than their counterparts announced a year earlier. Hence there is an earnings effect embedded in the dividend effect in these announcements; but this should be relatively non-confounding in effect because share repurchases, generally speaking, also imply that company earnings are good. Special dividends, on the other hand, like share repurchases and unlike ordinary dividends, are announced on the basis that they do not imply repetition in future years. Further, the special dividends used in the paper were all announced independently of earnings and ordinary dividends. This makes special dividends and share repurchases close substitutes in almost every dimension other than taxation, and flexibility. Share repurchases confer flexibility in that investors get to choose whether or not to participate in the announced offer, while ordinary dividends and special dividends go, wanted or not, to all shareholders.

We find, in spite of capital gains not being taxed while dividends are (albeit once only), the New Zealand marginal investor gets more excited about an increase in dividend than about a share repurchase.

The paper is organised as follows: Section 2 provides the required background for understanding this study, through describing the substitution and soft-substitution hypotheses and then briefly discussing international literature on dividends and repurchases. In section 3 the research questions and hypotheses are outlined. In section 4 the data collection and methodology used in this paper are described. Section 5 includes both the results and subsequent discussion, while Section 6 concludes.

2. Literature Review

We start with a brief nod to the vast record of published dividend research, then consider share buybacks and the choice between dividends and buybacks.

Lintner (1956) found that firms set dividends at a level they are confident of their ability to maintain into the future and that this level is only raised if the firm believes it can sustain the increase indefinitely. Miller and Modigliani (1961) on the other hand, argued that in a world without information asymmetry and taxes, dividend policy was irrelevant to the value of the

firm. However they did conjecture in a footnote that dividend signalling could exist; and this point was taken up by Asquith and Mullins (1983), who found that investors react positively to dividend initiations. Asquith and Mullins credited this to the value investors place on dividends and the signalling value of the initiation. Miller and Rock (1985) went on to posit a theory of dividend signalling.

Kane, Lee and Marcus (1984) examine, on U.S. data, abnormal stock returns generated by contemporaneous earnings and dividend announcements to see whether investors evaluate the two announcements in relation to each other, known as the corroborative effect. Their results are consistent with the hypothesis that earnings and dividend announcements are interpreted in relation to each other. Lonie, Abeyratna, Power, and Sinclair (1996) find similar results for UK data: that both earnings and dividend announcements jointly influenced the level of abnormal returns earned by companies.

Various factors are considered in deciding between increasing dividends and undertaking a share repurchase. Bartov, Kirinsky and Lee (1998), using US data, find the main factors include equity undervaluation, management compensation and institutional investors' holdings. For Canadian firms, De Jong, Van Dijk and Veld (2003) find the decision depends on behavioural and tax preferences, the existence of asymmetric information, and whether or not the company has executive stock option plans. Dittmar (2000) found that firms repurchase stock to take advantage of potential undervaluation and to distribute excess capital. In addition to this, however, firms also repurchase stock during some periods to alter their leverage ratio, fend off takeovers and counter the dilution effects of stock options.

Companies that enter into share buyback transactions often cite a desire to improve earnings per share (EPS) as a main reason (Grullon and Ikenberry, 2000). For example, share buybacks can be used to offset the dilutive effects of employee stock options upon reported earnings per share. However, just because the number of shares in the denominator of the EPS ratio following a buyback will decrease, it does not necessarily mean that EPS will increase. Gould (2008) conjectures that the impact on earnings from which a firm's resources are diverted must be considered in conjunction with the reduction in shares. The impact on EPS will be positive if the rate of after-tax earnings forgone from the buyback programme is less than the return on equity capital, and negative if the opposite is true. Share repurchases are theoretically superior to dividends for two reasons. The first of these is that a share repurchase "beats" a cash dividend by the amount of the tax savings from the tax basis which protects

some of the cash distribution from taxes, plus any subsequent earnings on the tax savings (Bierman, 2008). The second advantage is that shareholders who do not desire immediate cash flow will not sell and thus will save both the taxes and transactions costs related to reinvesting.

However, the above reasoning ignores the stock price effect that might occur if the market likes dividends and likes increasing dividends through time. This was found by Graham and Kumar (2006), who discovered on US data that the preference for dividend yield increases as investor age increases and decreases as investor income increases. In examining the effect of payout policy on institutional holdings Grinstein and Michaely (2005) found that paying a dividend attracts institutional investors. As conjectured by Black and Scholes (1974, p. 21), stock prices of firms that pay dividends "may change temporarily in response to a change in the dividend, because the market may believe that the change indicates something about the probable future course of earnings". However, this effect will disappear if it "becomes clear that the change was not made because of any changes in estimated future earnings".

A decreasing tendency for firms to make dividend payments and an increasing tendency for firms to repurchase shares is known as the "substitution effect" (Aharoni et al., 2011). Substitution requires firms to depart from their existing payout policies in order to undertake buybacks. Evidence for the United States prior to 2003 is indicative of the substitution effect being present (Fama and French, 2001; Grullon and Michaely, 2002; Skinner, 2008). Grullon and Michaely (2002), using US data find that firms have gradually replaced dividends with repurchases. However, Chetty and Saez (2005) discover that dividend payments in the U.S. increased by 20% following the tax reform of 2003; indicating the tax environment has an impact on the substitutability of repurchases for dividends. Further to this, repurchases by dividend initiators increased after 2003, suggesting that these firms were not simply substituting dividends for repurchases. Von Eije and Megginson (2008), using European Union (EU) data prior to 2004, find that, like in the US, the fraction of European firms paying dividends had declined, while the level of share repurchases had markedly increased. Further, although large scale share repurchases started much later in the EU, they have grown even more rapidly than the U.S. over the past decade.

Aharoni et al. (2011) introduce a variation of the substitution hypothesis which they call the soft substitution hypothesis. When either greater profitability or decreasing investment opportunities cause a firm to experience a situation where *higher* distributions to equity

holders are feasible, it has to choose a method to distribute these *additional* funds. In this case the firm has to choose between distributing these funds through dividends or share buybacks. The salient feature that distinguishes soft substitution is that it only concerns the choice between dividends and share buybacks when a firm has excess cash. By examining the payout behaviour of large Australian firms, they find evidence in support of the soft-substitution hypothesis. Any substitution that occurs in Australian firms does not involve a choice between dividends and repurchases, but the choice between increasing dividends and undertaking a repurchase. By and large, the preferred choice is to increase the dividend.

Jagannathan, Stephens and Weisbach (2000) provide evidence of the opposite choice in the US, finding that repurchases are used by firms with higher 'temporary', non-operating cash flows. Skinner (2008), also on US data, finds repurchases are used in place of dividends even for firms that continue to pay dividends, and that the primary determinant of repurchases is the level of earnings.

Aharoni et al. (2011) go on to provide information on the characteristics underlying share repurchases and payout policies in Australia. They find that firms which have increased their dividends are less likely to undertake a repurchase, and firms that increased dividends in the past are less likely to undertake a repurchase in the future. Additionally they find there is a high persistence in the choice of payout method. This means a firms that has increased dividends in the past is more likely to increase dividends in the future. However, share repurchases can be "habit forming" too. Bagwell and Shoven (1998) find the share-repurchase habit to be consistent with the clientele hypothesis, which asserts that firms specialise in how they transmit cash to their owners.

Aharoni et al. (2011) also found that repurchases are used as a signalling device. Firms that undertake a repurchase are signalling that the current negative trend in earnings is unlikely to continue in the future. Further to this, their results emphasise that repurchases signal a lower probability of a large deterioration in the firm's future prospects, rather than a high probability of a good outcome. By examining US. data, Ofer and Thakor (1987) find that both share repurchases and dividends are used as signals. Though they discover neither one dominates the other in all circumstances, in general there is larger information content in a repurchase than in a dividend.

In what follows the existence of abnormal returns will be examined, then compared over the three different announcement types. Explanations for the findings will be conjectured; and, then, the findings will be related to those of previous studies.

3. Hypotheses

Given the tax structure differences in the three countries and existing findings on US and Australian data, it would seem reasonable to predict that the reactions of New Zealand investors to buybacks and to dividends will be quite distinct from each other. Both the US and Australia have capital gains taxes, which implies that differences between these two countries are driven by how dividends are taxed. According to Aharoni et al (2011) it is the presence of the dividend imputation system (franking credits) in Australia that predisposes the Australians favourably towards dividend increases The existence of a dividend imputation system in New Zealand would encourage New Zealand investors to show a similar attitude towards dividends, since they become tax-neutral. However, the fact that there is no New Zealand capital gains tax would suggest on the other hand, that New Zealand investors should actually prefer share buybacks.

Do New Zealanders prefer buybacks over dividends is the research question. That preference is modelled in terms of the reaction of the marginal investor at or near the close of announcement day trading captured the form of an abnormal return. Hence, if abnormal returns are to be the workhorse variable employed in this paper, the first step is to determine whether the various buyback and dividend announcements furnish any of significance. The hypotheses, split out for the three announcement types, are stated in the null form and testing will be done by a simple *t*-test. H_1 covers two different types of buyback announcement. The first is the initial announcement, and the other is the follow-up-detail announcement, which we consider in order to get a better picture of the marginal investor's reaction. H_2 refers to earnings-and-dividend-increase announcements.

H_1: On the days of the buyback announcements there are no abnormal returns generated that are significant at the 5% level.

H_2: On the days of the dividend and earnings increase announcements there are no abnormal returns generated that are significant at the 5% level.

Since earnings-and-dividend announcements and the buyback announcements both imply or explicitly disclose an increase in earnings (or at the very least, excess cash on hand), it is

reasonable to expect abnormal returns to be observed on the announcement date where any specific influence of the earnings component should not skew the results.

The next set of hypotheses is designed to detect differences in abnormal returns across the announcement types. The primary measures of interest are size of ARs and sign. These can be determined from medians, means, proportion by sign and other basic characteristics of the AR sets. The tool for evaluating differences between sets will be a Kruskal-Wallis test, which evaluates median values. The two versions of buyback announcement will again be considered separately.

> **H_3:** There is no difference in investor reactions, in terms of abnormal returns, between buyback announcements and dividend-increase announcements at the 5% level of error in a Kruskal-Wallis test.

For completeness, differences between initial and follow-up-detail share repurchase announcement abnormal returns will be considered:

> **H_4:** There is no difference in investor reactions, in terms of abnormal returns, between *initial buyback* announcements and *follow-up-detail buyback* announcements at the 5% level of error in a Kruskal-Wallis test.

However, so far we have taken no account of firms employing both repurchases and dividends to return cash to shareholders. In narrowing our focus to observe the abnormal returns generated by these firms, we move closer to generating results that can be used to shed some preliminary light on the relevance of Aharoni et al's (2011) soft-substitution hypothesis in New Zealand.

> **H_5:** There is no difference in investor reactions between initial buyback announcements and earnings-dividend-increase announcements detectable by a Kuskal-Wallis test on abnormal returns for firms that have historically undertaken both forms of distribution.

We can also compare investor reactions between firms that only use one method, and firms that use both, again in terms of a Kruskal-Wallis test:

> **H_6:** There is no difference in investor reactions between initial buyback announcements for firms that don't increase dividends and buyback announcements for firms that do increase dividend payments.

H_7: There is no difference in investor reactions between dividend-increase announcements for firms that don't undertake buybacks and dividend-increase announcements for firms that do undertake initial buybacks.

If the predicted preference for repurchases is verified, it would suggest evidence the substitution hypothesis applies in New Zealand. But this turns out not to be the case.

4. Methodology and Data

We use the market model estimated on a 100-day estimation period to generate returns expectations and, from them, forecast abnormal returns into a 21-day test period centred on the day of a share repurchase or dividend announcement. This yields ten days worth of abnormal returns available immediately before and after the timing of the announcement for comparison with the day zero abnormal return. The returns fed into the market model's estimation process are log returns calculated from daily closing price and market index data.

The OLS market model has the following form:

$$\boldsymbol{R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon} \quad \textbf{(1)}$$

Here, $R_{m,t}$ is the return on the market, and $R_{i,t}$ is the observed arithmetic return for security i at date t. Define $A_{i,t}$ as the abnormal return for security i at day t. For every security, the excess return for each day in the event period using the OLS market model is defined as:

$$\boldsymbol{A_{i,t} = R_{i,t} - \alpha_i - \beta_i R_{m,t}} \quad \textbf{(2)}$$

Three-day cumulative abnormal returns (CARs) are also calculated over the test period. This is simply calculated as the sum of the 1-day abnormal returns over three day periods.

Daily data is used because a longer interval such as weekly or monthly would have greatly diminished the power of the tests. Mackinlay (1997) finds that the probability of detecting a given level of abnormal performance of a 5 percent test using daily data is 0.94, whereas the power using weekly and monthly data is a mere 0.35 and 0.12, respectively. This illustrates the severe trade-off between accuracy and computation time from increasing the interval.

All of the data used in this study comes from the 17-year period starting January 2003 and ending December 2009. Share buyback announcements were obtained from a data feed supplied by NZX Limited. This data feed was a four-thousand-page electronic transcript of all information released by firms in their buyback programmes, disclosure by disclosure. The share buybacks compiled for use in the study were companies' initial announcements of a distinctly new buyback programme, as well as the first announcement following the initial announcement which provided details on buyback price, quantity and buyback period. The company name and date of buyback were recorded for each relevant announcement. Obtaining this restricted information set required the filtering out of huge volumes of detail in the data feed that was extraneous to the study. This was done by converting the transcript into Excel files and employing Excel's sorting and filtering tools.

We then gathered a 121-day closing price information set and matching market index (NZX50) for each company-announcement starting 111 days prior to each announcement and ending ten days afterward. There prices were daily gross imputed adjusted prices provided in the NZX Company Deep Archive. This price and index information furnished company log returns and market log returns for the 100-day estimation period and 21-day test period. Where a firm did not trade during the 21-day market model test period, or for less than 30 days of the estimation period and test period combined, the company-announcement observation was dropped from the sample. This led to approximately half of the recorded announcements being removed, most of which were from before the year 2000. The final repurchase data set contains 86 initial and 68 follow-up-detail (or, alternatively, called 'detail announcement'), buyback announcements.

The dividend data used in the study was similarly restricted, and in several further ways. In the first instance, it was restricted to announcements made at the end of a company's year, which ruled out mid-year and other interim dividend announcements. In the second instance, since dividends are almost always announced in conjunction with earnings, the sample was restricted to announcements heralding increases in dividends along with increases in earnings, which were the good news (++) combination in Kane, Lee and Marcus (1984). This provided 298 dividend announcements over this period.

In addition, we locate the firms that make both dividend announcements and initial buyback announcements. The data set for this subsample consists of 43 initial buybacks and 101 dividend announcements.

5. Results and Discussion

5.1 Incidence of significant abnormal returns

The first result of interest pertains relates to the nature of abnormal returns associated with initial buyback announcements. In Table 1, the abnormal return generated by initial buybacks on the announcement date is strongly significant with a p-value of 0.0015. This allows H_1 to be rejected. The average day zero mean abnormal return is 1.14%, which is 2.3 times larger than the largest mean return in the test period prior to the announcement, which occurs on day t_{-9} and which also turns out to be significant, although this significance is likely to be random. Immediately following day zero, there is a significant abnormal return on day t_{+1}, which is indicative of a slow-ish news take-up by investors; but the size of abnormal returns falls sharply back into insignificance on day two.

Table 1: Initial Buyback Abnormal Returns

	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
Day -10	0.8723	0.0002	0.0119	0.0437	-0.0273	0.0001	0.8027	2.5784
Day -9	0.0381	0.0049	0.0215	0.1238	-0.0381	0.0002	2.6597	11.4803
Day -8	0.5501	-0.0010	0.0152	0.0293	-0.0426	0.0007	-0.7574	1.0103
Day -7	0.2261	0.0029	0.0224	0.1600	-0.0264	0.0002	4.2968	28.4939
Day -6	0.5397	-0.0011	0.0165	0.0420	-0.0731	-0.0002	-1.3725	4.9274
Day -5	0.7793	-0.0007	0.0227	0.0934	-0.0828	0.0008	-0.1638	5.4708
Day -4	0.9985	0.0000	0.0207	0.1016	-0.0503	-0.0006	1.5195	7.1108
Day -3	0.7636	-0.0005	0.0165	0.0428	-0.0682	-0.0006	-0.6483	3.5776
Day -2	0.8248	0.0008	0.0337	0.1304	-0.2142	0.0009	-2.5028	21.1147
Day -1	0.1336	0.0037	0.0229	0.1425	-0.0348	0.0004	3.1950	16.3080
Day 0	0.0015	0.0114	0.0320	0.1701	-0.0782	0.0047	1.9389	8.4093
Day 1	0.0158	0.0093	0.0351	0.1450	-0.0556	0.0020	1.6442	4.4758
Day 2	0.4831	0.0016	0.0205	0.0826	-0.0606	0.0009	0.4768	3.1433
Day 3	0.2168	-0.0030	0.0220	0.0484	-0.1039	-0.0011	-1.1796	5.0140
Day 4	0.6070	0.0014	0.0249	0.1081	-0.0761	0.0006	0.2303	4.0942
Day 5	0.6973	0.0008	0.0182	0.0849	-0.0393	-0.0008	1.5099	5.4542
Day 6	0.9198	0.0002	0.0221	0.1466	-0.0576	-0.0003	3.1754	22.4779
Day 7	0.6960	0.0011	0.0258	0.1516	-0.0786	-0.0004	1.9421	13.8835
Day 8	0.8228	0.0004	0.0183	0.0712	-0.0934	0.0004	-1.1323	9.8681
Day 9	0.2798	0.0022	0.0187	0.0782	-0.0604	0.0007	1.0338	5.9884
Day 10	0.3207	0.0016	0.0147	0.0461	-0.0424	0.0015	0.2693	1.8663

The standard deviations on these days, 3.20% and 3.51% respectively, are also larger than all but one of the days in the test period. This shows that the returns on these days are spread out over a large range of values around the mean. In addition, both days have positive skewness and are more outlier-prone than the normal distribution (as measured by the kurtosis values).

The pattern of 3-day cumulative abnormal returns (CAR) in Table 2 reinforces the above findings. Again H_1 can be rejected. The CAR starting one day prior to the announcement furnishes the highest mean in Table 2 at 2.44%; and the standard deviation of this CAR at 5.58% is larger than any of the other CAR standard deviations. This is backed up with positive skewness and relatively large kurtosis, indicative of a positive sprawl towards greater levels of enthusiasm by some marginal investors.

Table 2: Initial Buyback 3-day CARs

	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
CAR -3	0.2050	0.0041	0.0298	0.1770	-0.0456	-0.0004	2.7062	13.0847
CAR -2	0.7281	0.0012	0.0308	0.1620	-0.0839	0.0010	1.3815	8.6727
CAR -1	0.9577	0.0003	0.0464	0.1991	-0.2184	0.0025	-0.3217	8.6068
CAR 0	0.0001	0.0244	0.0558	0.3273	-0.0736	0.0101	2.4505	10.5354
CAR 1	0.9975	0.0000	0.0319	0.0788	-0.0763	0.0018	-0.0887	0.0955
CAR 2	0.6190	0.0021	0.0389	0.2137	-0.0724	-0.0026	2.6058	11.7762
CAR 3	0.1655	0.0042	0.0280	0.0794	-0.0878	0.0050	-0.3388	2.2526

Table 3 presents results for the follow-up-detail buyback announcements. Although the day zero abnormal return is not significant, can reject the null of H_1 on days t_{-1} and t_{+1}. When coalesced into CARs in Table 4, the extended announcement period yields a strongly significant CAR ($p = 0.0002$) with mean 2.71% and standard deviation of 5.76% that stand out in a plain of six other quite insignificant CARs. Again, the day zero CAR has positive skewness; which indicates the returns are spread to the right of the mean. This implies that the set of marginal investors in these announcement observations tended to contain a larger fringe set of optimists who bid their stock's price up than of pessimists who either did little to the existing stock value or bid it down. This reinforces the finding of a positive mean around the announcement date. In addition the data has a 'tighter' distribution than the normal distribution; which indicates the data is less outlier prone.

Table 3: Follow-Up-Detail Buyback Abnormal Returns

	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
Day -10	0.8359	0.0004	0.0177	0.042	-0.0368	-0.0002	0.2354	0.2963
Day -9	0.8626	0.0004	0.019	0.0852	-0.0614	-0.0009	1.1504	6.9894
Day -8	0.2904	-0.0031	0.0238	0.0723	-0.1066	-0.0038	-0.6128	6.1617
Day -7	0.4937	-0.004	0.0485	0.1313	-0.3229	-0.0005	-4.2213	29.1894
Day -6	0.0180	0.0074	0.0253	0.1176	-0.0284	0.0017	2.4579	7.2047
Day -5	0.2981	-0.0025	0.0195	0.048	-0.0641	-0.0011	-0.7906	2.3296
Day -4	0.9641	-0.0001	0.0148	0.0381	-0.0457	-0.0004	-0.2243	1.3873
Day -3	0.4031	-0.0025	0.0241	0.0364	-0.138	-0.0008	-3.0066	15.4148
Day -2	0.6148	0.0016	0.0255	0.1208	-0.0777	0.0007	1.2588	7.7866
Day -1	0.0263	0.0057	0.0206	0.0951	-0.0346	0.0012	1.5934	4.5659
Day 0	0.1018	0.0065	0.0325	0.1081	-0.1066	0.0051	-0.2181	3.0339
Day 1	0.0030	0.0148	0.0397	0.2503	-0.0662	0.0058	3.2918	18.1845
Day 2	0.7011	-0.0014	0.0304	0.0993	-0.1516	0.0005	-1.4749	9.3274
Day 3	0.8191	-0.0005	0.0178	0.061	-0.0477	0.0002	0.0824	1.9603
Day 4	0.0612	-0.0033	0.0145	0.0357	-0.0597	-0.0002	-0.8689	2.9782
Day 5	0.9651	-0.0002	0.0311	0.1316	-0.1311	-0.0012	-0.2379	9.6907
Day 6	0.6955	0.0013	0.0265	0.1638	-0.0553	0.0007	3.2292	20.944
Day 7	0.4212	-0.0032	0.0327	0.1409	-0.1295	-0.0007	-0.2906	9.2813
Day 8	0.7381	-0.0012	0.0292	0.1779	-0.099	-0.0015	2.8146	22.9111
Day 9	0.3640	-0.0018	0.0159	0.0542	-0.0493	-0.0015	0.4278	4.0434
Day 10	0.2502	-0.0021	0.0151	0.0349	-0.0401	-0.0003	-0.2011	0.5101

These results indicate that while we cannot say there is evidence for one day abnormal returns at either the 95% or 99% levels of significance on the announcement date, we can say there is evidence for abnormal returns around the event date based on the results of the *t*-test on CARs and related descriptive statistics.

Table 4: Follow-Up-Detail Buyback 3-day CARs

	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
CAR -3	0.6474	-0.0022	0.0400	0.1330	-0.1108	-0.0010	0.1723	2.6874
CAR -2	0.8996	0.0009	0.0598	0.2970	-0.3067	0.0020	-0.2819	18.4910
CAR -1	0.7705	-0.0010	0.0275	0.0663	-0.0790	0.0018	-0.5456	1.5385
CAR 0	0.0002	0.0271	0.0576	0.2235	-0.1178	0.0192	0.8906	2.6523
CAR 1	0.2481	-0.0053	0.0372	0.0967	-0.1377	-0.0003	-0.8822	2.6463
CAR 2	0.6470	-0.0021	0.0379	0.0672	-0.1870	0.0011	-2.0249	7.9933
CAR 3	0.2794	-0.0051	0.0384	0.1980	-0.1298	-0.0040	1.7857	12.1762

We turn now to abnormal returns furnished by earnings-and-dividend increase announcements. The results in Table 5 are strongly significant for the announcement date and the day following ($p = 0.000$), allowing us to reject H_2 (that there are no significant abnormal returns). The announcement date has a very large kurtosis value of 34.05, which indicates the day zero abnormal returns are much more widely dispersed than the normal distribution. In addition, the standard deviation on this day of 4.85% is substantially bigger than any other day in the test period. However, unlike all the buyback announcements, the dividend announcements have a relatively large negative skewness of -3.0273. This indicates that while the mean return is positive at 1.56%, the abnormal return distribution is asymmetric in a negative direction. However, this does not mean there are more negative returns on this day compared to the buyback announcements, as the dividend announcements have a larger mean abnormal return. These results provide strong evidence indicating the presence of abnormal returns on the announcement date, as well as the days either side for dividend announcements.

Table 5: Earnings-and-Dividend Increase Abnormal Returns

	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
Day -10	0.7423	-0.0004	0.0218	0.0959	-0.2024	-0.0004	-2.6165	27.4788
Day -9	0.0108	-0.0024	0.0163	0.0494	-0.0636	-0.0005	-0.6738	2.4991
Day -8	0.2972	0.0011	0.0177	0.0901	-0.0986	0.0002	0.0529	6.9941
Day -7	0.5930	-0.0005	0.0173	0.0988	-0.0787	-0.0007	0.1633	7.5076
Day -6	0.0797	0.0018	0.0174	0.0644	-0.1541	0.0001	-2.2172	24.0266
Day -5	0.1715	0.0015	0.0183	0.1206	-0.0468	-0.0005	2.0244	10.7588
Day -4	0.0575	-0.0016	0.0142	0.0554	-0.0682	-0.0005	-0.6801	4.1321
Day -3	0.0513	0.0021	0.0182	0.1141	-0.0581	-0.0003	1.3809	8.6406
Day -2	0.6349	0.0005	0.0178	0.0784	-0.1085	-0.0002	-0.4278	8.6583
Day -1	0.0166	0.0033	0.0237	0.1468	-0.1528	0.0001	0.8420	14.3130
Day 0	0.0000	0.0156	0.0485	0.1570	-0.4674	0.0067	-3.0273	34.0468
Day 1	0.0000	0.0088	0.0289	0.2015	-0.0913	0.0016	1.6140	8.5455
Day 2	0.2889	-0.0013	0.0212	0.0600	-0.1207	-0.0002	-0.8198	4.7252
Day 3	0.5764	0.0007	0.0201	0.1273	-0.0699	-0.0006	1.2505	8.0027
Day 4	0.2848	0.0010	0.0168	0.0936	-0.0604	-0.0001	0.8629	4.3919
Day 5	0.5222	-0.0007	0.0192	0.1795	-0.0837	-0.0006	2.3066	27.0339
Day 6	0.5272	-0.0007	0.0193	0.0665	-0.2103	-0.0002	-4.2619	47.1656
Day 7	0.7804	-0.0003	0.0204	0.1449	-0.1507	-0.0007	0.1775	20.2843
Day 8	0.3858	-0.0010	0.0200	0.0941	-0.1487	-0.0002	-0.5734	13.2234
Day 9	0.4260	0.0009	0.0188	0.1337	-0.0785	-0.0002	1.1278	10.5129
Day 10	0.3236	-0.0010	0.0180	0.0769	-0.0752	-0.0006	-0.2726	4.7845

Results of a similar quality are furnished for earnings-and-dividend increase CARS in Table 6.

Table 6: Earnings-and-Dividend Increase 3-day CARs

	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
CAR -3	0.3190	-0.0018	0.0305	0.1125	-0.2020	-0.0002	-1.0169	7.1057
CAR -2	0.1527	0.0027	0.0324	0.1925	-0.1520	-0.0011	0.7345	6.2329
CAR -1	0.5696	0.0010	0.0298	0.1773	-0.1102	-0.0011	1.0401	7.3196
CAR 0	0.0000	0.0277	0.0585	0.2806	-0.4700	0.0203	-1.3715	18.6724
CAR 1	0.8459	0.0004	0.0343	0.1290	-0.1385	0.0000	-0.1093	2.4655
CAR 2	0.3831	-0.0018	0.0346	0.2165	-0.2071	-0.0017	-0.0243	11.1152
CAR 3	0.5019	-0.0012	0.0301	0.1130	-0.1201	-0.0017	0.0745	2.9185

5.2 Comparisons of Abnormal Returns from Buybacks and Dividends

To test for differences in abnormal returns distributions between buyback and earnings-and-dividend-increase announcements, we perform Kruskal-Wallis tests. The chi-square statistics and p-values are presented in Table 7.

Table 7: Kruskal-Wallis Test Output and Related Descriptive Statistics

Type	Chi-square statistic	Prob>Chi-square (p-value)	Difference in means	Difference in medians
ARs: Initial BB v Dividend	611.85	0.0000	0.42%	0.20%
CARs: Initial BB v Dividend	611.85	0.0000	0.33%	1.02%
ARs: Detail BB v Dividend	588.43	0.0000	0.91%	0.16%
CARs: Detail BB v Dividend	588.42	0.0000	0.06%	0.11%
ARs: Initial BB v Detail BBs	238.00	0.0000	0.49%	-0.04%
CARs: Initial BB v Detail BB	237.99	0.0000	-0.27%	-0.91%

The first row of Table 7 records the results of earnings-and-dividend increase announcement abnormal returns versus those generated by initial buyback announcements. The Chi-square statistic is 611.85 ($p = 0.0000$). This clearly rejects H_3: that there is no difference between the abnormal returns of the two types of announcement. The mean abnormal return on day zero for initial buyback announcements is 1.14% (standard deviation 3.2%) while the

corresponding dividend mean return is 1.56% (standard deviation 4.85%). Although the mean return only differs by 0.42 percentage points and the standard deviation differs by 1.65 percentage points, the strength of the rejection warrants some investigation of further properties of the two abnormal return distributions. The kurtosis values for initial buybacks and dividends are 8.4093 and 34.0468, respectively. This indicates that the dividend distribution of returns has substantially more outliers than the initial buyback distribution. Therefore, the dividend distribution of returns is much flatter and widely dispersed than the initial buyback distribution. To analyse where most of the outliers are we consider skewness. The value of skewness for dividends is -3.0273, indicative of a leftward spread to the data a. This is in contrast to the positive value of skewness of 1.9389 for initial buybacks. This is quite a substantial point of difference, implying there are more extreme negative values of abnormal returns for dividends than for initial buybacks. These measures indicate that the distributions of these two announcement samples are very different.

This rejection is repeated, with respect to CARs in the second row of Table 7. We also see the strong rejection repeated in the case of follow-up-detail abnormal returns versus earnings-and-dividend-increase abnormal returns in the third row, and their CAR equivalents in the fourth row.

The final two rows of Table 7 furnish the Kruskal-Wallis results when the two types of buyback announcement are compared. The chi-square statistic obtained in the fifth row with respect to abnormal returns with a value of 238 is the smallest value thus far. However, this is still a very large value, and the corresponding p-value is still zero to four decimal places. We are therefore able to reject the null of H_4, which posited no difference between the two types of buyback. The initial buyback announcement has clearly more news value as mean abnormal return is nearly double that of the detail-return.

An interesting finding is obtained by looking at the 3-day CAR distribution of each. While both exhibit positive skewness (indicating that the marginal investors in different companies across the data set react to the two announcement types positively on the whole), the initial buyback distribution is platokurtic while the follow-up-detail distribution is leptokurtic. It has a kurtosis value of only 2.65, which is less than the normal distribution. This implies that the marginal investors have reacted similarly to each other to the announcement of new details.

The abnormal return distribution for share buybacks has a positive skewness in conjunction with a large kurtosis value. This is interesting because it is in contrast to the finding on the

dividend data set. There are some intuitive and appealing explanations for why this is the case.

The first of these is related to the tax environment facing investors when they sell shares. In New Zealand there is currently no capital gains tax related to the sale of shares; unless an investor buys and sells shares frequently. Dividends, however, are taxed at an investor's personal income tax rate. When investors participate in a share buyback they are, therefore, not exposed to the value-eroding effect of taxes. The ability of investors to avoid taxes is clearly an attractive attribute of share buybacks, to which investors respond positively. Grullon and Michaely (2002) find strong evidence that US firms use share repurchases as a substitute for ordinary dividends. The US economy has no form of dividend imputation credits, so dividends are tax disadvantaged relative to realised capital gains.

A potential explanation as to why investors react more positively to dividends is provided by the argument that buybacks have signalling value. Aharoni et al. (2011) find evidence which suggests that firms which use repurchases are firms that tend to have suffered a decrease in earnings in the year prior to the buyback. They use repurchases to assure investors this decline is not indicative of a large deterioration in the firm's future prospects.[2] A share buyback announcement will therefore lead to a positive revision if shareholders had significantly downgraded their view on the firm's future prosperity upon extant evidence of earnings reduction. Just as shareholders view an increase in dividends as meaning firms have upgraded their expectation of future earnings (Lintner, 1956; deAngelo et al, 2006), they view buyback announcements as a signal by firms that the recent decline in earnings will not continue in the future. Clearly, dividend initiation and increase announcements signal more positive news than buyback initiations. This could partially explain the more positive reaction to dividend announcements.

The flexibility of buyback announcements, in that shareholders do not have to sell their shares if they choose not to, minimises the potential for negative reactions to buyback announcements. When a firm announces a dividend payment, if investors do not want dividends they will have to sell their shares to avoid them. On the other hand, if a firm initiates a share buyback programme, investors have the choice to opt in (or not) to this

[2] They are signalling to investors that a very bad scenario is unlikely rather than that future earnings are going to be good.

distribution plan. This is a likely explanation for the greater propensity for a positive reaction to buybacks, resulting in the positive skewed abnormal return distribution.

5.3. Initial Buyback Announcements vs. Dividends for firms that do both

We now cover the results for firms that undertake both forms of distribution over the period 1993-2009. These results appear in Table 8, which addresses $\mathbf{H_5}$ and Table 9, which addresses $\mathbf{H_6}$, both of which hypotheses are easily rejected. Day zero earnings-and-dividend-increase announcements in Table 8 have a 2.06% mean abnormal return (p-value of 0.000) with a standard deviation of 3.80 %. This mean is larger than the mean for all dividend announcements by half a percentage point (1.56% in Table 5). Further to this, the distribution of dividend-increase announcements of firms that also perform buybacks in Table 8 has a positive skewness (0.8525 versus -3.0273 in Table 5) and is strongly leptokurtic (1.3711 versus the platykurtic 34.068 of Table 5). This implies that shareholders of these firms react more positively than shareholders of firms that do not perform buybacks.

Table 8: Dividend Announcement Abnormal Returns by Share-Repurchasing firms

Day	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
Day -10	0.1598	0.0024	0.0167	0.0640	-0.0430	-0.0002	0.6141	2.1956
Day -9	0.0484	-0.0028	0.0140	0.0368	-0.0636	-0.0011	-1.3266	5.3331
Day -8	0.7114	-0.0007	0.0181	0.0504	-0.0986	0.0003	-1.3518	8.4573
Day -7	0.9034	0.0002	0.0136	0.0584	-0.0528	-0.0006	0.2966	5.7060
Day -6	0.2650	0.0015	0.0134	0.0392	-0.0570	0.0002	0.0247	4.1147
Day -5	0.7275	0.0007	0.0191	0.1067	-0.0455	-0.0004	1.9466	10.1415
Day -4	0.5378	-0.0009	0.0139	0.0554	-0.0476	-0.0001	-0.0199	3.9366
Day -3	0.5592	0.0009	0.0155	0.0565	-0.0565	-0.0007	-0.3019	3.9002
Day -2	0.0768	0.0030	0.0168	0.0746	-0.0347	0.0006	0.8805	3.3517
Day -1	0.9913	0.0000	0.0215	0.0495	-0.1528	0.0001	-3.4030	25.0743
Day 0	0.0000	0.0206	0.0380	0.1483	-0.0649	0.0114	0.8525	1.3711
Day 1	0.0014	0.0098	0.0302	0.2015	-0.0564	0.0028	2.8142	15.6484
Day 2	0.9557	-0.0001	0.0197	0.0466	-0.0759	0.0007	-0.5813	2.3635
Day 3	0.7086	0.0006	0.0164	0.0671	-0.0398	-0.0006	0.7175	3.6283
Day 4	0.0469	0.0032	0.0162	0.0559	-0.0293	0.0010	0.7698	1.0754
Day 5	0.2503	-0.0020	0.0172	0.0441	-0.0837	-0.0006	-1.0631	5.1139
Day 6	0.6953	-0.0006	0.0153	0.0571	-0.0479	-0.0008	0.6296	2.6604
Day 7	0.7159	0.0009	0.0261	0.1449	-0.1507	-0.0002	-0.2569	19.8620
Day 8	0.1826	-0.0033	0.0244	0.0941	-0.1487	-0.0007	-1.6418	14.0948
Day 9	0.6924	0.0007	0.0176	0.0650	-0.0662	-0.0008	0.2368	3.6227
Day 10	0.5764	-0.0010	0.0186	0.0769	-0.0752	-0.0011	-0.5689	6.9961

This is supported by the Kruskal-Wallis test performed on the abnormal returns of firms that pay just dividends and firms that perform both types of distribution. The chi-statistic for this test in Table 10 is 631.94 (pr > chi = 0.0000); which tells us the two types of distribution are sufficiently different for $\mathbf{H_7}$ which posits no difference. The implication is that investors of this subset of firms react more favourably to dividend announcements. It is interesting in Table 8 that a much smaller mean abnormal return with much larger kurtosis is also strongly significant on day t_{+1}.

Table 9 furnishes results obtained with respect to the abnormal returns from initial buybacks of firms that also pay dividends. But this time we see little change from the original results in Table 1. The mean day zero abnormal return in Table 9 of initial buybacks from firms that use both distribution methods is almost identical to the day zero mean of all initial buybacks, as is the standard deviation of each. Yet the Kruskal-Wallis test for differences between abnormal return distributions furnished where only buybacks are ever offered and where firms have also a dividend tradition is still strongly significant in Table 10 with a chi-square of 201.14 (pr>chi = 0.0000).

Table 9: Initial Buyback Announcement Abnormal Returns for Firms that issue Dividends

Day	p-value	Mean	StdDev	Max	Min	Median	Skewness	kurtosis
Day -10	0.4436	0.0016	0.0134	0.0437	-0.0249	0.0008	0.6650	1.7555
Day -9	0.0492	0.0076	0.0246	0.1238	-0.0213	0.0023	3.0239	11.9072
Day -8	0.2647	-0.0023	0.0136	0.0293	-0.0426	-0.0001	-0.9511	2.5551
Day -7	0.5428	0.0015	0.0158	0.0575	-0.0250	-0.0006	1.2616	2.8697
Day -6	0.5183	0.0012	0.0118	0.0420	-0.0232	-0.0002	0.8435	2.7593
Day -5	0.2063	-0.0039	0.0201	0.0456	-0.0752	-0.0006	-0.8710	3.4040
Day -4	0.4611	0.0028	0.0251	0.1016	-0.0503	-0.0002	1.5284	5.7187
Day -3	0.0485	-0.0046	0.0149	0.0260	-0.0405	-0.0015	-0.4861	0.3706
Day -2	0.1332	0.0061	0.0261	0.1304	-0.0290	0.0023	2.5950	11.5466
Day -1	0.7107	0.0015	0.0258	0.1425	-0.0297	-0.0036	4.0183	21.3895
Day 0	0.0223	0.0118	0.0326	0.1314	-0.0782	0.0048	0.9119	4.1875
Day 1	0.4110	0.0048	0.0382	0.1450	-0.0556	0.0017	1.6464	4.7200
Day 2	0.8303	0.0006	0.0193	0.0481	-0.0606	0.0027	-0.6061	2.4407
Day 3	0.8689	-0.0006	0.0246	0.0460	-0.1038	0.0012	-1.6824	6.8030
Day 4	0.8733	-0.0007	0.0296	0.1081	-0.0761	0.0000	0.5402	4.0095
Day 5	0.2594	0.0033	0.0188	0.0849	-0.0260	-0.0001	2.0369	7.4708
Day 6	0.0703	-0.0043	0.0150	0.0183	-0.0576	-0.0012	-1.4151	3.7567
Day 7	0.3745	0.0042	0.0303	0.1516	-0.0786	-0.0006	2.4090	13.8848
Day 8	0.4463	-0.0023	0.0198	0.0238	-0.0934	0.0001	-2.5884	10.4592
Day 9	0.2353	0.0030	0.0163	0.0753	-0.0333	0.0012	1.9368	8.7910
Day 10	0.2437	0.0027	0.0148	0.0461	-0.0424	0.0025	-0.2030	2.4531

Returning to Table 9 it becomes clear that what is strongly different is that the skewness and kurtosis values for the reduced data set are half the size of the original initial buyback data set. This means that there is a greater propensity for investors in firms that don't pay dividends to react more favourably to buyback announcements than investors in firms that also pay dividends. In other words the tradition of a firm's paying dividends appears to act as a dampener on the marginal investors' enthusiasm for the buybacks it might offer. Combining the buyback result in Table 9 with the dividend result in Table 8, it is clear there is a greater propensity (relative to the results in Table 1 and Table 3) for investors in buyback initiating companies to react favourably to dividend announcements, while reacting less favourably to buybacks if there is a history of dividend payments.

We now discard all observations of firms that only ever offer one of the two forms of cash distribution (buyback or ordinary dividend) and focus on the abnormal returns distributions for buyback announcements and for earnings-and-dividend increase announcements associated with companies that use or have used both forms. A direct comparison of the two distributions in this specialised subset yields a Kruskal-Wallis chi-square statistic of 225.74 (pr>chi-sq = 0.0000) in Table 10, allowing us to reject the null form of $\mathbf{H_7}$.

The gap between dividend and initial buyback mean abnormal returns increases from 0.42 to 0.88 percentage points. This implies that investors of these firms react more favourably to dividend announcements than they do buyback announcements. Further to this, they react more favourably than the average firm in the original dividend data set. As a result, we are able to infer, from this data set, that investors in New Zealand firms prefer dividends to share buybacks. This finding is similar to the result obtained comparing the original data sets, except this finding is much more significant; given the change from a platokurtic data set with negative asymmetry to a leptokurtic data set with positive asymmetry.

Table 10: Kruskal-Wallis Test Output for Reduced Data-set

Type: (A) vs (B)	Chi-square statistic	Prob>Chi-sq	Mean A- Mean B	Median A-Median B
Buybacks vs. Dividends	225.74	0.0000	-0.88%	-0.66%
Dividends with buyback vs. Dividends without buyback	631.94	0.0000	0.50%	0.47%
Buybacks with dividends vs. Buybacks without dividends	201.14	0.0000	0.04%	0.01%

These findings provide some support for the soft substitution hypothesis of Aharoni et. al (2011) on Australian data. While the tax situation is different between the countries given that Australia has a capital gains tax, we still see a preference for dividends over share buybacks. Although this study makes no inferences about what distribution method is used more often, either in terms of frequency or dollar value, we can infer that investors' reaction to dividends relative to buybacks would encourage firms to distribute through a dividend distribution. The soft substitution hypothesis concerns the decision firms face where even higher distributions to equity holders are feasible. It is possible that dividends will continue to be the main payout method, but that share buybacks are used to distribute any additional earnings. This would explain the tendency for New Zealand marginal investors to react in a more uniformly positive manner to share buybacks, than to dividends, which overall have a more widely dispersed distribution with a greater propensity for a negative skew. Nevertheless, earnings-and-dividend increase announcements generate, on average, a more enthusiastic response as shown by the larger mean abnormal return. The results of this paper provide support in favour of soft substitution in New Zealand, but not traditional substitution

5. Conclusion

Evidence from US studies suggests that there has been a shift from dividends being the preferred distribution method to repurchases being the main payout method. This is symptomatic of the tax situation in the U.S; where repurchases are tax advantaged relative to dividends. However, the opposite finding is attained on Australian data, where dividends continue to be the preferred distribution method. Again, this is largely due to the tax situation in Australia; which has a dividend imputation system and capital gains tax.

By examining New Zealand data it is discovered that the marginal investor prefers to receive a dividend increase over being offered a share repurchase. While there is a greater propensity for investors to react negatively to dividends relative to repurchases, the average investor prefers dividends. This is an interesting result considering repurchases are tax advantaged by the level of investors' personal income tax rate. Given that the results of the studies on US and Australian data are largely driven by the tax situation in each country in that the tax-advantaged method is preferred, it reasonable to conclude that the neutralisation of tax implications delivered by the dividend imputation system trumps the absence of a capital

gains tax. Further, one would posit that the adoption of a capital gains tax in New Zealand would not change this preference for dividends.

Nevertheless, the undeniably positive propensity of the marginal investor to react favourably to repurchase announcements in New Zealand is an appealing result. Part of this uptick may well be associated with the signalling content of repurchases in informing investors that any decline in earnings experienced recently is only temporary, as proposed by Aharoni et al (2011) on Australian data. More generally, there must be some advantage in a cash distribution method that is an opt-in one as distinct from compulsory to the recipient; and to one that, for many investors, is not taxed.

This paper has several limitations. It uses only very simple diagnostics. Second, part of its credibility rests on the assumption that investors will view both types of cash disbursement announcement as containing a message about the firm being cash rich. We would argue that the cash-richness of either announcement type puts them on an even footing for comparison. In the case of the dividend announcements, the cash richness is explicitly given by an earnings figure. In New Zealand, DPS information is joined at the hip to EPS information, given the standard practice of announcing dividends along with initial disclosures of company financial reports to the Stock Exchange. In the case of share repurchases, the fact that the firm has the cash to do the repurchasing implies it either has the wealth on hand or the prospect of generating it. But if this equal-footing assumption is rejected, then the paper's main finding becomes, to some extent, less tenable.

We would argue that that extent is, if anything, made smaller by the evidence provided in the case of reactions to dividend and repurchase announcements by companies undertaking both types of distribution. The findings from this analysis implied that investors of these companies prefer dividends twice as much as they do repurchases. Further, this provides evidence for New Zealand in favour of the results found in Australia by Aharoni et al; in that dividends are still the preferred distribution mechanism.

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