

Share repurchases in different taxation systems ¹

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Current Draft: 23rd November, 2017

¹This paper originated from Rhys Allan's honours project. We thank Graeme Guthrie and participants at the Victoria University 2017 Honour's Symposium.

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Abstract

This paper examines whether tax policy influences a firm share repurchase decision. Using firm-level data from single and double dividends taxation system, we find that firms in a single dividend taxation system repurchase fewer shares than those in a double. We find that repurchases by firms in a single dividends taxation system are less sensitive to cash flow than firms with a double taxation system. We find that firms in a single dividends taxation system use share repurchases to distribute non-operating income, however, do not use repurchases to distribute operating income. In contrast to past literature, we find that firms in a double dividends taxation system use share repurchases to distribute both operating and non-operating income. We also find evidence consistent with past literature that suggests share repurchases are complements rather than substitutes to cash dividends.

1 Introduction

While there are numerous studies about share repurchases in the United States, research on countries outside of the United States is limited, particularly in countries with a dividend imputation system. Previous research documents that firms in the United States use share repurchases to distribute non-operating income, and dividends to distribute operating income (Jagannathan, Stephens, and Weisbach, 2000). However previous research has overlooked how an imputation system would affect this relationship. The United States has a ‘double’ dividend taxation system whereas New Zealand and Australia have a ‘single.’ The two systems differ due to an imputation credit² which a company in New Zealand or Australia passes on to investors, so the individual investor does not pay a ‘doubled tax’ (i.e. does not pay both corporate tax and personal income tax).

In this paper, we fill this gap in academic research and expand the current knowledge of corporate share repurchase policy in different tax systems. Grullon and Michaely (2002) show that repurchases are an important form of payout for U.S. corporations. Also, firms finance share repurchases with cash that otherwise could be used to increase cash dividends. Using firm-level data from seven major countries including Australia, Lee and Suh (2011) examine the patterns and determinants of a share repurchase. However, they ignore the crucial fact that Australia has an imputation credit which is a possible explanation for why their general result does not apply to Australian firms. For example, Lee and Suh (2011) find that for Australia, an extremely high percentage of firms only distribute cash through dividends and that cash holdings are not a statistically significant determinant of share repurchases. Additionally, Rau and Vermaelen (2002) find that tax changes have had a significant impact on the importance and method of share repurchase in their study of the United Kingdom. We contribute to the literature by investigating how different dividend tax systems affect firms share repurchase decisions.

Our dataset is constructed using data collected from via Wharton Research Data Services (WRDS) from Compustat Global Fundamentals Annual for firms in New Zealand and Australian and Compustat North American Fundamentals Annual for firms in the United States. We include observations from New Zealand, Australia, and the United States over the period 1994

²Imputation is often referred to as ‘franking’ credit in Australia.

to 2016. We focus on these three countries because as mentioned above New Zealand and Australia both have an imputation credit attached to dividends, while the United States provides a well-researched benchmark to compare our findings too.

We summarise our key findings as follows. Firstly, single dividends taxation countries undergo fewer share repurchases than countries with a double dividends taxation system. The percentage of firms in New Zealand and Australia that undergo a share repurchase is extremely small relative to the US. The amount of cash, as a percentage of total assets that New Zealand and Australian firms payout in share repurchases is also relatively small. However, for the firms that do repurchase shares in New Zealand and Australia, the share repurchases are larger (as a percentage of total assets), which we put down to regulatory restrictions. Furthermore, we find that the sensitivity of cash flow in explaining share repurchase size is higher in a double dividends tax system than a single. We find that US firms use share repurchases to distribute both non-operating income and operating income, while firms in New Zealand and Australia use share repurchases just to distribute non-operating income. The results we present for firms in the United States contradict the results of Jagannathan, Stephens, and Weisbach (2000) who claim that share repurchases are used to distribute non-operating income while dividends are used to distribute operating income.

Our investigation also confirms several important determinants of share repurchases. Lee and Suh (2011) advances that large cash holdings are a key motive for share repurchases but fail to support this with evidence from Australia. Likewise, we come to a similar outcome using United States data, but our findings using Australia and New Zealand fail to support a relationship between cash holdings and share repurchases, which suggests that cash holdings do not affect firm share repurchases decisions in a single dividend taxation system. Furthermore, across countries, firms do not appear to substitute cash dividends for share repurchases, but rather use share repurchases as a complement to dividends.

To our knowledge, we are the first to test how long-term debt due in one year affect firms share repurchase decisions. We find that debt due in one year negatively affects both share repurchase size and the propensity to undergo a share repurchase in the US. Results indicate that if a firm has long-term debt due in one year, a firm is less likely to undergo a share repurchase and will also repurchase fewer shares. Additionally, we find that the sensitivity

of divestments to share repurchase size and the propensity to undergo a share repurchase is negative for our sample of US firms. Indicating that after divestments firms do not repurchase shares with the proceeds raised. We offer a possible explanation for this which suggests that the firms that are making divestitures are those who are under financial stress and are selling off assets in an attempt to stay afloat.

We organise our paper as follows. Section 2 reviews the literature on why firms repurchase shares. Section 3 reviews the institutional and legal environment regarding share repurchases. Section 4 develops the hypotheses. Section 5 details the dataset and variable construction. Section 6 develops the testing approach and the reports results from testing our hypothesis. Section 7 conducts robustness tests and discusses the results. Section 8 concludes.

2 Literature Review

2.1 Why do firms repurchase shares?

Firms repurchase shares for several reasons. The Vermaelen (1981) information signal theory suggests that when a firm repurchases its own shares, it signals to investors that it is undervalued. While Jensen (1986) cash flow distribution theory proposes that it is in the shareholder's best interest for a firm with substantial free cash flow to distribute it back to shareholders rather than invest it in low return projects. However, these are not the only motives for repurchasing stock. Other academic research suggests that share repurchases are used to adjust leverage, deter takeovers, and counter the effect of employee and management stock options.

The Vermaelen (1981) theory of information signaling suggests that managers of firms offer a premium for shares they own to signal positive information. The market interprets this premium, and the fraction of inside holdings, as a signal to price securities. Alternatively, Vermaelen (1981) states that this premium is motivated by the need to comply with provisions of the 1934 Securities and Exchange Act. If a firm offers a price below the value of the information the shareholders who offered their shares might take legal action. Numerous studies have been conducted to test the validity of Vermaelen (1981) hypothesis that when a company purchases its stock, a firm sends an information signal to investors. For example, Jagannathan, Stephens, and Weisbach (2000) show that purchase activity is negatively correlated with prior stock returns,

thus supporting Vermaelen (1981) theory that firms repurchase stock when their prices are perceived as undervalued.

Alternatively, Jensen (1986) states that managers with sizeable free cash flow can repurchase stock or increase dividends and thereby pay out cash that would otherwise be invested in low NPV projects or wasted. Managers have incentives to grow their firms beyond the optimal size, thus an incentive to not act in the best interest of shareholders. These incentives for managers to grow the company beyond the optimal size arise due to the personal incentives of managing a larger firm and the increase in power and compensation. By a firm participating in a share repurchase, the resources under the manager's control decrease and ultimately improve shareholder's welfare.

Bagwell and Shoven (1989) discuss the possibility that managers repurchase stock to increase its leverage ratio. Finding that when firms distribute capital through share repurchases, it reduces the equity and increases the leverage ratio. Thus, assuming that an optimal leverage ratio exists, firms may use a stock repurchase to achieve this target ratio.

Bagwell (1991) examines the use of share repurchases as a takeover deterrent. Bagwell (1991) find that the takeover cost to the acquirer can be greater if the target firm distributes cash through share repurchases than if it chooses to either pay cash dividends or do nothing. Further, Fenn, Liang, and Prowse (1997) find that firms use repurchases to counter the dilution effects of employee and management stock options. Additionally, firms may wish to repurchase shares due to the relative tax advantage of capital gains over dividends; this will be discussed further in section 2.3.

Dittmar (2000) test all of these potential motivations and find that the major motivations for firms to repurchase stock is to take advantage of potential undervaluation and, in many periods, to distribute excess capital. However, Dittmar (2000) also finds that firms repurchase stock to alter their leverage ratio, discourage takeovers, and mitigate the dilution effects of stock options.

2.2 Share repurchases as a substitute to cash dividends

In the United States, why did firms take so long to substitute share repurchases for cash dividends when share repurchases had an obvious tax advantage? Grullon and Michaely (2002)

offers two explanations why with the first being that corporations were "simply wrong" for paying relatively high levels of cash dividends. Secondly, Grullon and Michaely (2002) states that firms were at risk of violating the provisions of the Securities Exchange Act, so were apprehensive in making the switch to share repurchases. One year after the approval of rule 10b-18³ which eased the provisions of the Security Exchange Act, the total amount of cash spent on share repurchase programs tripled. Barclay and Smith (1988) offer an alternative possibility for this lag in firms substituting to share repurchases with there being a previously unrecognised cost associated with regular open market repurchases. This unrecognised cost stems from increased trading activity in the market by more informed managers. Increases bid-ask spread, reduces the liquidity of the firm's shares, thus increasing the firm's cost of capital. They argue that tax considerations alone are not sufficient to make repurchases a dominant alternative to dividends.

While both dividends and share repurchases are channels of distributing cash to shareholders, Jagannathan, Stephens, and Weisbach (2000) find that stock repurchases are very pro-cyclical, while dividends increase steadily over time. Dividends are paid by firms with higher 'permanent' operating income while repurchasing are used by firms with higher 'temporary' non-operating income. Due to shareholders viewing dividends as an ongoing obligation, firms as a whole are very reluctant to make a dividend increase if they believe they may have to reverse it in the future. Repurchases improve financial flexibility relative to dividends because they do not require the company to commit to future payout ratios. Similarly, Brav, Graham, Harvey, and Michaely (2005) findings indicate that maintaining the dividends level is on par with investment decisions, while firms use repurchases to distribute the residual cash flow after investment spending.

Rau and Vermaelen (2002) find that the level market of activity in the United Kingdom to be small in comparison to that reported in the US. This inconsistency could be due to the US capital gains having a relative tax advantage over the UK. However, Rau and Vermaelen (2002) suggest that this low repurchase volume is put down to regulatory restrictions in the UK that reduce the opportunity for firms to use open market share repurchase to take advantage of an undervalued share price. This relative size difference was also apparent in the lack of

³Rule 10b-18 provides issuers with a 'safe harbor' from liability for manipulation when they repurchase their common stock in the market in accordance with the rule's manner, timing, price, and volume conditions.

share repurchase activity of Australian market in the early 1990s. However, as we alluded to in the introduction, we put this down to an imputation credit making dividends a relatively more effective way of distributing income to shareholders. Mitchell and Robinson (1999) states several contributing factors: (1) Conservatism of corporate managers towards the return of capital to shareholders. (2) A lack of corporate and market familiarity with the benefits of share repurchases. (3) An inherent lack of flexibility in undertaking capital reorganisations via a share repurchase. (4) The costs of complying with the previous share repurchase legislation. (5) Complex taxation implications affect the sellers of shares repurchased.

Findings in academic research appear to be ambiguous about the extent in which share repurchases and cash dividends are substitutes. It is clear that both share repurchases and cash dividends are both methods to distribute excess cash to shareholders. However, as noted in section 2.1, share repurchases can also be used to achieve alternative objectives such as alter leverage, reduce the threat of takeover which cash dividends cannot achieve.

2.3 Tax considerations

Share repurchases can be favoured to cash dividend because often capital gains are taxed at a lower rate than dividend income. An individual investor only gets taxed the portion of the repurchase that is a capital gain, and investors can defer the capital gains tax until they realise the gain and sell their stock (Dittmar, 2000). Due to the nature of taxes, the relative tax advantage of capital gains over dividends is frequently changing and differ by sovereign state. Hence, there is substantial research on the effects of taxes in different taxation structures.

Several academic articles find that share repurchases have an apparent tax advantage over cash dividends. However, due to changing tax rates, this tax advantage has slowly disappeared in many countries over the last few decades. In Grullon and Michaely (2002) study of US share repurchases they find that there is an obvious incentive for corporations to substitute for share repurchases from dividends. However, they also state that the Tax Reform Act (TRA) of 1986 greatly reduces this relative tax advantage of capital gains, but still find that the disparity between the top marginal rate on ordinary income and the top marginal rate on capital gain to be both positive and significant. Chetty (2005) found that in the US, individual tax rates on dividends and realised capital gains are legally the same after the 2003 dividends tax cut.

However, similar to Dittmar (2000), Chetty (2005) finds that due to investors tax on capital gains being net of basis, share repurchases retain an economic advantage relative to dividends.

Brav, Graham, Harvey, and Michaely (2005) survey of financial executive's states that taxes are a second order payout policy concern. Most financial executives say that tax considerations are not a dominant factor in the decision in their choice between payout in the way of repurchases or dividends. Results of their research indicate that taxes affect payout decisions, but are not the dominant effect for the majority of firms.

Rau and Vermaelen (2002) find that tax changes have had a significant impact on the importance and method of share repurchase. These findings are consistent with their proposition that the tax treatment of important investors, such as pension funds, determines the payout policy. Rau and Vermaelen (2002) examine share repurchases activity in the United Kingdom, where before their study, the tax and regulatory environment had changed significantly. Rau and Vermaelen (2002) findings show that the introduction of tax favoured agency buyback programs ⁴ in 1994 caused a substantial increase in the number of open market repurchase programs. However, when previously tax-exempt pension funds stopped receiving the tax credit in 1996, dividends became a relatively more profitable method of returning cash to shareholders. Rau and Vermaelen (2002) find that the number of open market repurchase completions fell significantly. Lastly, after the elimination of all tax credits in 1997, the relative advantage of share repurchases increased again, with a rise both in the number of repurchases declared and repurchases completed. These findings in support of corporate payout policy being sensitive to taxation law changes in the UK are not consistent with the fact that after the 1986 US tax reform, share repurchase activity did not decrease. However, Grullon and Michaely (2002) offers a possible explanation for this in section 2.2 which indicates that firms were at risk of violating provisions of the Securities Exchange Act. Additionally, these findings by Rau and Vermaelen (2002) go somewhat against the findings of Brav, Graham, Harvey, and Michaely (2005) which state that taxes are a second order payout policy concern and do not play a dominant factor in the decision between cash dividends and share repurchase.

⁴In 1994 Investments banks invented the 'agency buybacks' an open market repurchase mechanism that increased the tax attractiveness of share repurchases.

3 Institutional and Legal Environment

3.1 Methods to Repurchase Shares

A firm may repurchase shares from its shareholders using a pro-rata buyback, direct negotiation, special offer, on-market repurchases with prior knowledge, and an on-market repurchase without prior knowledge. (1) A pro-rata buybacks are off-market repurchases made by a company when it makes an offer to all of its shareholders to repurchase a specified proportion of their shares. (2) Direct negotiation offers are off-market repurchases made to specific shareholders. This method may be used to prevent ‘activist’ shareholder from getting on board. (3) Special offers made by a firm are off-market buybacks where the offers are expressly permitted by the company’s constitution. The offers require special resolutions and oblige the directors who vote in favour of the repurchase to set out in full the reasons to repurchase and sign a certificate attesting the board’s resolution. (4) On-market repurchases with prior notice are repurchases undertaken on the market for no more than a specified number of stocks. (5) On-market repurchase without prior notice is on-market buybacks made by a company where the number of shares acquired in the preceding 12 months does not exceed 5 percent of the shares of the same class as at the beginning of the 12-month period.

While the method of share repurchase is important in determining the legality of the buyback and tax considerations, it is not important to our study. We ignore which method a firm has used to repurchase shares. We assume that a manager of a firm will use the method which maximises shareholders welfare. As discussed later, our measure of share repurchases is the dollar value as reported in a firms’ annual report.

3.2 New Zealand

Share repurchases have been permitted in New Zealand since adjustments to the Companies Act in 1994, allowing a company effectively to return money to shareholders⁵. To be able to conduct a share repurchase program, a company listed on the New Zealand Stock Exchange must pass two solvency tests (Koerniadi, Liu, and Tourani-Rad, 2007). The first test is to ensure that after the cash distribution is made the company has sufficient cash flows to maintain its solvency.

⁵Koerniadi, Liu, and Tourani-Rad (2007) mentions this as an investment in itself. However, we find this unusual because share repurchases decrease the capital available for investment. However, undervalued shares could make this a good investment if no effect on dual investment decision.

The second test is to ascertain that after the share repurchase, the value of a firm's assets is greater than all of its liabilities. These restrictions are intended to protect a firm's creditors that, after making cash distribution through a share repurchase program, this company will not be financially insolvent. Section CD 22 of the Income Tax Act 2007 states that for pro rata off-market repurchase, a share repurchase is not taxable if it results in a 15 percent reduction in capital, or a 10 percent reduction in capital and the inland revenue is satisfied it is not instead of a dividend. For non pro-rata off-market repurchase, share repurchase is not taxable if it results in a 15 percent capital reduction. For on-market repurchase, if sourced from the company's subscribed capital ⁶ it is not taxable. Finally, if a firm repurchases shares as treasury stocks ⁷, they must be cancelled or sold within 12 months and sourced from subscribed capital (Koerniadi, Liu, and Tourani-Rad, 2007)

Retained earnings avoid double taxation through the exemption of capital gains from personal income tax. By not taxing the capital gains, New Zealand is untypical amongst OECD countries. Other OECD countries typically tax capital gains but at concessional rates compared with the taxation of other income (Burman and White, 2009). However, if an investor is deemed to be a 'trader', then capital gains are taxed. While the Inland Revenue Department is unclear to what they deem to be a trader, a common belief is that a trader is an investor who buys a share for resale and hence capital gain (rather than intend to keep for dividends). Dividends avoid double taxation through an imputation system that grants individual shareholders a full credit for the underlying corporate tax against the personal tax on dividends (Burman and White, 2009).

3.3 Australia

Share repurchases have been permitted in Australia since 1989. However, it was not until laws governing share repurchases were substantially liberalised in 1995 ⁸ that Australia saw a large increase in share repurchase activity (Brown, 2007). For a company in Australia to undertake

⁶Available subscribed capital (ASC) is an important concept in determining whether a distribution by a company to its shareholders is a dividend or a return of capital. Essentially, ASC reflects the amount paid to the firm on the issue of shares, less the amount paid out on the repurchase of shares when those amounts are not dividends (i.e. repurchases) (Department of Inland Revenue, 2017).

⁷A treasury stock is the portion of stock that a firm keeps in its treasury. Treasury stock may have come from a repurchase from shareholders, or a firm may have never issued it to the public in the first place. These shares do not pay dividends, and have no voting rights.

⁸First Corporate Law Simplification Act 1995 No.115, 1995 (Australian, 1995).

a share repurchase it is required to make an initial formal announcement of the intention to repurchase shares with detailed information (Akyol and Foo, 2013). The information released must include the duration of the repurchase program, the number of shares intended to be repurchased, and the reason for the repurchase. Furthermore, according to Corporation Act 2001, companies in Australia can only repurchase a maximum of 10 percent of the number of shares issued over a 12-month period without shareholders' approval (Brailsford, Handley, and Maheswaran, 2008). Additionally, the repurchase process throughout the share repurchase period is transparent, and firms are required to make timely disclosures relating to the buyback activity. According to the Australian Securities Exchange Listing Rules 3.8A, firms are required to disclose the repurchase transactions at any given day by 9:30 AM on the next business day. Additionally, Listing Rules 7.33 restricts the repurchase price to be no more than 5 percent of the 5-day average price before the repurchase day. The shares repurchased must be cancelled and cannot be treated as treasury shares (Mitchell and Dharmawan, 2007). A share repurchase program finishes with a final repurchase notice issued to the market. It signifies the completion of the repurchase program with relevant information disclosed.

In Australia, an individual investor is only liable to pay capital gains tax when the gain is realised, i.e. when an investor sells the asset or security. If an investor holds an asset for at least 12 months, then it is considered to be long-term and is subject to a 50 percent exclusion. For the top income tax bracket, the marginal personal tax rate is 46.5 percent. Therefore, the effective tax rate on long-term capital gains is 23.25 percent (Burman and White, 2009). Additionally, earnings in pension funds are subject to a flat 15 percent tax rate, but long-term capital gains are subject to a one-third exclusion, resulting in a top effective tax rate of 10 percent (Burman and White, 2009). Like New Zealand, Australia avoids the double taxation of dividends through an imputation or franking system that grants individual shareholders a full credit for the underlying corporate tax against the personal tax on dividends (Burman and White, 2009).

3.4 United States

The practice of share repurchases by firms in the United States was limited until 1982. Before then, there was no regulatory roadmap to guide corporate repurchases. Because of the firm's

market power, concerns over potential accusations of price manipulation undoubtedly kept many companies from repurchasing shares (Grullon and Ikenberry, 2000). In 1982 the SEC adopted rule 10b-18, the first and only rule that provides any legal structure and protection to the repurchase process. A crucial point about rule 10b-18 is that it provides few limitations as to what companies can and cannot do. Instead, the rule is a ‘safe-harbour’ and provides legal protection against accusations of price manipulation if an issuer follows the four trading limits. Issuers are deemed not to violate the anti-manipulative provisions of other SEC rules if the company’s repurchases on any given day: (1) Are made through only one broker or dealer. (2) Are not executed at the opening or during the last half hour of trading. (3) Are not done at a price exceeding the highest current independent bid price or the last independent sale price, whichever is higher. (4) If the total repurchase volume does not exceed 25 percent of average daily trading volume, as calculated by the prior four calendar-weeks (Grullon and Ikenberry, 2000).

In the United States, short-term capital gains, as defined as investments held for a year or less before being sold, are taxed at the investor’s ordinary income tax rate. Long-term capital gains, on the sale of assets held for more than one year, are taxed at a lower capital gains tax rate. Likewise, for taxation on dividends if it is deemed to be ‘qualified’ then dividends are taxed at the lower capital gains tax rate. For a dividend to be qualified, the dividend must meet various requirements: (1) It must be paid after December 31, 2002. (2) Be paid by a U.S. corporation or by a corporation incorporated in a U.S. possession. (3) An investor must have held the share for more than 60 days during the 121-day period that begins 60 days before the ex-dividend date (Tuths, 2008).

4 Hypothesis Development

4.1 Imputation Credits

Imputation is a mechanism that a company can use to pass on credits for the tax it has paid on its profits, to its shareholders when it pays dividends. These imputation credits offset the amount of tax that the individual shareholders would otherwise be liable to pay on dividends. Hence under an imputation system, an investor does not have to pay ‘double tax’ (Department of Inland Revenue, 2013).

How an imputation credit works is that when a company pays income tax, it gains that amount of imputation credits. The company records these credits in a memorandum account known as the imputation credit account (ICA). Inland Revenue requires that all New Zealand companies must maintain an ICA. At what time a company decides to distribute dividends to its shareholders, it can choose to allocate some of the imputation credits it has gained by attaching a certain amount of them to the dividend payments. Distributing the credits creates a debt of the same amount, which the company again records in its ICA (Department of Inland Revenue, 2013).

Figures 1,2,3 provides a pictorial and numerical illustration of how the different dividends taxation systems affect a shareholder's final dividends. In all three scenarios, the firms' earnings before tax are \$100 and the firm wishes to pay all of its earnings out in dividends to shareholders. Figure 1 provides an example of the current dividends taxation systems in New Zealand. Under an imputation system, the investor receives tax credits for the taxes paid by the firm on pre-tax profits. As a result, the investor essentially only pays the difference between his personal tax rate and the corporate tax rate. As such the investor receives 67% of the total pre-taxed profits. In comparison, if New Zealand were not to have an imputation dividends taxation system, under its current tax thresholds for an investor in the highest tax bracket, the investor would only receive 48% of the firms' profits. This double taxation results in an investor receiving 19% less in absolute terms than that of an investor under an imputation system. In the double taxation system of the US, the investor in the US receives 55% of the profits, which is 12% less in absolute terms than that of an investor under an imputation system.

The findings from figures 1,2,3 provide clear evidence that dividends are a relatively favourable method of distributing excess cash to shareholders in a single dividends taxation system compared to a double. Due to this, we would expect a single dividends taxation firm to use dividends as a preferred method of distributing cash, while a double dividends taxation firm to use share repurchases.

4.2 Case Study

Spark (formerly Telecom) is the largest telecommunications company in New Zealand. Spark provides fixed line telephone services, a mobile network, an internet service provider, and a

major information and communications technology provider to NZ businesses. Spark has undertaken numerous share repurchases (both on and off the market) since being listed on the New Zealand stock exchange in 1991. By analysing Spark's share repurchase history, we can illustrate motivations for New Zealand firms (single dividends taxation firms) to repurchase shares.

In 1997, Spark commenced a programme to repurchase shares. Spark stated that the objectives of the repurchase were to reduce Spark's average cost of capital and further enhance value to shareholders. In the years of 1997 to 1998 Spark acquired a total of 138.1 million shares at an aggregate cost of 1,001.3\$NZ million which was largely funded by debt (Spark, 1997).

In 2007 the Board of Directors announced Spark's intention to return capital to shareholders of around 1.1\$NZ billion. This planned return of capital follows the divestment of Yellow Pages Group Limited in April 2007 for 2.2\$NZ billion. Spark carried out this return of capital as a pro-rata share cancellation, in which Spark cancelled one in nine shares (Spark, 2007).

After the spinoff of Chorus, in 2012 Spark announced its intention to complete an on-market capital buyback to acquire a maximum of 200 million ordinary shares for an aggregate purchase price of no more than 300\$NZ million. The purpose of this repurchase was to return surplus capital to shareholders and to alter the firm's gearing ratio so that it is more consistent with Spark's long-term capital management policies. Spark offset the repayment by a net receipt on the short-term and long-term debt of 1,427\$NZ million, of which included 1,106\$NZ million in net assets transferred to Chorus (Spark, 2012).

The example of Spark highlights two possible reasons why a firm with imputation credit may wish to repurchase shares. Firstly, as a way to return capital after divestment (the example of 2007 and 2012 Spark repurchase). Secondly, to alter its gearing ratio to reduce the cost of capital.

4.3 Hypotheses

Our motivation for our initial hypothesis comes from the relative tax advantage dividends in New Zealand, and Australia has over the United States. The imputation system that New Zealand and Australia have adopted is expected to make dividends a relatively more favourable payout option than in a taxation system without imputation (US). Thus treating dividends and share repurchases as substitutes, we would expect a country with a double dividends taxation

systems to repurchase more shares than countries with a single dividends taxation system. As discussed earlier, Jensen (1986) suggest that managers with substantial free cash flow can increase dividends or repurchases shares to improve shareholders welfare. Due to this, we would expect to see share repurchases being significantly more sensitive to cash flow in a double dividends taxation system than a single.

Hypothesis 1. *The sensitivity to cash flow in explaining the propensity to undergo a share repurchase and share repurchase size is higher in a double dividend taxation system than in single dividend taxation system, ceterus paribus.*

As discussed in our case study of Spark in Section 4.2, Spark repurchased shares after the divestment of Yellow Page Group. A divestment generates cash which a firm can use to invest, save, or distribute to shareholders. In the absence of profit from the divestment, a firm cannot claim an imputation credit. In other words, the firm has no imputation credit to pass on to investors after making an unprofitable divestment the advantage of dividends in a single dividends taxation system disappears, so we would expect to see firms consider the possibility of distributing cash through share repurchases. In part due to our expectation that US firms use share repurchases to distribute both operating and non-operating income, we would expect a firm with a single dividends share repurchases to have a greater sensitivity to divestments than a firm with a double dividends taxation system. We also would expect divestments to be a positive determinate for share repurchases as our example of Spark suggest.

Hypothesis 2. *The sensitivity to divestments in explaining the propensity to undergo a share repurchase and share repurchase size is lower in a double dividend taxation system than in single dividend taxation system, ceterus paribus*

The need to pay down long-term debt limits a firms ability to use cash to pay dividends or to repurchase shares. When long-term debt is due, a firm can either pay down debt or reissue debt. We expect both of these decisions to affect a firm's share repurchase decision. Firstly, if a firm pays down debt, it limits the cash available to repurchase shares. Secondly, if the firm reissues debt, we would expect firms not to engage in a share repurchase that year, as we believe that it is likely that a share repurchase would increase the cost of debt. Due to our expectation that US firms are not just using share repurchases to distribute non-operating income but are

also using them to distribute operating income, we expect debt due in one year to have less effect on share repurchases in the US than in New Zealand or Australia. Hence we develop the following hypothesis that:

Hypothesis 3. *The sensitivity to long-term debt payable in one year in explaining the propensity to undergo a share repurchase and share repurchase size is lower in double dividend taxation system than in single dividend taxation system, ceterus paribus*

Discussed in our case study of Spark in Section 4.2, Spark repurchased shares to alter its leverage to enhance the shareholder's wealth. Spark funded its 1997 share repurchase with debt as an attempt to increase their leverage ratio to a more optimal level. This decision by Spark would support Bagwell and Shoven (1989) findings that, assuming an optimal leverage ratio exists, firms may use share repurchases to achieve this target. When a firm distributes debt-funded capital through share repurchases, it reduces the equity and simultaneously increases its debt. Overall, the firm would increase its leverage ratio. If a firm in a single dividends taxation system wishes to alter its leverage ratio in the absence of profit, therefore in the absence of an imputation credit, then a dividend has lost its relative advantage over share repurchases as explained in Section 4.1 'Imputation Credits.' Therefore, we expect firms in a single dividends taxation system to be more sensitive to changes in debt than firms with double dividends taxation. While the leverage ratio would be more suitable variable to test this theory, the mechanical relationship between share repurchases and leverage ratio means that we cannot use this. This is because if a firm repurchases shares, the firm's equity decrease and hence its leverage decreases. It is this mechanical relationship between the two which is why we use change in debt to test our theory. As if a firm repurchases share through debt, then we would expect to see a positive coefficient on the *Change in Debt to TA* term.

Hypothesis 4. *The sensitivity to change in long-term debt in explaining the propensity to undergo a share repurchase and share repurchase size is lower in double dividend taxation system than in single dividend taxation system, ceterus paribus*

5 Data and Variable Construction

5.1 Data

Using annual accounting data from Compustat North America and Compustat Global collected via Wharton Research Database Services (WRDS), we create an initial sample of firms from New Zealand, Australia, and the United States from 1987 to 2016. Data includes information on the purchase of common stock, shares outstanding, outstanding debt and other variables of interest. We follow filters used in prior literature. Firstly, to be included in our analysis, total assets of a firm must be positive. We remove records with negative or incomplete information for total assets from the dataset. We also remove financial companies (SIC codes 6000-6999). Removing financial companies was suggested by Fama and French (2001) as the high leverage that is normal for financial firms does not have the same meaning as for non-financial firms, where high leverage is more likely to indicate distress. Fama and French (2001) also eliminate utility companies (SIC codes 4900-4949) from their sample, however, due to the significant number of utility firms in our New Zealand sample we are hesitant to remove these firms. In our initial testing, we include utility firms as (Grey, 2017) suggests that Utility firms do not have a major impact. However, in robustness, we drop utility firms (SIC codes 4900-4949). We also drop observations from 1987 to 1993 due to share repurchases not being made legal in New Zealand till 1994 and 1989 in Australia. Even though share repurchases in Australia were made legal in 1989, we do not see our first observation of share repurchases until 1994, so we do not lose any observations of share repurchases in Australia by making this adjustment in our sample period. We deal with extreme values by winsorising each of our variables at the bottom one percent and the top one percent of their respective distributions each year. Table 1 provides definitions of our variables.

We begin by examining the extent to which firms use share repurchases as a payout method in each of our countries. In our Table 2 summary statistics, the variable *Repurchase Share (0/1)* provides detail of this. Results for *Repurchase Share (0/1)* show that 1.1% of New Zealand firms and 0.03% of Australian firms repurchase shares, this is compared to 30.7% in the United States. New Zealand and Australia firms also spend a smaller percentage of total assets out on share repurchases with 0.01% and 0.003% respectively. With firms in the United States pay out 1.17% as a percentage of total assets in repurchases. Also shown in Table 2, New Zealand and

Australia firms preferred method of returning cash to shareholders is through cash dividends. Shown by the summary statistics for *Dividends to TA*, New Zealand firms spend an average of 2.9% of total assets on dividends, while Australian firms spend 1.3% on cash dividends. For the United States, firms spend less than one percent of total assets on dividends.

5.2 How to measure Share Repurchases

A key data item in our study is the number of share repurchases, i.e. the amount of cash that a firm spends on repurchasing its shares. Our approach to measuring share repurchase data is comparable to that of Grullon and Michaely (2002). Likewise, Grullon and Michaely (2002) form their dataset using Compustat where they define repurchases as total expenditure on the purchase of common and preferred stocks minus the of the net number of preferred stocks outstanding. A problem we encounter in doing so is that Compustat global does not have the variable of redemption value. Lee and Suh (2011) also face this problem when using data from Worldscope, their solution to this is to drop firms that have preferred stock on the balance sheet, even if these firms might repurchase common shares during a given year. While we do not drop firms with preferred stock on a firms balance sheet initially, we do so in robustness. Our robustness test as shown in Table 15 indicates that this does not make a difference. Grullon and Michaely (2002) tests the validity of this measure of share repurchases by comparing it to the amount of repurchase activity reported by SDC (amount of repurchases announced). The correlation coefficient between these two measures is 0.97, and the dollar amounts are similar.

Jagannathan, Stephens, and Weisbach (2000) states two possible concerns using the purchase of common stock variable available through Compustat. The first concern is that we do not know the price of the shares repurchased. However, this is not of concern to us as data on the total expenditure on repurchases is sufficient. A second problem Jagannathan, Stephens, and Weisbach (2000) finds with this measure of share repurchases is that the repurchase figure from Compustat is an aggregate of all security repurchases and retirements during the year. This aggregation may result in a serious overstatement of share repurchases and may, in some instances, double count repurchases. Grullon and Michaely (2002) overcomes this problem by subtracting the redemption value. However, this variable is not available to us as mentioned

above. We prove that we do not overstate our measure in robustness, where we show that dropping firms with preferred stock on the balance sheet cause little effect.

5.3 Dependent Variables

To test our four hypothesis, we use two dependent variables. Our first dependent variable is used to measure the propensity that a firm undergoes a share repurchase. For this, we use an indicator variable which is set equal to zero if the firm has not repurchased shares, and equal to one if the firm has repurchase shares in any given year.

The second dependent variable is used to measure the size of the repurchase (*Share Repurchase Size*). We calculate this by dividing the repurchase of common shares by the lagged total assets. Along with all our variables, we winsorize this at the 1 percent level.

5.4 Variable of Interest

To test the sensitivity of cash flow on share repurchases, we use two proxies for cash flow. The first proxy we use is *EBITDA to TA*. *EBITDA to TA* represents cash that might be distributed by the firm to shareholders through a share repurchase or dividends. We measure *EBITDA to TA* by taking the ratio of EBITDA to lagged total assets. Additionally, we use *NOP to TA* which is the non-operating income to total assets. We use this as a proxy for temporary cash flow. To test the sensitivity of cash flow to share repurchase policy, we create a dummy variable for New Zealand and Australia. These dummy variables then interact with both *EBITDA to TA* and *NOP to TA* in our testing of the sensitivity of cash flow across countries. The coefficient associated with the interaction terms represent the sensitivity of cash flow to share repurchases in a single versus double dividend tax system.

To test the sensitivity of divestments on share repurchases, we use Sale of Property, Plant and Equipment and Investments to Assets as our main proxy for divestments. *Divestments to TA* represents cash outside of operating and non-operating income that might be distributed by the firm to shareholders through share repurchases. We measure *Divestments to TA* by taking the ratio of Sale of Property, Plant and Equipment and Investments to lagged total assets. To test the sensitivity of divestments to share repurchase policy, we once again use a New Zealand and Australian dummy variables. These dummy variables then interact with

Divestments to TA in our testing of the sensitivity of divestments across countries. Once again, the coefficient associated with the interaction term represents the sensitivity of divestments to share repurchases in a single versus double dividend tax system.

To test the sensitivity of long-term debt due in one year on share repurchases, we take the ratio of long-term debt due in one year to lagged total assets. We then create a dummy variable for New Zealand and Australia that interacts with long-term debt due on one year to total assets. The coefficient associated with the interaction term represents the sensitivity of long-term debt due in one year to share repurchases in a single versus double dividend tax system.

To test the sensitivity of change in debt on share repurchases, we take debt at the end of the year minus debt at the start of the year over lagged total assets. We then create a dummy variable for New Zealand and Australian that interacts with the change in debt. The coefficient associated with the interaction term represents the sensitivity of cash flow to share repurchases in a single versus double dividend tax system.

5.5 Control Variables

In collecting our control variables, we mostly follow the lead of Dittmar (2000). However, like Lee and Suh (2011) we do not include variables that represent the use of stock options and the threat of takeover due to lack of data availability. We include *CHE to TA* which represents a firm's cash holdings and short-term investments to lagged total assets. We include this as if a firm uses share repurchases to distribute excess capital then share repurchases should be positively related to a firm's excess cash. We also control for firm size by including *Total Assets*. However, this variable is subject to measurement error due to the values being in the currency of the individual countries. In our other measures, we overcome this problem by making all our variables ratios to lagged total assets. We also include *Asset Growth* as a control variable, as we expect growth firms not to be undergoing share repurchases to the same extent as value firms. Additionally, we include the variables *R&D to TA* and *Acquisitions to TA*. These two variables both represents cash that a firm could otherwise spend on share repurchases. Further, if firms repurchase shares as a substitute for dividends, then we would expect low dividend paying firms more likely to repurchase stock. Thus, we include *Dividends to TA*, the ratio of cash dividends

paid to lagged total assets. Again, following Dittmar (2000) we control for a firm's investment opportunities by including *Market to Book*, which we calculate to be the market value of equity plus debt to the book value of assets at the end of the year before the repurchase.

Furthermore, we include *Total Debt to TA* for which we take total liabilities over lagged total assets as we suspect that debt limits a firm's ability to repurchase shares. What is of concern is the high correlation between the control variable *Total Debt to TA* and our variable of interest *Change in Debt to TA*. Our thought is that *Total Debt to TA* controls for the need to pay out cash regarding interest payments, while *Change in Debt to TA* controls for both the principle and interest. While a high correlation of these two terms is expected, we are surprised by the magnitude in which they are (0.68).

6 Testing Approach and Results

The general structure of the regressions is:

$$Y_{it} = f(\alpha + \beta_1 VOI_{it} + \beta_2 Country + \beta_3 VOI_{it} * Country + X_{i,t}\beta + \epsilon_{it}), \quad (1)$$

where Y is either *Repurchase Shares (0/1)*, or *Share Repurchase Payout Ratio*. *Country* is the dummy variable for either New Zealand or Australia. The variable of interest (VOI) is the interaction term $VOI_{it} * Country$ where β_3 represents the variable of interest sensitivity of the firm in a dividend imputation system relative to a double taxation system. $X\beta$ represents the matrix of controls discuss in previous section. Lastly, $f(\cdot)$ represents the functional form, α represents the constant term in the regression, i represents the firm and t represents year, and ϵ_{it} is the error term. We cluster standard errors by firm. When we test against the dependent variable "propensity to undergo a share repurchase" we use a logit form regression due to the dependent variable being a dummy variable (only having two possible outcomes). When we test against the dependent variable "share repurchase size" we use linear regression.

6.1 Sensitivity of Cash Flow to Share Repurchases

The results presented in Table 4 provide strong evidence that the sensitivity to cash flow in explaining share repurchase size is higher in a double dividend tax system than in a single

dividend tax system. The coefficient on the interaction *EBITDA to TA* (operating income) for NZL/USA and AUS/USA are both negative and significant at the one percent level (-0.0329 and -0.0328 respectively). These two results highlight the fact that the sensitivity of cash flow, as measured by operating cash flow, to share repurchase size is higher in a double dividends tax system than single. We also include *NOP to TA* as a measure of cash flow with the coefficients on the interaction terms once again indicating that the sensitivity to cash flow in explaining share repurchase size is higher in double dividend tax system than in single dividend tax system.

Even though the coefficients on the interaction term are significant ⁹, the coefficient on the variable *EBITDA to TA* for both New Zealand and Australia are not significant (meaning that *EBITDA to TA* is statistically indistinguishable from zero). This result tells us that operating income does not play a significant role in determining share repurchases for a single dividends taxation country. For *NOP to TA* (temporary income), the coefficient on the term for Australia is positive and statistically significant at the 5 percent level. This positive and statistically significant coefficient suggests that in Australia, firms use share repurchases to distribute non-operating income. Results for the US suggests that US firms use share repurchases to distribute both non-operating (temporary) income and operating income. This result goes against (Jagannathan, Stephens, and Weisbach, 2000) findings, where they state that firms in the US use share repurchases to distribute non-operating income, and dividends to distribute operating income.

We also test the sensitivity of cash flow against the propensity to undergo a share repurchase. We report results in Table 5. The findings from this provide ambiguous results. Firstly, for operating profit (*EBITDA to TA*), the coefficient for the interaction term NZL/USA is negative but not significant. The coefficient for the interaction term AUS/USA is positive and not significant. An interesting result comes when we test the sensitivity of non-operating profit to share repurchases. While we do not find any difference between NZL/USA, the interaction term for AUS/USA is positive and significant at the one percent level. This positive coefficient indicates that for Australian firms, the sensitivity of non-operating profit to share repurchases is greater than in the United States. Suggesting that Australian firms use share repurchases to payout non-operating income (temporary) to a greater extent than firms in the United States.

⁹The interpretation is this is that NZL/AUS is significantly different to USA.

6.2 Sensitivity of Divestments to Share Repurchases

The results in Table 6 provide ambiguous results on the sensitivity of divestment to share repurchase size and the propensity to undergo a share repurchase in single dividends taxation systems versus double. In panel A of Table 6 where the dependent variable is *Repurchase Share (0/1)*, the coefficients for the interaction terms NZL/USA and AUS/USA are both negative and not statistically significant. While the negative coefficient would advance that the sensitivity of divestments to the propensity to undergo a share repurchase is greater in a single dividends taxation system than a double, the lack of statistical significance means we can claim our hypothesis to be true. In panel B of Table 6, results do not support our hypothesis that the sensitivity of divestment to share repurchase size is higher in a single dividends taxation system than a double. The statistically significant positive coefficient of the AUS/USA interaction term goes against what we hypothesized and suggests that the sensitivity of divestments to share repurchase size is lower in a single dividends taxation system than a double.

A notable observation coming from this is that the coefficient on divestment for the United States is negative and significant. Our example from Spark would suggest that divestments are a possible motivation for a firm to conduct a share repurchase. However, this negative coefficient does not support this claim. A possible explanation for this is the firms that are making divestments are not those who are in financial position to distribute cash to shareholders but are rather firms who are struggling to stay afloat and are scrambling for cash. Hence, why we would see negative coefficients on the sensitivity of divestments to share repurchases. We test this theory in Table 11, where we separate firms into quintiles by *EBITDA to TA*. Firms with the lowest *EBITDA to TA* are in quintile 1, while firms with the highest are in quintile 5. Based on our theory mentioned above, we would expect firms in the lowest *EBITDA to TA* to have a negative coefficient for divestments, due to these firms are making divestitures to ensure financial solvency. Whereas firms with the highest *EBITDA to TA*, we would expect to have a positive coefficient for divestments due to these firms being in a financial position to make share repurchases with additional cash. Results in Table 11 indicate that this is a possible explanation. The sensitivity of divestments to the propensity to undergo share repurchases is a negative statistically significant coefficient for the lowest quintile. For the highest quintile, the coefficient is positive but not statistically significant. When tested against the dependent

variable, share repurchase size, our results are not so supportive of this theory. In panel B of Table 11 we can see that in the lowest quintile, divestments play a negative and statistically significant role in share repurchase size. However, for the highest quintile, the coefficient is negative but not statistically significant.

6.3 Sensitivity of Debt Due in One Year to Share Repurchases

Results in panel A of Table 7 are supportive of our hypothesis that the sensitivity of debt due in one year to the propensity to undergo share repurchase is greater in a single dividends tax system than in a double. The negative coefficients on the interaction term for New Zealand and Australia indicate this result. While the coefficient for NZL/USA is not significant, the coefficient for AUS/USA interaction term is (at the 5 percent level). The results presented panel B of Table 7 do not support our hypothesis. The positive coefficients for the interaction terms, suggests that the sensitivity of debt due in one year to the propensity to undergo a share repurchase is smaller in a single dividends tax system than in a double.

The two conflicting results from Table 7 make it difficult for us to imply how the different dividends taxation system affect the sensitivity of debt due in one year. From the evidence reported in Table 7, we conclude that the sensitivity of debt due in one year to share repurchases is greater in a country with a single dividends system. We also conclude that the sensitivity of debt due in one year to the propensity to undergo a share repurchase is smaller in a single dividends tax system than in a double.

Additionally, the results in this table show that debt due in one year is a statistically significant determinant of both share repurchase size and the propensity to undergo a share repurchase for Australia and the US. As expected the coefficient on debt due in one year is negative for each of the countries tested. We attribute this to, if a firm has debt due in the next year then it is more likely to use the excess cash to pay down debt than to commit to returning capital to shareholders.

6.4 Sensitivity of Change in Debt to Share Repurchase

In testing the sensitivity of change in debt to the propensity to undergo a share repurchase our results are unable to determine whether there is a significant difference between the sensitivities

in a single dividends taxation country versus a double. We present the results in Table 8. The coefficient on the interaction term, NZL/USA, is negative and not statistically significant, while for AUS/USA the coefficient is positive and again not statistically significant. When testing against the dependent variable, share repurchase size, the coefficients on the interaction terms for NZL/USA and AUS/USA would suggest that that the sensitivity to change in debt to share repurchases is smaller in a single dividends taxation country than a double. This result goes against what we hypothesise by our case study of Spark.

With the coefficient of *Change in Debt to TA* for New Zealand and the US being positive and significant in panel A of Table 8, we can imply that firms possibly fund share repurchases with debt. This supports Bagwell and Shoven (1989) results that, assuming an optimal leverage ratio exists, firms may use share repurchases funded by debt to achieve this target. The positive coefficient on the *Change in Debt to TA* for the US, as shown in panel B, is also supportive of this.

6.5 Relationship Between Share Repurchases and Dividends

By analysing the control variable *Dividends to TA*, we can determine the relationship between share repurchases and dividends. This relationship is shown in Table 4 and 5. In Table 4, the coefficient associated with Dividends to TA in testing the sensitivity of cash flow in explaining share repurchase size is positive and statistically significant for New Zealand, Australia and the US. This result indicates that firms use share repurchases as a complement rather than as a substitute to cash dividends. Interestingly for New Zealand, *Dividends to TA* is just one of the two control variables we use that is statistically significant, with the other being *Acquisitions to TA*. Additionally, the positive coefficients in Table 5 indicates that a firm paying dividends has a greater propensity to undergo a share repurchase. This result is supportive of Lee and Suh (2011) findings which claim that firms do not switch from one payout method to the other. In other words, it is rare for firms that only repurchase shares to adopt dividends as their sole payout method in the subsequent year. Our evidence suggests firms who return cash to shareholders in the form of dividends, also do so in the form of share repurchases.

7 Robustness

7.1 Sub-sample analysis

As discussed in section 5.2 ‘How to measure Share Repurchases’ we do not follow the lead of Grullon and Michaely (2002) in subtracting reductions in the value of the net preferred stocks outstanding due to this data not being available to us. However, to prove the validity of our measure of share repurchase, we run a robustness test where we drop firms with preferred stock on the balance sheet as suggested by Lee and Suh (2011). We report results in Table 9, where we test the sensitivity of cash flow to both share repurchase size and propensity to undergo share repurchases. Results from dropping preferred stock verify that reductions in the value of the net preferred stock have little to no effect on our measure of repurchases. From Table 9, we can see that there is very little variation in the coefficients and the statistical significance for the results with preferred stock and without preferred stock.

As discussed in section 5.1 ‘Data’ we do not initially drop utility firms (SIC code 4990-4949) due to utility firms making up a significant number of our New Zealand observation. In Table 12 we test the sensitivity to cash flow to both share repurchase size and propensity to undergo a share repurchase with utility firms dropped. Results from running this robustness provide strong evidence that utility firms do not have a significant effect on our results. Once again from Table 9, we can see that there is a very little variation in the coefficients and the statistical significance of the results with utility firms and without utility firms.

7.2 Alternative Measures

Additionally, we test the sensitivity of cash flow to share repurchases against an alternative measure of cash flow. In our initial estimation, we use *EBITDA to TA* as our measure for operating cash flow. While in robustness, we use *EBIT to TA*. As reported in Table 10, this alternative measure of cash flow causes does not affect the statistical interpretation of our results. For example, the coefficient on the interaction term for NZL/USA is -0.0247 (-0.0329) and statistically significant at the one percent level, while the coefficient on the interaction term for AUS/USA is -0.0234 (-0.0328) and again statistically significant at the one percent level. While the coefficient on the term changes, the economic interpretation does not. All our control

variables economic interpretation does not change by using *EBIT to TA* as a measure of a firms cash flow.

7.3 Regulatory restrictions

We present clear evidence that single dividends taxation countries favour cash dividends over a share repurchase program. While dividends taxation undoubtedly plays a role in a firm's share repurchase decision, it is not the only contributing factor for why New Zealand and Australian firms repurchase so few shares. We also attribute this to the strict regulatory environment regarding share repurchases. As discussed in Section 3 'Institutional and Legal Environment', for a firm in New Zealand and Australia to complete a share repurchase it is a complex process. For example, for a New Zealand firm to undertake a share repurchase it must meet two solvency requirements. In addition to this, for a share repurchase to be deemed not taxable it must meet requirements of Section CD 22 of the Income Tax Act 2007. These requirements state that for pro rata off-market repurchase, a share repurchase is not taxable if it results in a 15 percent reduction in capital, or a 10 percent reduction in capital and the inland revenue is satisfied it is not instead of a dividend. Due to this threshold, we would expect the size of New Zealand firms share repurchases to be significantly greater than that of a United States firm. We test this in Table 12 where we take the average share repurchase size as a percentage of total assets for firms that have undertaken a share repurchase in their respective countries. This measure is different to the one we present in the summary statistics in Table 2 as this measure includes all firms (even if they have not undertaken a share repurchase). We can see by this that share repurchases in New Zealand are of a greater size than that in Australia and the United States (0.1191 compared to 0.0519 and 0.04723). These findings would suggest that the majority of New Zealand firms only repurchase shares if they can meet the threshold that makes a share repurchase not taxable. This provides evidence that the regulatory environment also plays a significant role in a firm's share repurchase decision.

Likewise, Rau and Vermaelen (2002) find that the regulatory environment of the UK discourages share repurchases relative to the US. Rau and Vermaelen (2002) put the relatively small share repurchase activity in the UK down to the regulatory environment not allowing firms to take advantage of undervalued share prices. As this is a major motivation behind

repurchase programs in the United States, it is not surprising that share repurchases remain relatively unpopular in the UK.

We believe that a firm in New Zealand will engage in a share repurchase program under two conditions. Firstly, in the absence of profit, a firm may choose to distribute cash through share repurchases as the relative advantage of cash dividends disappears. Secondly, a firm will repurchase share conditional on it meeting the requirements of Section CD 22 of the Income Tax Act 2007 that make a share repurchase not taxable.

8 Conclusion

In our cross-country study of the influence of tax policy on firms share repurchase decisions we document several significant results. Firstly, single dividends taxation countries undergo fewer share repurchases than countries with a double dividends taxation system. The percentage of firms in New Zealand and Australia that undergo a share repurchase is extremely small relative to the US. The amount of cash, as a percentage of total assets that New Zealand and Australian firms payout in share repurchases is also relatively small. However, for the firms that do repurchase shares in New Zealand and Australia, the share repurchases are larger (as a percentage of total assets), which we attribute to regulatory restrictions. Furthermore, we find that the sensitivity of cash flow in explaining share repurchase size is higher in a double dividends tax system than a single. We find that US firms use share repurchases to distribute both non-operating income and operating income, while firms in New Zealand and Australia use share repurchases just to distribute non-operating income. The results we present for firms in the United States contradict the results of Jagannathan, Stephens, and Weisbach (2000) who claim that share repurchases are used to distribute non-operating income while dividends are used to distribute operating income.

Additionally, we find that the sensitivity of divestments to share repurchase size and the propensity to undergo a share repurchase is negative, indicating that after divestments firms do not repurchase shares with the proceeds raised. We offer a possible explanation for this which suggests that firms that are making divestitures are those who are in financial stress and are selling off assets as an attempt to stay afloat. In testing of this our results to some extent agree with our theory. The firms with the lowest cash flow have a statistically significant

negative coefficient for the sensitivity of divestments to share repurchases, while the firms with the highest cash flow have a coefficient on divestment that is statistically indistinguishable from zero. To our knowledge, we are the first to test how former long-term debt due in one year affect share repurchases. With results finding that debt due in one year to total assets being a statistically significant determinant of both share repurchase size and the propensity to undergo a share repurchase in the US. Results indicate that if a firm has former long-term debt due in one year, a firm is less likely to undergo a share repurchase and will also repurchase fewer shares.

Lastly, we offer a circumstance in which we would expect a New Zealand firm with imputation will engage in a share repurchase. We believe that a firm in New Zealand will engage in a share repurchase program under two conditions. Firstly, in the absence of profit, the firm does not have an imputation credit to pass on to shareholders, and hence cash dividends lose its relative advantage over share repurchases. Secondly, a firm will repurchase shares conditional on it meeting the requirements of Section CD 22 of the Income Tax Act 2007 that make a share repurchase not taxable.

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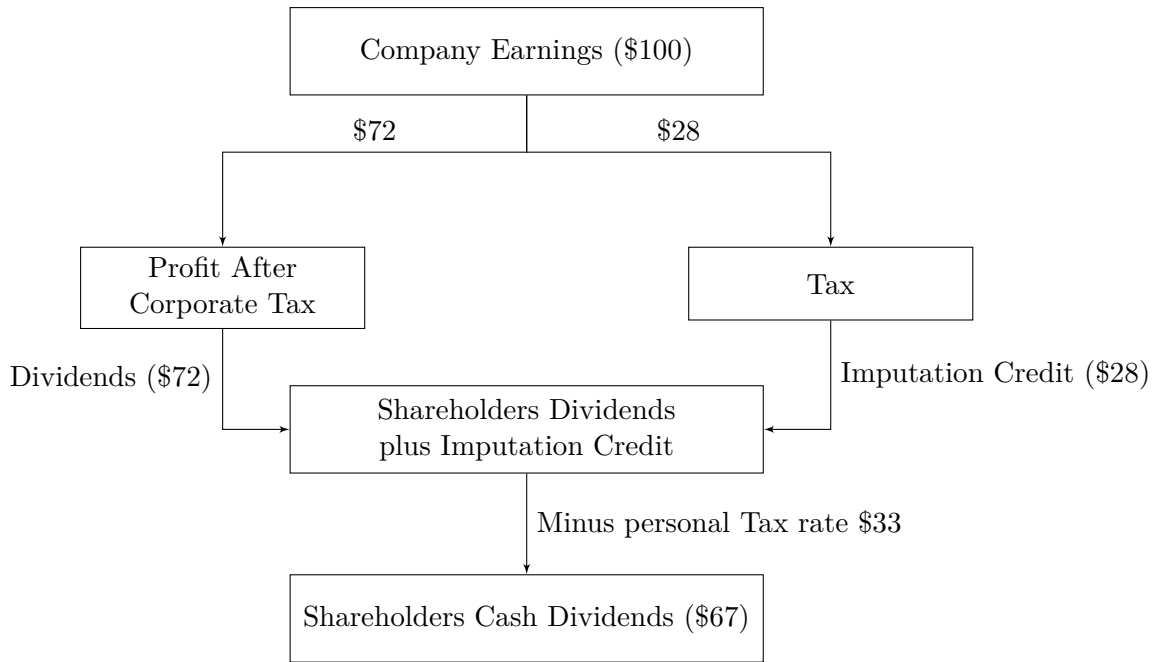


Figure 1: Single dividends taxation system (New Zealand with Imputation) . The firm faces a corporate tax rate of 28% while the investor faces a personal tax rate of 33%

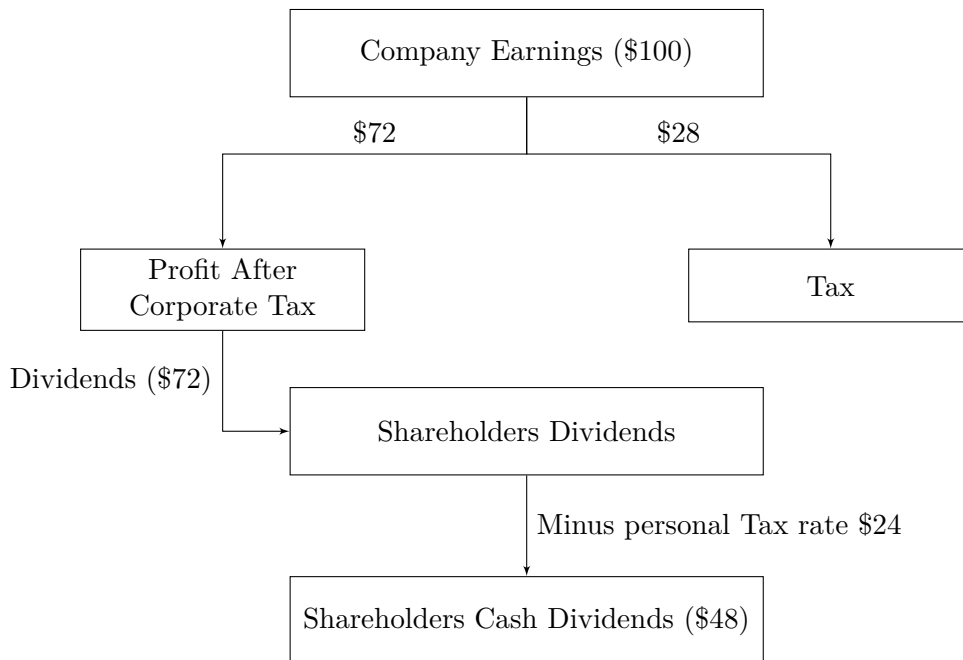


Figure 2: Double dividends taxation system (New Zealand without imputation). The firm faces a corporate tax rate of 28% while the investor faces a personal tax rate of 33%

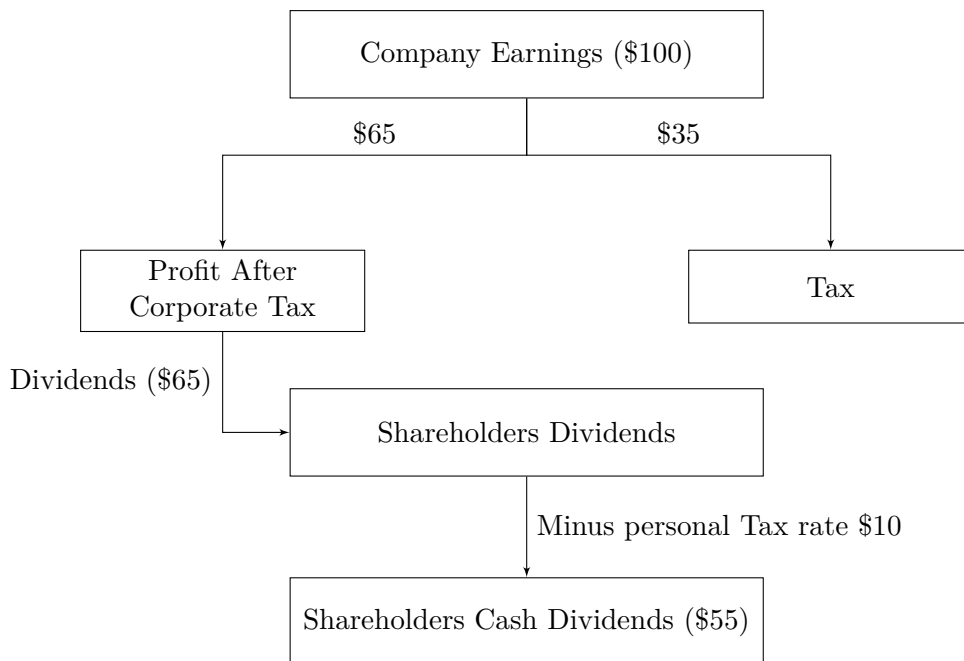


Figure 3: United States double dividends taxation system. The firm faces a corporate tax rate of 35% while the investor faces a personal tax rate of 15%

Table 1: This table provides the definition of all variables used in the paper

Variable	Definition
Share Repurchases Size	Share repurchase during year/ beginning of the year total assets
Share Repurchase (0/1)	Share repurchase indicator variable (1 if a firm has repurchase shares, 0 otherwise)
EBITDA to TA	End of year EBITDA / beginning of the year total assets
EBIT to TA	End of year EBIT / beginning of the year total assets
R&D to TA	Research and development during year/ beginning of the year total assets
Asset Growth	Change in assets from beginning of year to end/ beginning of the year total assets
NOP to TA	Non-operating income / beginning of the year total assets
Divestments to TA	Sale of Plant property and Investments/ beginning of the year total assets
DD1Y to TA	Debt due in 1 Year to Assets/ beginning of the year total assets
Change in Debt	Debt at end of the year minus Debt at start of the year/Lagged total assets
Dividends to TA	Cash dividends during year/ beginning of the year total assets
CHE to TA	Cash and short term investments/ beginning of the year total assets
Acquisitions to TA	Value of acquisitions made during year/ beginning of the year total assets
Total Debt to TA	Total Liabilities/ beginning of the year total assets
Market to Book	market value of equity + total debt/total assets
New Zealand (0/1)	1 if New Zealand firm, 0 otherwise
Australia (0/1)	1 if Australia firm, 0 otherwise

Table 2: Summary Statistics

Variable	New Zealand				Australia				United States			
	mean	min	max	sd	mean	min	max	sd	mean	min	max	sd
Share Repurchase	1.5877	0	774	25.303	0.9015	0	774	21.592	25.333	0	774	109.68
Share Repurchase (0/1)	0.0113	0	1	0.1059	0.0031	0	1	0.0552	0.3077	0	1	0.4616
Share Repurchase Size	0.001	0	0.2276	0.0133	0.0003	0	0.2276	0.0063	0.0117	0	0.2276	0.0357
Assets	817.43	0.004	18315	2007.3	470.96	0.004	32555	2261.1	1743.6	0.004	32555	5010.2
EBITDA to Assets	0.0769	-0.995	0.6194	0.2066	-0.066	-1	0.6194	0.2831	0.0439	-1	0.6194	0.2353
EBIT to Assets	0.0371	-1.173	0.564	0.2033	-0.097	-2.606	0.564	0.2772	-0.005	-14.5	0.564	0.2796
R&D to Assets	0.0192	0	1.594	0.0973	0.0143	0	1.594	0.0678	0.0542	0	1.594	0.1349
Asset Growth	0.1627	-0.845	13	0.9414	0.2809	-0.845	13	1.3093	0.1938	-0.845	13	0.9401
Non-operating income to Assets	-0.001	-0.534	0.5217	0.0869	-0.014	-0.534	0.5217	0.1273	0.0082	-0.534	0.5217	0.0491
Divestments to Assets	-0.003	-0.205	0.081	0.024	-0.004	-0.205	0.081	0.0352	-0.003	-0.205	0.081	0.0207
Debt due in 1 Year to Assets	0.1727	0	2.363	0.227	0.0985	0	2.363	0.2354	0.2048	0	2.363	0.322
Change in Debt to Assets	0.0323	0	0.9048	0.0971	0.0231	0	0.9048	0.0881	0.0285	0	0.9048	0.0893
Dividends Payout Ratio	0.0297	0	0.2032	0.0439	0.0137	0	0.2032	0.0343	0.0087	0	0.2032	0.0264
Cash holdings to Assets	0.1172	0	7.1176	0.3628	0.2858	0	7.1176	0.6211	0.2216	0	7.1176	0.5051
Acquisitions to Assets	0.0193	-0.017	0.8455	0.0839	0.0215	-0.017	0.8455	0.0989	0.0299	-0.017	0.8455	0.1098
Total Debt to TA	0.4759	0	3.5084	0.4222	0.3896	0	3.5084	0.5216	0.5666	0	3.5084	0.5501
Market to Book	1.0695	0	6.8791	1.3061	1.2598	0	6.8791	1.5011	0.2475	0	6.8791	0.4338

Table 3: Correlation Matrix

This table shows the correlation between our variables. (1) equals *Repurchase Share (0/1)*, (2) equals *Share Repurchase Size*, (3) equals *Total Assets*, (4) equals *EBITDA to TA*, (5) equals *EBIT to TA*, (6) equals *R&D to TA*, (7) equals *Asset Growth*, (8) equals *NOP to TA*, (9) equals *Divestments to TA*, (10) equals *Change in Debt to TA*, (11) equals *Debt Due in One Year to TA*, (12) equals *Dividends to TA*, (13) equals *CHE to TA*, (14) equals *Acquisitions to TA*, (15) equals *Total Debt to TA*, (16) equals *Market to Book*.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Repurchase Share (0/1)</i>	1.00															
<i>Share Repurchase Size</i>	0.50	1.00														
<i>Total Assets</i>	0.19	0.11	1.00													
<i>EBITDA to TA</i>	0.22	0.18	0.14	1.00												
<i>EBIT to TA</i>	0.19	0.16	0.12	0.86	1.00											
<i>R&D to TA</i>	-0.05	0.01	-0.08	-0.30	-0.31	1.00										
<i>Asset Growth</i>	-0.04	0.01	-0.02	0.08	-0.01	0.16	1.00									
<i>NOP to TA</i>	0.03	0.03	0.01	0.00	-0.01	0.07	0.11	1.00								
<i>Divestments to TA</i>	0.00	-0.02	0.00	0.01	0.01	0.00	-0.05	-0.24	1.00							
<i>Change in Debt to TA</i>	0.03	0.03	0.12	0.17	0.09	-0.06	0.28	0.02	-0.01	1.00						
<i>Debt Due in One Year to TA</i>	-0.06	-0.03	-0.02	-0.03	-0.08	0.02	0.16	0.01	-0.01	0.17	1.00					
<i>Dividends to TA</i>	0.05	0.07	0.11	0.26	0.22	-0.07	0.05	0.03	-0.02	0.09	-0.01	1.00				
<i>CHE to TA</i>	-0.04	0.03	-0.08	-0.14	-0.18	0.39	0.66	0.13	-0.06	-0.01	0.03	0.00	1.00			
<i>Acquisitions to TA</i>	0.03	0.03	0.01	0.14	0.09	0.00	0.32	0.01	-0.01	0.34	0.09	0.06	0.04	1.00		
<i>Total Debt to TA</i>	0.00	0.03	0.09	0.09	-0.02	0.08	0.43	0.03	-0.03	0.68	0.39	0.09	0.14	0.31	1.00	
<i>Market to Book</i>	-0.15	-0.08	-0.04	-0.16	-0.14	-0.06	0.01	-0.08	-0.02	0.15	0.14	0.09	0.03	0.00	0.10	1.00

Table 4: Share Repurchase Size: Sensitivity of Cash Flow

This table shows estimation results of Eq. (1) where the dependent variable is the share repurchase size and the functional form is linear regression. All estimations include the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Columns (1), (2), and (3) report estimation results for New Zealand, Australia, and the United States firms, respectively. Column (4) reports results for the sample consisting of both New Zealand and United States firms and includes *NZ (0/1)* and *EBITDA to TA *NZ* as variables of interest. Column (5) reports results for the sample consisting of both of Australia and United States firms and includes *AUS (0/1)* and *EBITDA to TA *AUS* as variables of interest. The sample period is 1994 through 2016. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	Dependent Variable: Share Repurchase Size				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
EBITDA to TA	-0.000260 (0.000528)	-0.000105 (0.000166)	0.0318*** (0.00115)	0.0318*** (0.00114)	0.0316*** (0.00112)
NZ (0/1)				-0.00598*** (0.000439)	
EBITDA to TA* NZ				-0.0329*** (0.00201)	
AUS (0/1)					-0.00759*** (0.000182)
EBITDA to TA* AUS					-0.0328*** (0.00115)
NOP to TA	0.00312 (0.00347)	0.00127** (0.000608)	0.00994*** (0.00247)	0.00995*** (0.00246)	0.0106*** (0.00242)
NOP to TA* NZ				-0.00910* (0.00504)	
NOP to TA* AUS					-0.0103*** (0.00252)
CHE to TA	-0.000172 (0.000423)	4.21e-05 (7.30e-05)	0.00821*** (0.000516)	0.00814*** (0.000509)	0.00640*** (0.000387)
TA	6.74e-08 (1.45e-07)	2.16e-07*** (8.04e-08)	5.06e-07*** (5.74e-08)	5.05e-07*** (5.73e-08)	4.97e-07*** (5.54e-08)
Dividends to TA	0.0227** (0.0104)	0.00941*** (0.00364)	0.0594*** (0.00906)	0.0591*** (0.00870)	0.0498*** (0.00701)
Acquisitions to TA	-0.00252** (0.00120)	-0.000728** (0.000340)	0.00505*** (0.00127)	0.00499*** (0.00126)	0.00372*** (0.00108)
Market to Book	0.000148 (0.000194)	-3.53e-05 (3.10e-05)	-0.00365*** (0.000286)	-0.00308*** (0.000245)	-0.00139*** (7.90e-05)
Total Debt to TA	-9.97e-05 (0.000426)	7.00e-05 (5.78e-05)	0.00267*** (0.000317)	0.00241*** (0.000314)	0.00144*** (0.000272)
R&D to TA	-0.00115 (0.000735)	0.000713 (0.00103)	0.0104*** (0.00140)	0.0105*** (0.00138)	0.0117*** (0.00127)
Growth	-0.000208 (0.000226)	-4.37e-05 (4.16e-05)	-0.00449*** (0.000297)	-0.00436*** (0.000290)	-0.00319*** (0.000209)
Observations	2,379	26,493	127,017	129,396	153,510
R-squared	0.008	0.010	0.056	0.057	0.069

Table 5: Propensity to Undergo Share Repurchase: Sensitivity of Cash Flow

This table shows estimation results of Eq. (1) where the dependent variable is repurchase shares (0/1) and the functional form is logistic. All estimations include the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Columns (1), (2), and (3) report estimation results for New Zealand, Australia, and the United States firms, respectively. Column (4) reports results for the sample consisting of both New Zealand and United States firms and includes NZ indicator (0/1) and *EBITDA to TA*NZ* as variables of interest. Column (5) reports results for the sample consisting of both of Australia and United States firms and includes AUS indicator (0/1) and *EBITDA to TA*AUS* as variables of interest. The sample period is 1994 through 2016. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	Dependent Variable: Repurchase Shares (0/1)				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
EBITDA to TA	-0.833 (1.436)	2.089*** (0.693)	2.769*** (0.0715)	2.769*** (0.0715)	2.768*** (0.0714)
NZ (0/1)				-3.204*** (0.272)	
EBITDA to TA* NZ				-1.634 (1.113)	
AUS (0/1)					-4.521*** (0.147)
EBITDA to TA* AUS					0.147 (0.553)
NOP to TA	1.900 (4.827)	5.618*** (0.919)	1.176*** (0.214)	1.178*** (0.214)	1.181*** (0.214)
NOP to TA* NZ				0.000463 (3.020)	
NOP to TA* AUS					3.812*** (0.798)
CHE to TA	-7.797** (3.597)	-1.511** (0.741)	0.483*** (0.0442)	0.483*** (0.0441)	0.480*** (0.0439)
TA	6.35e-05 (9.27e-05)	7.33e-05*** (1.52e-05)	6.00e-05*** (3.36e-06)	6.00e-05*** (3.36e-06)	6.01e-05*** (3.35e-06)
Dividends to TA	10.54*** (3.238)	8.798*** (2.846)	1.402*** (0.452)	1.433*** (0.452)	1.471*** (0.451)
Acquisitions to TA	1.465 (2.912)	-6.335 (4.381)	1.099*** (0.0879)	1.100*** (0.0879)	1.092*** (0.0877)
Market to Book	0.126 (0.0956)	-0.235** (0.114)	-0.580*** (0.0440)	-0.565*** (0.0436)	-0.565*** (0.0425)
Total Debt to TA	-1.177 (0.877)	0.123 (0.210)	-0.0166 (0.0243)	-0.0221 (0.0243)	-0.0213 (0.0241)
R&D to TA	-3.966 (2.772)	1.921 (2.759)	-0.810*** (0.121)	-0.805*** (0.121)	-0.796*** (0.121)
Growth	-0.964 (1.155)	-0.438 (0.372)	-0.580*** (0.0363)	-0.578*** (0.0363)	-0.578*** (0.0362)
Observations	2,379	26,493	127,017	129,396	153,510
χ^2	32.35	141.1	2442	2623	3470
Pseudo R-Square	0.0680	0.0970	0.0737	0.0821	0.161

Table 6: Sensitivity of Divestment

This table shows estimation results of Eq. (1). In panel A the dependent variable is repurchase shares (0/1) and the functional form is logistic. While in panel B the dependent variable is share repurchase size and the functional form is linear regression. All estimations include the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Columns (1), (2), and (3) report estimation results for New Zealand, Australia, and the United States firms, respectively. Column (4) reports results for the sample consisting of both New Zealand and United States firms and includes *NZ (0/1)* and *Divestments to TA*NZ* as variables of interest. Column (5) reports results for the sample consisting of both of Australia and United States firms and includes *AUS (0/1)* and *Divestments to TA*AUS* as variables of interest. The sample period is 1994 through 2016. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	Dependent Variable: Repurchase Shares (0/1)				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
Divestments to TA	-4.845	1.924	-1.686***	-1.687***	-1.627***
	(4.440)	(2.591)	(0.383)	(0.383)	(0.384)
NZ (0/1)				-3.424***	
				(0.240)	
Divestments to TA* NZ				-2.441	
				(5.618)	
AUS (0/1)					-4.442***
					(0.145)
Divestments to TA* AUS					-0.0707
					(2.199)
Observations	2,379	26,493	127,017	129,396	153,510
χ^2	33.07	145.6	2471	2645	3503
Pseudo R-Square	0.0694	0.0973	0.0738	0.0822	0.161

VARIABLES	Dependent Variable: Share Repurchase Size				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
Divestments to TA	-0.0160	0.000934	-0.0381***	-0.0384***	-0.0401***
	(0.0180)	(0.00102)	(0.00705)	(0.00704)	(0.00694)
NZ (0/1)				-0.00847***	
				(0.000581)	
Divestments to TA* NZ				0.0241	
				(0.0232)	
AUS (0/1)					-0.00714***
					(0.000202)
Divestments to TA* AUS					0.0513***
					(0.00719)
Observations	2,379	26,493	127,017	129,396	153,510
R-Squared	0.008	0.010	0.057	0.057	0.060

Table 7: Sensitivity of Long-Term Debt Due in One Year

This table shows estimation results of Eq. (1). In panel A the dependent variable is repurchase shares (0/1) and the functional form is logistic. While in panel B the dependent variable is share repurchase size and the functional form is linear regression. All estimations include the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Columns (1), (2), and (3) report estimation results for New Zealand, Australia, and the United States firms, respectively. Column (4) reports results for the sample consisting of both New Zealand and United States firms and includes *NZ (0/1)* and *DD1Y to TA*NZ* as variables of interest. Column (5) reports results for the sample consisting of both of Australia and United States firms and includes *AUS (0/1)* and *DD1Y to TA*AUS* as variables of interest. The sample period is 1994 through 2016. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	Dependent Variable: Repurchase Shares (0/1)				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
DD1Y to TA	-1.719 (3.875)	-55.69** (26.69)	-1.392*** (0.159)	-1.401*** (0.159)	-1.408*** (0.159)
NZ (0/1)				-3.379*** (0.250)	
DD1Y to TA* NZ				-2.902 (4.172)	
AUS (0/1)					-4.248*** (0.151)
DD1Y to TA* AUS					-48.00** (24.15)
Observations	2,379	26,493	127,017	129,396	153,510
χ^2	36.20	154	2496	2662	3527
Pseudo R-Square	0.0686	0.122	0.0746	0.0831	0.162

VARIABLES	Dependent Variable: Share Repurchase Size				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
DD1Y to TA	-0.000955 (0.00150)	-0.000528** (0.000225)	-0.00429*** (0.00134)	-0.00508*** (0.00132)	-0.00896*** (0.00120)
NZ (0/1)				-0.00890*** (0.000622)	
DD1Y to TA* NZ				0.00914* (0.00550)	
AUS (0/1)					-0.00750*** (0.000207)
DD1Y to TA* AUS					0.00614*** (0.00142)
Observations	2,379	26,493	127,017	129,396	153,510
R-Squared	0.008	0.010	0.056	0.057	0.060

Table 8: Sensitivity of Change in Long-Term Debt

This table shows estimation results of Eq. (1). In panel A the dependent variable is repurchase shares (0/1) and the functional form is logistic. While in panel B the dependent variable is share repurchase size and the functional form is linear regression. All estimations include the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Columns (1), (2), and (3) report estimation results for New Zealand, Australia, and the United States firms, respectively. Column (4) reports results for the sample consisting of both New Zealand and United States firms and includes *NZ (0/1)* and *Change in Debt to TA*NZ* as variables of interest. Column (5) reports results for the sample consisting of both of Australia and United States firms and includes *AUS (0/1)* and *Change in Debt to TA*AUS* as variables of interest. The sample period is 1994 through 2016. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	Dependent Variable: Repurchase Share (0/1)				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
Change in Debt to TA	5.102*** (1.353)	0.378 (0.709)	0.721*** (0.0524)	0.720*** (0.0523)	0.718*** (0.0522)
NZ (0/1)				-3.422*** (0.251)	
Change in Debt to TA* NZ				0.910 (0.640)	
AUS (0/1)					-4.407*** (0.142)
Change in Debt to TA* AUS					-0.623 (0.572)
Observations	2,379	26,493	127,017	129,396	153,510
χ^2	38.11	140.8	2441	2602	3478
Pseudo R-Square	0.0966	0.0971	0.0752	0.0836	0.162

VARIABLES	Dependent Variable: Share Repurchase Size				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
Change in Debt to TA	0.00302 (0.00258)	-1.41e-06 (0.000178)	0.0133*** (0.000905)	0.0132*** (0.000899)	0.0120*** (0.000823)
NZ (0/1)				-0.00808*** (0.000594)	
Change in Debt to TA* NZ				-0.00771*** (0.00288)	
AUS (0/1)					-0.00705*** (0.000199)
Change in Debt to TA* AUS					-0.00844*** (0.000883)
Observations	2,379	26,493	127,017	129,396	153,510
R-Squared	0.009	0.010	0.060	0.060	0.063

Table 9: Robustness: Drop firms with preferred stock on balance sheet and Utility firms

This table shows estimation results of Eq. (1) where both the dependent variable Repurchase Shares (0/1) and Share Repurchase Size. The functional form is logistic for the former and logistic for the latter. The estimation in column 1 shows our normal sample, while column 2 excludes firms with preferred stock on their balance sheet, and column 3 excludes utility firms. All estimations include but not report the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

Panel A: New Zealand vs USA subsample test			
Dependent Variable	EBITDA to TA*NZ		
	(1)	(2)	(3)
Repurchase Shares (0/1)	-1.634 (1.113)	-1.724* (1.047)	-1.625 (1.082)
Share Repurchase Size	-0.0329*** (0.00201)	-0.0354*** (0.00213)	-0.0342*** (0.00210)
Observations	129,396	104,620	122,834
Perferred Stock on Balance Sheet	Yes	No	Yes
Utilities	Yes	Yes	No
Panel B: Australia vs USA subsample test			
Dependent Variable	EBITDA to TA*AUS		
	(1)	(2)	(3)
Repurchase Shares (0/1)	-0.147 (0.553)	-0.0850 (0.643)	-0.192 (0.623)
Share Repurchase Size	-0.0358*** (0.00129)	-0.0358*** (0.00129)	-0.0333*** (0.00116)
Observations	153,510	130,517	146,884
Perferred Stock on Balance Sheet	Yes	No	Yes
Utilities	Yes	Yes	No

Table 10: Share Repurchase Size: Sensitivity of Cash Flow (with EBIT as our measure of Cash Flow)

This table shows estimation results of Eq. (1) where the dependent variable is the share repurchase size and the functional form is linear regression. All estimations include the independent variables *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Columns (1), (2), and (3) report estimation results for New Zealand, Australia, and the United States firms, respectively. Column (4) reports results for the sample consisting of both New Zealand and United States firms and includes NZ indicator (0/1) and EBIT to TA*NZ as variables of interest. Column (5) reports results for the sample consisting of both of Australia and United States firms and includes AUS indicator (0/1) and EBIT to TA*AUS as variables of interest. The sample period is 1994 through 2016. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	Dependent Variable: Share Repurchase Size				
	(1) NZ	(2) AUS	(3) USA	(4) NZL/USA	(5) AUS/USA
EBIT to TA	-0.000421 (0.000604)	-0.000125 (0.000176)	0.0207*** (0.00205)	0.0207*** (0.00205)	0.0208*** (0.00204)
NZ (0/1)				-0.00774*** (0.000470)	
EBIT to TA* NZ				-0.0247*** (0.00230)	
AUS (0/1)					-0.00934*** (0.000226)
EBIT to TA* AUS					-0.0234*** (0.00192)
NOP to TA	0.00310 (0.00347)	0.00127** (0.000608)	0.00960*** (0.00250)	0.00912*** (0.00237)	0.00443*** (0.00109)
CHE to TA	-0.000193 (0.000415)	4.06e-05 (7.35e-05)	0.00739*** (0.000523)	0.00735*** (0.000516)	0.00588*** (0.000392)
TA	6.74e-08 (1.45e-07)	2.16e-07*** (8.04e-08)	5.40e-07*** (5.90e-08)	5.39e-07*** (5.88e-08)	5.32e-07*** (5.69e-08)
Dividends to TA	0.0230** (0.0106)	0.00947*** (0.00366)	0.0757*** (0.00951)	0.0749*** (0.00911)	0.0626*** (0.00737)
Acquisitions to TA	-0.00253** (0.00121)	-0.000731** (0.000341)	0.00641*** (0.00132)	0.00637*** (0.00131)	0.00523*** (0.00113)
Market to Book	0.000143 (0.000197)	-3.60e-05 (3.10e-05)	-0.00384*** (0.000299)	-0.00325*** (0.000257)	-0.00145*** (8.37e-05)
Total Debt to TA	-0.000105 (0.000427)	6.76e-05 (5.76e-05)	0.00305*** (0.000333)	0.00279*** (0.000330)	0.00178*** (0.000284)
R&D to TA	-0.00125 (0.000769)	0.000700 (0.00104)	0.00554*** (0.00190)	0.00563*** (0.00188)	0.00748*** (0.00174)
Growth	-0.000203 (0.000223)	-4.32e-05 (4.18e-05)	-0.00323*** (0.000295)	-0.00313*** (0.000288)	-0.00232*** (0.000211)
Observations	2,379	26,493	127,017	129,396	153,510
R-Squared	0.008	0.010	0.044	0.045	0.057

Table 11: EBITDA to TA Quintiles (Low to High)

This table shows estimation of Eq. (1) for both dependent variables (*Repurchase Shares (0/1)* and *Share Repurchase Size*). The sample is separated into 5 Quintiles by EBITDA to TA. With Quintile 1 representing firms with the lowest EBITDA to TA, and Quintile 5 includes firms with the highest EBITDA to TA. All estimations include the independent variables (which are not displayed) *EBITDA to TA*, *NOP to TA*, *CHE to TA*, *TA*, *Dividends to TA*, *Acquisitions to TA*, *Market to Book*, *Total Debt to TA*, *Asset Growth*. Standard errors clustered by firm and are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by *, **, and ***, respectively.

VARIABLES	(1) 1st Quintile	(2) 2nd Quintile	(3) 3rd Quintile	(4) 4th Quintile	(5) 5th Quintile
Dependent Variable: Repurchase Shares (0/1)					
Divestments to TA	-1.237** (0.588)	-0.980 (0.907)	-0.553 (0.707)	-0.693 (0.938)	0.988 (0.779)
Dependent Variable: Share Repurchase Size					
Divestments to TA	-0.0108** (0.00454)	-0.0230** (0.00939)	-0.0397*** (0.0122)	-0.0370* (0.0199)	-0.00313 (0.0159)

Table 12: Share Repurchase Size (exluding observations where firms do not repurchase shares)

This table reports share repurchase size (over total assets) for each of our sample countries. Column (1) gives the mean. Column (2) gives the Min. Column (3) gives the Max. Column (4) gives the the number of observatione i.e. the number of firms that engaged in share repurchases for each country

VARIABLES	(1) Mean	(2) Min	(3) Max	(4) Obs
New Zealand				
Share Repurchase Size (NZ)	0.08489	3.90E-06	0.2276	29
Australia				
Share Repurchase Size (AUS)	0.05159	0.000092	0.2276	145
United States				
Share Repurchase Size (USA)	0.0409778	8.11E-08	0.2276067	36,209