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THE INFLUENCE OF R&D INVESTMENT AND DIVIDEND PAYMENT TAX INCENTIVES ON CORPORATE DIVIDEND POLICY

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ABSTRACT

Although much research on corporate dividend policy exists, the evidence is far from conclusive. Understanding how dividend taxes affect firm-level decisions is crucial to evaluating dividend imputation credits which provide shareholder-level tax credits for dividends received or decreased shareholder-level dividend tax rates, which reduce the double taxation of dividends. Using changes in New Zealand and Australia's tax regimes, this paper provides new insight into the corporate dividend policy views. The results support the double taxation and tax irrelevance corporate dividend policy views in dividend-paying firms operating in a tax regime with dividend imputation and capital gains taxes. By documenting a significant decrease in R&D investment and increase in dividend payment after a change in dividend taxes, this paper also highlights a void in the current corporate dividend policy views and demonstrates the need for the inclusion of R&D investment. In New Zealand and Australia, much of the increased dividend payment appears to have come from a decrease in R&D investment. Thus, if a country decides to decrease shareholder-level dividend taxes and the country values investment in R&D, it may need to consider simultaneously increasing the R&D investment incentive.

INTRODUCTION

The role shareholder-level taxes play in corporations' decisions to pay dividends is still debated in academic research. Since Black (1976) posed the questions of why corporations pay dividends given their tax disadvantages and why investors appear to pay attention to them, researchers have tried to explain corporations' dividend policies (McKenzie and Thompson, 1997; Miller and Scholes, 1978). Poterba and Summers (1985, 1) reiterate Black's ideas, and they demonstrate that when governments tax corporate profits at the corporate level and again when they are distributed to shareholders as dividends, corporations should not pay dividends. Shareholders should prefer that corporations retain earnings where they can continue to be invested by the corporation and increase the corporation's value (Poterba and Summers, 1985). Since paying dividends is common among U.S. corporations, corporate dividend policy is obviously not this straightforward (Poterba, 1987; John and Williams, 1985; Poterba and Summers, 1985).

Three perspectives on how shareholder-level taxes affect firms' corporate dividend policy dominate the literature: the tax irrelevance view, the tax capitalization (or residual) view, and the double taxation view (McKenzie and Thompson, 1997; Zodrow, 1991; Poterba, 1987; Poterba and Summers, 1985). These three views differ as to why corporations pay dividends, how dividend taxes at the shareholder-level affect dividend payment, and what changes in shareholder-level dividend tax policy mean for corporate investment.

Utilizing natural experimental settings in Australia and New Zealand, this paper demonstrates that the R&D investment and dividend payments vary according to the country's tax incentives for R&D investment and taxation of dividend payments. The results support the double taxation and tax irrelevance views in dividend-paying firms operating in a tax regime with dividend imputation and capital gains taxes. This paper also documents significant decreases in R&D investment when a tax regime provides dividend implementation but does not provide explicit incentives for R&D investment. Thus, if a country decides to decrease shareholder-level dividend taxes and the country values investment in R&D, consideration should be given to simultaneously increasing the R&D investment incentive. Current dividend policy views do not include R&D investment in their predictions, and researchers tend to add it to capital investment to determine a firm's overall investment. This paper documents the importance of looking at R&D investment separate from capital investment.

This paper proceeds by further explaining the tax changes in New Zealand and Australia. It then reviews each of the three corporate dividend policy views. A literature review of the three corporate dividend policy views then demonstrates that the evidence is inconclusive. The hypotheses are developed and followed by a discussion of the data and analysis. Lastly, the results are presented and implications of the paper and its findings are discussed.

COUNTRY SETTINGS

Effective July 1985, Australia implemented R&D super-deductibility which permitted companies to deduct 150 percent of their R&D cost if the total annual R&D expenditure was greater than 20,000 Australian dollars and the company registered with the Industry Research and Development Board (Parliament of Australia: Senate Committee Report on Business Taxation Reform, 1999). As shown in Table 1, Panel A, prior to July of 1985, firms were permitted to deduct 100 percent of R&D. In July 1987, Australia implemented an incentive for dividend payments known as a dividend imputation credit (Table 1, Panel B). A dividend imputation credit reduces the double taxation of dividends by providing shareholder-level tax credits for dividends received or decreased shareholder-level dividend tax rates. The dividend tax credit enabled shareholders to receive a credit known as a "franking credit" for the portion of dividends paid out of a company's after-tax profit or "franked dividends" (Petty et al., 2000, 30). Although Australia refers to its imputation credit as a franking credit, to be consistent with the terminology in the literature, this paper continues to refer to it as an imputation credit. Thus, shareholders calculated their imputed credit on fully-franked dividends as follows:

$$\text{Imputation Credit} = \frac{\text{Dividends} * \text{Company tax rate}}{1 - \text{Company tax rate}}$$

Shareholders report the amount of the “franked dividend” they receive plus the imputation credit in their gross incomes (where the addition of the imputation credit “grosses up” the dividend received to a before-tax amount). They then claim the imputation credit against their tax liability (Petty et al., 2000, 31). For example, in 1988 when the maximum corporate and individual tax rates were both 48 percent, without dividend imputation, an Australian individual receiving a dividend of \$100 from an Australian corporation in the 48 percent tax bracket would have reported \$100 in gross income and been liable for \$48.00 in taxes. However, with dividend imputation, the individual reported not only the \$100 in gross income but also the \$92.31 imputation credit, calculated according to the above equation. The resulting \$192.31 total increase in gross income, increased the individual shareholder’s tax before credits by \$92.31 (i.e. \$192.31 times 48 percent individual tax rate). This \$92.31 tax liability is fully offset when the \$92.31 imputation credit is applied against it. Thus, the individual effectively received the \$100 dividend from the corporation free of additional tax.

As summarized in Panel B of Table 1, Australia also added an individual-level capital gains tax in July 1987. Prior to this date, individuals only paid tax on the gain from selling shares if they held the shares less than 12 months. Since July 1987, when individuals hold shares over one year, they pay tax on the difference between the sale price and the shares’ cost, indexed for inflation. They then include this gain in gross income where it is taxed at regular rates. However, shareholders no longer pay tax on fully-franked dividends they receive while holding the stock (Thomas and Sellers, 1994, 87).

Prior to April of 1988, New Zealand taxed individual residents’ worldwide taxable incomes, including dividends, at a three-rate scale of 15, 30, and 48 percent (Cameron, 1996). In April of 1988, the three-rate scale on individual residents’ worldwide incomes was reduced to a two-rate scale of 24 and 34 percent. As Panel C of Table 1 shows, corporate rates also fell from 48 to 33 percent (Brash, 1996). At this time, New Zealand also implemented a dividend imputation credit (Prevost et al., 2002, 1100).

Similar to Australia’s dividend imputation credit, New Zealand residents include dividends received plus the corporate tax on these dividends (i.e. gross-up amount) in gross income. They then offset their individual tax liabilities with the tax the corporation has already paid, i.e. imputation credit (Prevost et al., 2002, 1081). Prior to 1988, New Zealand permitted corporations a 100 percent deduction for R&D expenditures. While the tax changes in 1988 did not alter the R&D deduction, the 15 percent reduction in the maximum corporate tax rate reduced the value of deducting R&D expenditures (Brash, 1996). For example consider a firm with an income of \$20,000 before their R&D expense of \$1,000. Prior to the tax change the firm would save \$480 ($\$1,000 * .48$) in taxes via the R&D deduction; after the tax change the same amount of R&D expense, \$1,000, would only save the firm \$330 ($\$1,000 * .33$) in taxes.

The settings in Australia and New Zealand provide unique opportunities in which to test the relationship between R&D investment and dividend payment. Australia went from a tax

regime without tax incentives for R&D investment or dividend payment to a tax regime with a tax incentive only for R&D investment and then to a tax regime with tax incentives for both R&D investment and dividend payment. New Zealand went from a tax regime without tax incentives for R&D investment or dividend payment to a tax regime offering a tax incentive for dividend payments. New Zealand did continue its 100 percent deduction of R&D. However, Thomas et al. (2003) did not classify countries with only a 100 percent R&D deduction as ones offering incentives for investment in R&D. For comparability, I use the same classification approach.

Table 1: Summary of Australian and New Zealand Tax Changes		
Panel A: Tax Changes in Australia (effective July 1985)		
	<u>Prior to the Tax Change</u>	<u>After the Tax Change</u>
R&D Investment	Immediate deduction for 100 percent of investment	Immediate deduction for 150 percent of investment
Dividends Received	Taxed fully at shareholder level	Same
Capital Gains Realized	Taxed at individual rates only if held for less than 12 months; otherwise, no tax applied	Same
Panel B: Tax Changes in Australia (effective July 1987)		
	<u>Prior to the Tax Change</u>	<u>After the Tax Change</u>
R&D Investment	Immediate deduction for 150 percent of investment above \$20,000 AUS	Same
Dividends Received	Taxed fully at shareholder level	Credit for the portion of the dividend on which the corporation had already paid tax (“franked dividend”)
Capital Gains Realized	Taxed at individual rates only if held for less than 12 months; otherwise, no tax applied	Taxed at the individual tax rate on the difference between the consideration received and the indexed cost base
Panel C: Tax Changes in New Zealand (effective April 1988)		
	<u>Prior to the Tax Change</u>	<u>After the Tax Change</u>
R&D Investment	Immediate deduction for 100 percent of investment	Same
Dividends Received	Taxed fully at shareholder level	Credit for the portion of the dividend on which the corporation had already paid tax
Top Corporate Tax Rate	48 percent	33 percent

CORPORATE DIVIDEND POLICY VIEWS

The three views explaining why corporations pay dividends, the tax irrelevance view, the tax capitalization view and the double taxation view, differ in the calculation of the corporation’s

cost of capital and the components included in this calculation. This difference leads to varying predictions in the event of a change in shareholder-level dividend taxes. This section reviews each corporate dividend policy view's calculation of corporate cost of capital and prediction of alterations in behavior following a change in shareholder-level dividend taxes. Table 2 summarizes the implications for firms under each scenario according to each of the three corporate dividend policy views.

Table 2: Tax Change Implications for Firms Typically Paying Dividends			
Panel A: Given No Explicit Incentive for R&D Investment, the Effect of a Dividend Imputation Credit			
	R&D Investment	Capital Investment	Dividend Payment
Tax Irrelevance	No Change	No Change	No Change
Tax Capitalization	No Change	No Change	No Change
Double Taxation	-----	Increase	Increase
Panel B: Given No Explicit Incentive for R&D Investment, the Effect of a Decrease in Corporate Tax Rates			
	R&D Investment	Capital Investment	Dividend Payment
Tax Irrelevance	-----	Increase	-----
Tax Capitalization	-----	Increase	-----
Double Taxation	-----	Increase	Increase
Panel C: Given an Explicit Incentive for R&D Investment, the Effect of a Dividend Imputation Credit			
	R&D Investment	Capital Investment	Dividend Payment
Tax Irrelevance	No Change	No Change	No Change
Tax Capitalization	No Change	No Change	No Change
Double Taxation	-----	Increase	Increase
Panel D: Given a Dividend Imputation Credit and an Explicit Incentive for Investment in R&D, the Effect of Capital Gains Tax on Firms			
	R&D Investment	Capital Investment	Dividend Payment
Tax Irrelevance	No Change	No Change	No Change
Tax Capitalization	-----	Decrease	-----
Double Taxation	-----	-----	-----
Indicates no prediction. According to the dividend policy view, the variable could increase, decrease, or remain the same.			

Tax Irrelevance View

In the tax irrelevance view investors do not demand that corporations pay greater returns on equity instruments when shareholder-level dividend tax rates or capital gains tax rates decrease. Instead investors with similar tax characteristics form tax clienteles. For example, individuals or institutions with low shareholder-level dividend tax rates (or MTRs) hold stocks

with high dividend payments. Likewise investors facing high shareholder-level dividend tax rates will hold stocks with low dividend payments. Due to uncertainty, investors also hold some stock inconsistent with their tax-preferred dividend payment for diversification. Thus, a “marginal investor clientele” forms which is indifferent between receiving dividends or capital gains. The marginal investor is the investor who determines the market price of the securities under consideration. Under the tax irrelevance view this is the investor whose marginal tax rates on dividends and capital gains are virtually equal (Poterba and Summers, 1985, 11). Further, as clarified below, the effective shareholder-level dividend tax rate and capital gains tax rate of these marginal investors is zero (Poterba and Summers, 1985; Miller and Scholes, 1978; Miller and Modigliani, 1961).

Miller and Scholes (1978), proponents of this view, argue that all personal taxes can be effectively laundered. For example, a marginal investor who is selling stock at a loss will also sell stock with a gain, bringing his effective capital gains rate to zero. Further, a marginal investor consisting of a pension fund, university, or charity pays no tax and, thus, has a zero tax rate on both shareholder-level dividends and capital gains. Since the effective shareholder-level dividend and capital gains tax rates for the marginal investor are zero, the return to the marginal investor for one dollar initially invested is the return on the investment after corporate-level taxes. Neither the shareholder-level dividend tax rate nor the capital gains tax rate factor into the corporation’s cost of equity capital. Since a permanent change in shareholder-level dividend taxes or capital gains taxes will not result in a change in the corporate cost of equity, corporate investments and dividend payment policies will not change.

Tax Capitalization View

The tax capitalization view states that shareholder-level dividend taxes are an additional tax on corporations’ profits, and thus shareholders capitalize future dividend taxes into share values (Auerbach, 1979; King, 1977). Corporations only pay dividends when they have cash remaining after paying all other obligations and it is the only method for them to distribute this trapped equity. Since an alternative tax-advantaged method of distributing the income does not exist, corporations finance dividends with this remaining or residual cash. In other words, dividends do not signal the market; they merely return trapped equity to stockholders (McKenzie and Thompson, 1997; Zodrow, 1991; Poterba and Summers, 1985).

These firms continue to use retained earnings for corporate investment until investors are indifferent between reinvesting within the firm and receiving additional dividends. Not paying dividends defers the tax on the corporation’s earnings from the original investment and causes stock price appreciation. This tax deferral offsets the later shareholder-level dividend tax (Zodrow, 1991, 500; Poterba and Summers, 1985, 15). In other words, the after-tax appreciation of the stock equals the after-tax value of foregone dividends. For instance, if a corporation uses one dollar for new investment, instead of paying one dollar in dividends, the shareholder does

not have to pay the shareholder-level dividend tax and thus saves an amount equal to the shareholder-level dividend tax rate. However, the reinvested one dollar will increase the stock price causing the shareholder to pay a capital gains tax. In equilibrium, the cost to the shareholder of the corporation investing one dollar instead of paying one dollar in dividends equals the value of the new investment, q^N , which is reflected in the stock price as follows:

$$q^N = (1 - \text{Shareholder-Level Dividend Tax Rate}) + (\text{Capital Gains Tax Rate})(q^N) \quad (1)$$

where $(1 - \text{Shareholder-Level Dividend Tax Rate})$ is the after-tax dividend the shareholder would have received if the corporation had paid dividends and $(\text{Capital Gains Tax Rate})(q^N)$ is the capital gains tax the shareholder pays as a result of the increase in stock price the new corporate investment causes. Rewriting equation (1) in terms of the value of the corporate-level investment of one dollar in equilibrium results in the following:

$$q^N = \frac{1 - \text{Shareholder-Level Dividend Tax Rate}}{1 - \text{Capital Gains Tax Rate}} \quad (2)$$

Whether the corporation pays a dollar of dividends or uses it for corporate investment, the value to the shareholder of each initial dollar invested in the company is the same, and thus dividend tax policy plays a role in the value of the corporation but does not influence corporate investment.

To demonstrate this, consider two scenarios, one in which the corporation pays dividends and one in which it foregoes paying dividends for corporate investment. In both cases the individual initially owns 50 shares of stock, each valued at \$1.40, giving him a total stock value of \$70. The shareholder-level dividend tax rate is 46 percent, and the capital gains tax rate is 10 percent.

Scenario A: The corporation pays a cash dividend of \$1 per share.

Since the dividend is paid and not used for corporate reinvestment, the value of the stock does not change. The individual pays \$23 in shareholder-level dividend taxes [(\$1 dividend per share) (50 shares) (0.46 dividend tax rate)], receives \$27 after shareholder-level dividend taxes [(\$1 dividend per share) (50 shares) – \$23 shareholder-level dividend tax], and holds a total of \$70 worth of stock.

Scenario B: Instead of paying the \$100 dividend, the corporation uses it for new investment.

In accordance with equation (2), the corporate investment will cause the stock price to increase by \$0.60 per share [(\$1 foregone dividend) $(1 - 0.46 \text{ shareholder-level dividend tax rate}) / (1 - 0.10 \text{ capital gains tax rate})$]. The individual will pay a capital gains tax of \$3 [(\$0.60

share price increase) (50 shares) (0.10 capital gains tax rate)]. The individual now owns 50 shares worth \$2 each (\$1.40 original stock price + \$0.60 increase in stock price), for a total stock value of \$100. Now, suppose, the individual decides to sell stock equal to his overall stock value increase of \$30 [(\$0.60 increase in stock price)(50 shares)]. Since his shares each have a value of \$2, he sells 15 shares. This leaves him with \$70 worth of stock [(\$2 per share) (50 initial shares – 15 sold shares)]. The total value of the stock, \$70 is now the same as it was in Scenario A when the corporation paid a \$1 dividend instead of investing it. Further, the total amount the shareholder has received is \$27 [(\$30 from stock sale) – (\$3 capital gains tax)], the same amount received in Scenario A.

To summarize the total distribution the individual in Scenario A receives is \$27 (\$1 dividend * 50 shares - \$1 * 50 shares * 0.46 shareholder-level dividend tax rate) which equals the total distribution the individual in Scenario B receives after selling the portion of stock equal to the capital gain:

$$\left[\frac{(1 - 0.46 \text{ Shareholder - Level Dividend Tax Rate})}{(1 - 0.1 \text{ Capital Gains Tax Rate})} \right] * 50 \text{ shares} - \$3 \text{ Capital Gains Tax} = \$27$$

Now suppose that instead of selling the 15 shares in Scenario B, the individual continues to hold all 50 shares and the corporation pays as dividends all after-corporate-level tax returns from the new capital investment. The individual will receive the return on the investment, less corporate tax and shareholder-level dividends taxes. The individual will be content with this after-tax return as long as it is greater than or equal to the initial cost of each dollar of investment, q^N , as defined in equations (1) and (2). Each period the individual's after-tax return will be determined by the rate of return of the new corporate investment, the corporate tax rate and the shareholder-level dividend tax rate. Again, the individual will expect this after-tax return to equal the initial cost of the investment, q^N , leading to the following equation:

$$q^N = \frac{1 - \text{Shareholder - Level Dividend Tax Rate}}{1 - \text{Capital Gains Tax Rate}} = \tag{3}$$

Before - Tax Rate of Return * (1 – Corporate Tax Rate) * (1 - Shareholder - Level Dividend Tax Rate)

As you can see, the shareholder-level dividend taxes in equation (3) cancel out, demonstrating that the level of corporate investment is influenced only by corporate tax rates and capital gains tax rates. Rewriting equation (3) reveals that the value to the individual of the return per initial dollar invested is as follows:

$$q^N = (\text{Before- Tax Rate of Return})(1 - \text{Corporate Tax Rate})(1 - \text{Capital Gains Tax Rate}) \tag{4}$$

Thus, while a permanent change in shareholder-level dividend tax rates will increase the price of the stock, unless coupled with a change in capital gains tax rates, it will not result in a change in corporate investments or dividend payment policies (Poterba and Summers, 1985).

Double Taxation View

Similar to tax capitalization view, the double taxation view contends that shareholder-level dividend taxes are an additional tax on corporate profits. The shareholder's after-tax return is calculated in equation (5):

$$\begin{aligned} \text{Shareholder-Level After Tax Return} = & [(\text{Before Tax Rate of Return}) (1 - \text{Corporate Tax Rate})] \\ & * [(\text{Dividend Payment Rate}) (1 - \text{Shareholder-Level Dividend Tax Rate}) \\ & + (1 - \text{Dividend Payment Rate})(\text{Capital Gains Rate})] \end{aligned} \quad (5)$$

The twist is that the double taxation view holds that despite their tax disadvantage, shareholders reward corporations when they pay dividends by increasing the stock price. Note that this differs from the tax capitalization view that stock prices rise when corporations reinvest instead of paying dividends. Proponents of the double taxation view do not claim to know the reason for the increase in stock price but simply accept that the market rewards corporations when they pay dividends (Poterba and Summer, 1985; McClure, 1977). Therefore, as shown below in equation (6), the shareholder's required rate of return (corporations' cost of capital) depends on corporate taxes and the weighted average of shareholder-level dividend and capital gains taxes:

$$\begin{aligned} \text{Shareholder-Level After Tax Return} = & [(\text{Before Tax Rate of Return}) (1 - \text{Corporate Tax Rate})] \\ & * [(w)(\text{Dividend Payment Rate}) (1 - \text{Shareholder-Level Dividend Tax Rate}) \\ & + (1 - w) (1 - \text{Dividend Payment Rate})(\text{Capital Gains Rate})] \end{aligned} \quad (6)$$

where (w) is the weight shareholders place on dividend taxes, which depends on the dividend payout ratio. When dividend payout ratios are high, shareholders place less weight on shareholder-level dividend taxes (w) and more weight on capital gain taxes ($1 - w$). This reduces the weighted average tax rate of dividends and capital gains and the shareholder's required rate of return. This lower weighted average tax rate of dividends and capital gains entices firms to pay dividends despite their tax disadvantages (Zodrow, 1991; Poterba and Summers, 1985). A decrease in shareholder-level dividend taxes decreases the amount corporations have to pay for the shareholder's after-tax dividend to remain constant. In other words the decrease in shareholder-level dividend taxes reduces the cost of paying dividends and receiving the increase in stock price. This motivates the corporation to increase the dividend payout ratio, decreasing

the weighted average tax rate of dividends and capital gains and increasing investment (Zodrow, 1991; Poterba and Summers 1985).

PRIOR RESEARCH

Prior research examines the three corporate dividend policy views in a variety of settings. The literature has not reached a consensus as to the correct view. The three views of corporate dividend policy, the tax irrelevance view, the tax capitalization view and the double taxation view, are not necessarily mutually exclusive. They could each hold true for certain corporations under certain conditions (Poterba and Summers, 1985, 2).

The first of the three corporate dividend policy views is the tax irrelevance view. Under this view, a corporation's decision to invest is independent of its decision to pay dividends (Miller and Modigliani, 1961). Miller and Scholes (1978) warn that many studies rely on short-term responses to dividends when testing the relationship between taxes and dividend yield or the relationship between taxes and rate of return. As a result, findings that do not support the tax irrelevance view often are suspect. They demonstrate that dividend announcement effects, which also increase rates of return in the short run, bias these studies by creating short-term price increases.

The tax irrelevance view assumes operation in perfect capital markets; everyone in the market has the same expectations of future earnings and amount of risk involved. In other words, everyone participating in the market has the same information set (Mougoue and Mukherjee, 1994). But, researchers have found evidence that managers have superior information regarding their corporations. Since information asymmetry exists, dividends provide a signal to the market (Bhattacharya, 1979; Ross, 1977).

The tax irrelevance view also assumes transaction costs and taxes do not exist (Mougoue and Mukherjee, 1994). However, Easterbrook (1984) contends that not only do taxation costs exist but agency costs also influence dividend payments. Managers are imperfect agents of investors, and paying dividends helps to restrict their discretion.

The second corporate dividend policy view, the tax capitalization view states that despite the fact that shareholder-level dividend taxes are an additional tax on corporations' profits, shareholders capitalize future dividend taxes into share values. The after-tax appreciation of the stock equals the after-tax value of foregone dividends. Thus, a permanent change in dividend taxation, unless coupled with a change in capital gains taxation, will not result in a change in corporate investments or dividend policies (Poterba and Summers, 1985, 15; Zodrow, 1991, 500).

Looking at the financing choices of corporations, Masulis (1980) finds that stock prices increase when corporations exchange debt for equity and decrease when corporations exchange equity for debt. In his opinion, this supports the tax capitalization view: when debt replaces equity, stock prices increase because they now incorporate future dividends into the price.

Contrary to Masulis' study (1980), Myers-Majluf's theory (1984) predicts the opposite: corporations tend to issue equity when their shares are over-valued. Consistently, Masulis and Korwar (1986) and Vermaelen (1981) find that new stock issues lower stock prices while repurchases raise stock prices.

Elton and Gruber (1970) argue in favor of the tax capitalization view by showing that stock prices fall on ex-dividend days. The stock price falls because the dividend is no longer included in the stock price. Eades et al. (1984) refute this finding by demonstrating that stock dividends, which are not subject to a shareholder-level tax, produce similar results in the stock prices on ex-dividend dates.

Fama and French (1997) also look for evidence in support of the tax capitalization view using asset pricing models. If the tax capitalization hypothesis is true, they expect a negative relationship between corporate value and dividend payments. When a corporation pays dividends, the payout should no longer be included in the firm's future value; thus, the stock price should decline. Instead, they find a positive relationship between firm value and dividends and a negative relationship between leverage and value. They conclude that dividends and debt convey information to the market about profitability that is not captured elsewhere.

This potential for dividend signaling and the restriction of manager discretion is incorporated into the third view, the double taxation view (Poterba and Summers, 1985; McClure, 1977). Similar to dividend tax capitalization, this view contends that shareholder-level dividend taxes are an additional tax on corporate profits. The double taxation view holds that despite their tax disadvantage, shareholders still reward corporations when they pay dividends by increasing the corporate value (Poterba and Summers, 1985; McClure, 1977). The higher the dividend payout ratio, the lower the weighted average tax rate of dividends and capital gains, and the lower the shareholder's required rate of return (Zodrow, 1991; Poterba and Summers, 1985).

Using British data before and after changes in the way Great Britain taxes corporate retained and distributed income, Poterba and Summers (1985) find that the double taxation view is the closest match to their results and reject both the tax irrelevance and tax capitalization views. Their results show that changes in dividend taxation significantly impact ex-dividend price movements. Dhaliwal et al. (2003) also use the Revenue Reconciliation Act of 1993 to investigate the effects of the increase in the highest individual tax bracket on stock prices. They document a positive relationship between dividend yield and long-term stock returns which is mitigated by institutional ownership which supports the traditional double taxation view.

HYPOTHESES

This paper examines a shareholder-level dividend tax in two countries which have different tax treatments for R&D investment and which change their shareholder-level dividend tax policies over the time period investigated. Since firms often deduct R&D in the year incurred, R&D investment is tax favored in comparison to capital investment. Additional R&D

tax incentives come in a multitude of guises. Tax regimes can offer R&D tax credits based on flat rates (Canada), R&D tax credits based on incremental rates above a base (France, Japan, Spain, and the United States), or super-deductibility (more than 100 percent) of R&D expenses (Austria and Australia). Researchers still debate the effectiveness of R&D tax incentives in increasing R&D investment and the organizational factors influencing this investment (Hoskisson and Johnson, 1992; Goel, 1990; Hill and Snell, 1989; Bradley et al., 1984; Link and Long, 1981).

In July of 1985, Australia implemented an R&D investment tax incentive in the form of super-deductibility. Super-deductibility permitted companies to deduct 150 percent of their R&D expenses. While New Zealand did not offer an explicit tax R&D incentive, R&D expenses were 100 percent deductible. I use the same classification approach as Thomas et al. (2003) and do not classify countries with only a 100 percent R&D deduction as countries offering incentives for investment in R&D. During this study, both New Zealand and Australia also begin taxing corporate profits only once through dividend imputation credits. Though countries can implement such credits in a variety of ways, the net effect of a dividend imputation credit is to reduce the double taxation of dividends by reducing the tax shareholders pay on dividend income they receive. Table 3 summarizes these changes and defines the four tax regimes.

	Time Period	R&D Investment Incentive	Dividend Payment Incentive
Tax Regime I	Australia prior to July 1985 New Zealand prior to April 1988	No	No
Tax Regime II	Australia from July 1985 to June 1987	Yes	No
Tax Regime III	New Zealand after March 1988	No	Yes
Tax Regime IV	Australia after June 1987	Yes	Yes

Effect of Dividend Imputation in the Absence of Explicit R&D Incentives

The dividend policy views vary in their predictions of the effects of a dividend imputation credit. As summarized in Table 2, Panel A, the tax irrelevance view predicts that dividend imputation credits will not change the dividend payment or the relationship between R&D investment and dividend payment. Similarly, the tax capitalization view states that any change in the dividend payment is the result of a change in the firm's corporate investment opportunities; thus, a dividend imputation credit will not change the firm's corporate investment policy.

Only the double taxation view of dividend policy suggests that a change in the way dividends are taxed will alter the dividend payment. According to this view, the market rewards dividend-paying firms by increasing stock prices when firms pay dividends. A decrease in the dividend tax decreases the amount of pre-tax dividend necessary for shareholders to receive the same after-tax dividend. This reduction in the cost of equity capital reduces the firm's cost of receiving the market's reward of an increased stock price. Thus, capital investment and the dividend payout ratio will increase (Poterba and Summers, 1985, 4). As mentioned earlier, prior

corporate dividend policy research does not address R&D investment alone. Instead it either includes it as part of capital investment or excludes it completely. Thus, the double taxation view of corporate dividend policy does not predict a direction for the change in R&D investment (Table 2, Panel A). Following a decrease in dividend taxes, the increases in the capital investment and dividend payment predicted by the double taxation view have to be funded by either the decrease in the average cost of capital, newly raised capital or as suggested by Thomas et al. (2003), a decrease in R&D investments. New Zealand's 1988 tax change provides a setting in which to explore these relationships and dividend views.

In 1988, New Zealand changed its tax regime from one offering tax incentives for neither R&D investment nor dividend payment to one offering tax incentives for paying dividends. New Zealand did continue to offer immediate deduction of 100 percent of the R&D expenses. To be consistent with prior literature, the 100 percent deduction is not classified as an explicit incentive to invest in R&D. According to Thomas et al. (2003), after this change, New Zealand firms that typically paid dividends should have now found paying dividends more attractive than investing in R&D. At this time, New Zealand also decreased its highest corporate tax rate by 15 percentage points (from 48 to 33 percent). This reduced the tax benefit of the implicit incentive for R&D investment, making the incentive for the payment of dividends even stronger. This does not alter the predictions under the double taxation view. However, corporate tax rates affect the cost of capital calculation under both the tax irrelevance and tax capitalization views of corporate dividend policy. Reducing the cost of capital results in an increase in capital investments according to both of these views (McKenzie and Thompson, 1997; Zodrow, 1991; Poterba and Summers, 1985; Miller and Scholes, 1978). Panels A and B of Table 2 summarize the effects these tax changes should have on dividend-paying firms and their R&D investment, capital investment, and dividend payment according to the three views of how dividend taxes affect corporate dividend policies.

Defining Tax Regime III as providing only a tax incentive for dividend payment (Table 3), the first hypothesis is as follows:

H1a When a country moves from Tax Regime I to Tax Regime III, dividend-paying firms will alter their R&D investment.

H1b When a country moves from Tax Regime I to Tax Regime III, dividend-paying firms will increase their capital investment.

H1: When a country moves from Tax Regime I to Tax Regime III, dividend-paying firms will increase their dividend payment.

Effect of Dividend Imputation in the Presence of Explicit R&D Incentives

Australia's 1987 tax change also provides a setting in which to test the relationships among the uses of firm resources and the views of what affects corporate dividend policy. In July of 1987, Australia altered its tax regime from one offering tax incentives only for R&D

investment (defined as Tax Regime II in Table 3) to one offering tax incentives both for R&D investment and dividend payments (defined as Tax Regime IV in Table 2). According to the double taxation view, the implementation of a dividend imputation credit will directly impact the payment of dividends in dividend-paying firms (Table 2, Panel C). The dividend imputation credit allows firms to pay less in dividends while shareholders receive the same after-tax dividend payment. The reduced equity costs make paying dividends and capital investments attractive uses of firm resources (Poterba and Summers, 1985, 4).

At this time, Australia also implemented a capital gains tax. A capital gains tax would not cause a change in the dividend payment or investment policy under the tax irrelevance view. The tax capitalization view contends that implementing a capital gains tax will decrease the after-tax appreciation shareholders receive when they sell their stock (Table 2, Panel D). In turn, this will increase the cost of capital and discourage capital investment (McKenzie and Thompson, 1997, 9). Under the double taxation view, the cost of capital depends on a weighted average of shareholder-level dividend taxes and capital gains taxes. An increase in capital gains taxes alone would increase a firm's cost of capital. This increase in the cost of capital would decrease investments and dividend payout ratios. However, when coupled with dividend imputation which as discussed above, has the opposite effect on the cost of capital, it is not possible to predict the movement in R&D investment, capital investment, or dividend payment.

H2a When a country moves from Tax Regime II to Tax Regime IV, dividend-paying firms will alter R&D investment.

H2b When a country moves from Tax Regime II to Tax Regime IV, dividend-paying firms will increase capital investment.

H2c When a country moves from Tax Regime II to Tax Regime IV, dividend-paying firms will increase dividend payment.

DATA AND METHODOLOGY

To test the hypotheses, I examine pooled cross-section firm-year Australian and New Zealand data from the fiscal year ending 1982 to the fiscal year ending 1993. Where available, the data comes from the Worldscope Global Researcher Database via Thompson Financial and Datastream Advance 4.0. The remainder of the data is hand-collected from the Australian Graduate School of Management Annual Report File and the Australian Stock Exchange annual reports housed in Perth, Western Australia. Only domestic dividend-paying firms are kept in the sample since these are the firms which will be most affected by a tax change in their country. Consistent with Thomas et al. (2003), this paper defines domestic firms as those with (1) less than 50 percent of their total sales due to foreign sales, (2) less than 50 percent of their total assets located abroad, and (3) less than 50 percent of their total income due to foreign income. The complete sample contains 498 firm-year observations.

In each case, I deflate R&D expense and capital expenditures by size. I deflate dividend payment by earnings. To test each hypothesis, I use the nonparametric Wilcoxon-Mann-Whitney test. I run the Wilcoxon-Mann-Whitney test because Bartlett's test for equal variances rejects the null hypothesis of equal variances in each of the deflated variables, and thus the parametric t-test would not be appropriate. I use a two-tailed test when the hypothesis is non-directional and a one-tailed test when the hypothesis is directional.

RESULTS

The first hypothesis investigates actions of dividend-paying firms moving from Tax Regime I to Tax Regime III—New Zealand before and after dividend imputation. H1 compares the amounts of dividend payment, capital investment, and R&D investment in Tax Regime II with Tax Regime IV, to determine the dominant dividend policy view. Using the nonparametric Wilcoxon-Mann-Whitney test to investigate H1a reveals that R&D expense deflated by size changed (decreased) significantly ($z = 1.80$, $p = 0.0714$) after dividend imputation. Running the same test on capital expenditures, deflated by size and dividend payment, deflated by earnings investigates H1b and H1c. The results do not show a significant change in the median of capital expenditures; thus, H1b is not supported. However, they do indicate a marginally significant increase in dividend payment ($z = -1.25$, $p = 0.10$) after dividend imputation, supporting H1c. When New Zealand moved from Tax Regime I to Tax Regime III, it also lowered its corporate tax rate. As Table 2, Panel B shows, all of the corporate dividend policy views predict that R&D investment could change and that capital expenditures should increase after moving from Tax Regime I to Tax Regime III. Further while the double taxation view suggests that dividend payment should increase, the other two views also hold that it may. Since capital investment did not increase, the results cannot support one corporate dividend policy view over another.

The second hypothesis compares dividend-paying firms operating under Tax Regime II with those operating under Tax Regime IV—Australia before and after the implementation of dividend imputation. H2 focuses on changes in investments and dividend payments to investigate the corporate dividend policy views. Running the Wilcoxon-Mann-Whitney test on R&D and capital investment deflated by size and dividend payment deflated by earnings investigates the changes in these variables between the two tax regimes. None of these tests detect significant changes in the medians of these variables when operating under Tax Regime II versus Tax Regime IV. Table 2, Panel D, contains the predictions of the corporate dividend policy views.

The tax irrelevance view predicts no changes in R&D investment, capital investment, or dividend payment. According to the tax capitalization view, R&D investment and dividend payment may increase. However, it also contends that the capital gains tax which was added under Tax Regime IV will decrease the after-tax appreciation shareholders receive when they sell their stock—increasing the cost of capital and decreasing capital investment. The double taxation view does not provide a prediction for the change since dividend imputation and capital gains affect the cost of capital in opposite directions. Thus when comparing the behavior of

dividend-paying firms in Tax Regime II to those in Tax Regime IV, I find support for only the tax irrelevance and double taxation views.

IMPLICATIONS

This paper highlights a void in the current corporate dividend policy views and shows the need for the inclusion of R&D investment. Traditionally these views have only considered capital investment, not R&D investment. This paper demonstrates that R&D and capital investments often move in opposite directions and that tax changes in shareholder-level dividend taxes affect the investment in R&D. Contingent on the R&D tax incentive in place, changes in shareholder-level dividend taxes may place pressure on firms to increase the amount of dividends paid while decreasing the amount of R&D investment. This study found that in both New Zealand and Australia, investment in R&D decreased after the implementation of dividend imputation.

Decreases in investment in R&D could have a negative effect on economic growth since research shows that domestic R&D spending is linked to the rate of innovation and the ability to learn from others (Cameron, 1996; Salter and Martin, 2001). While on the surface, the payment of dividends and R&D investment may seem unrelated, the results of this paper demonstrate this is not true. Therefore when a decrease in shareholder-level dividend taxes designed to stimulate economic growth is implemented, economic growth may be negated by a decrease in R&D investment.

Further, when investigating the results of a tax regime simultaneously ceasing to tax dividends at the shareholder-level and lowering corporate tax rates, I do not find support for any of the current corporate dividend policy views (Table 2, Panel A). I find that in dividend-paying firms, R&D investment and dividend payment change significantly. As shown in Table 3, Panel B, all three of the corporate dividend policy views predict an increase in capital investment. Since I do not find this, I cannot support one view over another in this setting.

However, when investigating the results of a tax regime simultaneously ceasing to tax dividends and implementing a capital gains tax (Table 2, Panel C), I find support for the tax irrelevance and double taxation views in dividend-paying firms. I do not find the significant decrease in capital investment predicted by the tax capitalization view.

More research is needed before the conclusions from this paper can be generalized to countries such as the United States. This is due primarily to the fact that unlike New Zealand and Australia during this paper's sample period, the United States permits share repurchases. When a country allowing share repurchases, implements a dividend payment incentive, funding for increased dividend payments may be drawn from funds previously used for share repurchases instead of from R&D investment funds. Therefore, future study in countries permitting share repurchases is needed before we can generalize the results of this paper to the United States.

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