Tax-Induced Trading and the Identity of the Marginal Investor: Evidence from Sweden

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Abstract

Changes in the Swedish tax code during the 1990s were structured in a way that offers an opportunity to test whether ex-dividend prices were determined by the taxation of domestic individual investors. The results presented in this paper indicate that ex-dividend prices were not influenced by the relatively large tax changes for domestic individual investors. In addition, there was no evidence that the taxation of domestic individual investors influenced ex-dividend prices for any specific dividend yield group.

1 Introduction

In an economy with perfect capital markets, Miller and Modigliani (1961) showed that shareholders are indifferent between dividends and future earnings. This implies that the stock price should decline on the ex-dividend day and that the decline should equal the size of the dividend per share. If this is not the case, investors can exploit the difference to make a profit from arbitrage. However, early empirical studies (e.g., Campbell and Beranek, 1953; Durand and May, 1960) indicated that the price-drop-to-dividend ratio (DOR), also called the ex-dividend price ratio, was less than one and positively correlated with the dividend yield.

Elton and Gruber (1970) showed that the DOR was determined by the differential taxation of dividends and capital gains, i.e., $DOR = (1-\tau_d)/(1-\tau_g)$; where τ_g is the capital gains tax rate and τ_d is the tax on dividends. This implies that the DOR, in an economy where capital gains are taxed more favourably than dividends, should be lower for stocks attracting shareholders in high income tax brackets. To illustrate this result, assume that dividends are fully taxed as ordinary income and that capital gains are only taxable at 40 percent. For an investor with a marginal tax rate of 60 percent, the DOR is then given by $(1-0.6)/(1-0.24) = 0.53$; while the DOR for a stockholder in a lower income tax bracket (e.g., $\tau_d = 40$ percent) is given by $(1-0.4)/(1-0.16) = 0.71$. Using US data, Elton and Gruber (1970) found that the DOR was less than one, and that it was closer to one for low dividend yield stocks than for high dividend yield stocks. In accordance with their model, they interpreted the positive correlation between the DOR and

the dividend yields as a result of tax-induced clienteles, i.e., investors with high marginal tax rates hold low dividend yield stocks and those in lower income tax brackets hold high dividend yield stocks.

However, Kalay (1982, 1984) and Miller and Scholes (1982) argued that marginal tax rates cannot be derived from the DOR because professional traders (e.g., institutional investors) and individual investors face different tax rules. For example, institutional investors are often tax indifferent; while dividends are tax penalised for individual investors (see e.g., Boyd and Jagannathan, 1994). This implies that, if transaction costs are sufficiently low and the DOR is less than one, institutional investors can exploit this relation to make arbitrage profit. Thus, in a small open economy like Sweden, domestic stock prices may be influenced by the arbitrage behavior of foreign institutional investors. Following previous literature, this theory is henceforth defined as the short-term trading hypothesis, while the Elton and Gruber (1970) theory is defined as the tax clientele hypothesis.

The short-term trading hypothesis is supported by empirical work (Lakonishok and Vermaelen, 1986; Karpoff and Walkling, 1988; Michaely and Vila, 1995; Athanassakos, 1996) indicating abnormally high trading volumes around the ex-dividend day. Note that, according to the short-term trading hypothesis, the observed positive correlation between the DOR and the dividend yield occurs because institutional investors prefer to trade with high yield stocks and not because of tax-induced clienteles.

A number of studies (Booth and Johnston, 1984; Poterba and Summers, 1984; Barclay, 1987; Michaely, 1991; Robin, 1991; Athanassakos and Fowler, 1993; Skinner, 1993; de Ridder and Södersten, 1995; and Wu and

Hsu, 1996) have used regime shifts in tax policy to investigate how taxes affect the behaviour of shareholders in the period around the ex-dividend day. The results from these studies are, however, inconclusive. Some of the studies (Poterba and Summers, 1984; Barclay, 1987; Robin, 1991), presented results indicating that taxes influence ex-dividend price behaviour, while other studies (Skinner, 1993; de Ridder and Södersten, 1995) have concluded the opposite.

It is very uncommon that tax policy changes are implemented in such a way that they provide an opportunity to discriminate empirically between competing hypothesis. Bell and Jenkinsson (2002) realised that the 1997 UK tax change provided such an opportunity. The 1997 UK tax reform implied that the taxation of dividend income was increased only for one investor class, namely pension funds. Their results indicated a reduction in the valuation of dividend income, especially for high dividend yield stocks, after the reform was implemented. Bell and Jenkinson (2002, p. 1344) concluded that: *"this provides strong evidence that pension funds were the effective marginal investors for high-yielding companies, and that taxes influence the valuation of companies"*.

The tax policy changes in Sweden during the 1990s were also designed in a way that provides an opportunity to study the impact of taxation on stock prices around the ex-dividend day. We can identify three distinct tax regimes for domestic individual investors in Sweden during the period under study. In this period capital gains have, in relation to dividends, been taxed at a higher, equal and lower marginal tax rate while no change in the tax code is apparent for institutional investors. This provides an opportunity

to test whether changes in the relative taxation of dividends and capital gains for domestic individual investors have influenced stock prices around the ex-dividend day.

The results indicated that the precent price change between the cum - and the ex-dividend day was unaffected by the relatively large tax changes for domestic individual investors in Sweden during the 1990s. This suggest that domestic individual investors were not the marginal investors in Sweden during the study period. Thus, the results provide evidence against the Elton and Gruber (1970) model; where the price change between the cum - and the ex-dividend day is solely driven by the differential tax treatment of capital gains and dividends for domestic individual investors.

The paper is organized as follows. Section 2 presents the theoretical framework for the study. Section 3 contains a description of the tax policy changes in Sweden during the 1990s. The data and the empirical methods are introduced in section 4. In Section 5, the empirical results are presented and commented. Finally, section 6 concludes the article.

2 Theory

Given that the rules of taxation are equivalent for all stockholders, a risk-neutral investor is indifferent between selling a stock on the cum-dividend day or on the ex-dividend day only if the expected price change is equal to the dividend received. Formally, this can be written as

$$P_c - \tau_g(P_c - P_o) - c = E(P_x) - \tau_g(E(P_x) - P_o) + (1 - \tau_d)D - c, \quad (1)$$

where P_o, P_c and $E(P_x)$ are the purchasing price of the stock, the price of the stock on the cum-dividend day, and the expected price of the stock on the ex-dividend day. D denotes the dividend per share, c is a fixed transaction cost, and the tax on capital gains and dividends is given by τ_g and τ_d, respectively.

The price-drop-to-dividend ratio (DOR) can then be written as

$$DOR = \frac{P_c - E(P_x)}{D} = \frac{1 - \tau_d}{1 - \tau_g}. \quad (2)$$

If $\tau_d = \tau_g$, then the right-hand side of equation (2) is equal to one and the change in the stock price is equal to the dividend received. On the other hand, if $\tau_d > \tau_g$, then the DOR should be less than one; while it should be greater than one if $\tau_d < \tau_g$. Using US data, Elton and Gruber (1970) found that the ex-dividend price ratio was less than one, but that it was closer to one for low dividend yield stocks than for high dividend yield stocks, which they interpreted as evidence of a tax clientele effect.

However, Kalay (1982, 1984) argued that the ex-dividend price ratio will also be influenced by the trading strategies of professional institutional traders. The reason is that institutional investors face different marginal tax rates than private investors, and can, therefore, exploit the ex-dividend day price change to make arbitrage profits. To show this formally, assume that private investors face a lower marginal tax rate on capital gains than

on dividends (as in most countries), i.e., $\tau_d > \tau_g$; while $\tau_d = \tau_g = \tau$ is valid for institutional investors. When the expected ex-dividend price ratio is determined by private investors differential taxation of dividends and capital gains, as suggested by Elton and Gruber (1970), equation (2) implies that the dividend per share is larger than the price change between the cum and the ex-dividend day. Kalay (1982) shows that institutional investors, in this case, will buy shares on the cum-dividend day and sell them on the ex-dividend day, as long as the after tax dividend exceeds the expected after tax capital loss (associated with having the share when it goes ex-dividend) and the transaction costs associated with trading in the period around the ex-dividend day. When it is assumed that capital losses are fully deductible this can formally be written as

$$(1-\tau)D > (1-\tau)(P_c - E(P_x)) + 2c(1-\tau). \tag{3}$$

Thus, given that the expected ex-dividend price ratio is determined by private investors preferential tax treatment of capital gains, institutional investors will intervene at the stock market as long as

$$\frac{P_c - E(P_x)}{D} < 1 - \frac{2c}{D}. \tag{4}$$

On the other hand, when dividends are taxed at a lower rate than capital gains for private investors (i.e., $\tau_d < \tau_g$), institutional investors will sell shares on the cum-dividend day and buy them on the ex-dividend day as long as the expected after tax capital loss exceeds the dividend per share and the transaction costs associated with a round trip, i.e.,

$$(1-\tau)(P_c - E(P_x)) > (1-\tau)D + 2c(1-\tau).$$

Therefore, when the ex-dividend price ratio is determined by private investors preferential tax treatment of dividends, an institutional investor will intervene in the stock market to make arbitrage profit as long as

$$\frac{P_c - E(P_x)}{D} > 1 + \frac{2c}{D}. \tag{5}$$

This means that institutional investors will exploit the possibilities for arbitrage until either inequality (4) or (5) no longer holds. Stock prices will, therefore, be influenced by the trading strategy of institutional investors. Accordingly, Kalay (1982, 1984) argues that marginal tax rates cannot be infered from the ex-dividend price ratio as suggested by Elton and Gruber (1970).

From inequalities (4) and (5), it follows that the presence of profit opportunities for institutional investors is directly proportional to the dividend yield. To illustrate this result, assume that the dividend yield is 2 percent; while the expected transaction cost of ex-dividend day trading is 0.2 percent. Given that $\tau_d > \tau_g$, an institutional investor will intervene at the stock market as long as $(P_c - E(P_x)/D) < 0.9$. On the other hand, if the dividend yield is 1 percent the bound is $(P_c - E(P_x)/D) < 0.8$. As a consequence, institutional investors will concentrate their ex-dividend trading on high dividend yield stocks. This means that the observed positive correlation between the DOR and the dividend yield occurs because institutional investors prefer to trade with high dividend yield stocks and not because

of tax-induced clienteles. Moreover, inequalities (4) and (5) imply that the ex-dividend price ratio is constrained to unity if transaction costs are zero. Higher transaction costs should, therefore, act as a barrier with respect to short-term trading in the period around the ex-dividend day and, thereby, reduce the ex-dividend price ratio. Several empirical studies (e.g., Karpoff and Walking, 1988; Michaely and Murgia, 1995; Michaely and Vila, 1996) have also confirmed this result.

3 Swedish tax regimes 1988-1995

In Sweden dividends and capital gains have, as in many other countries, been taxed at different rates for domestic individual investors. More specifically, the marginal tax rate on capital gains has traditionally been lower than the marginal tax rate on dividends. However, during the period studied (1988-1995), capital gains, in relation to dividends, were taxed at a lower, equal and higher marginal tax rate. Table 1 provides an overview of these three Swedish tax regimes.

Table 1 ABOUT HERE

During the period 1988-1990, both dividends and capital gains were taxed as ordinary income subject to a progressive scale. Long term capital gains were, however, taxed at a lower rate than dividends. The reason for this was that capital gains realised after two years were only taxable at 40 percent. This is illustrated in Table 1, where the marginal tax rate on ordinary income for the individual is assumed to be 54 percent. The relation between the marginal tax rate on dividends and capital gains changed in

1991, when a major tax reform was implemented in Sweden. In their comprehensive survey, Agell et al. (1998, p. 1) classified the 1991 Swedish tax reform as the *"most far-reaching tax reform in any western industrialized country"* in recent decades. According to the 1991 tax code, capital gains and dividends were separated from ordinary income and taxed as investment income subject to a flat tax rate of 30 percent. As can be seen from Table 1, already in 1992 the capital gains tax rate was reduced from 30 to 25 percent. Furthermore, in 1994, the tax on dividends was removed and the tax on capital gains was substantially reduced. However, these taxes were reintroduced at a uniform rate of 30 percent in 1995. Hence, during the period 1988-1995, we observe three different relationships between the tax on capital gains and dividends, as well as implementation of a major tax reform.

4 Data and Empirical Method

4.1 Data

Data on closing prices from the Stockholm Stock Exchange (SSE) during the period 1988-1995 are used to study whether the observed tax policy changes influenced ex-dividend price behaviour. Information on ex-dividend dates and the size of the dividends were obtained from Bonniers Findata and Delphi Economics, respectively. The sample was restricted to firms that pay out dividends and shares that have been traded both on the cum and the ex-dividend day. Moreover, to be included in the sample, at least thirty daily returns in the period prior to the event window must be observed.

The total number of ex-dividend dates considered was 420 and the number of firms varies from 40 for 1990 to 86 in 1995. Descriptive statistics for the sample are presented in Table 2.

Table 2 ABOUT HERE

The sample statistics show that the average DOR was 0.57 for the whole sample period. After the 1991 tax reform, the average DORs were in the range 0.34 to 0.74. This is less than the DOR predicted from the Elton and Gruber (1970) model for all of the tax regimes studied. Note also that the average decline in the stock price on the ex-dividend day was less than the dividend per share, regardless of the tax regime considered. The Elton and Gruber (1970) model predicts (see equation (2)) a larger ex-price decline than the dividend per share in 1994 because capital gains were tax penalised compared with dividends. According to Table 2, the average dividend yield was 2.72 percent. This means that the dividend yield in this study, on average, was larger than the dividend yields observed in previous ex-dividend studies. For instance, the average dividend yield was approximately 1 percent in Lakonishok and Vermaelen (1986). This result is, however, not surprising since dividends are paid quarterly in the US and once a year in Sweden.

4.2 The ex-dividend day price change

The empirical model was estimated on both an unadjusted and market-adjusted basis. In the latter case, the closing price on the ex-dividend day was adjusted in the following way:

$$P^*_{xit} = P_{xit} - P_{cit}\beta_{it}R^m_x,$$

where P^*_{xit} is the adjusted closing price on the ex-dividend day, R^m_x is the market return on the ex-dividend day (approximated by Affärsvärlden's value weighted general index), and β_{it} is the beta value of the stock estimated using daily data from the year preceding the event window.

A two-step procedure was used to test whether the tax policy changes in Sweden during the 1990s influenced stock prices around the ex-dividend day. First, we test whether the price change between the cum - and the ex-dividend day was driven by the differential tax treatment of dividends and capital gains for domestic individual investors.

Early empirical ex-dividend day studies tended to follow the orginal approach of Elton and Gruber (1970) by focussing on the price-drop-to-dividend ratio (DOR) as the dependent variable. However, as noted by e.g., Lakonishak and Vermaelen (1983), Barclay (1987) and Michaely (1991), this approach yields results that are heteroskedastic. Boyd and Jagganathan (1994) innovated the methodology by instead using the percent price change between the cum - and the ex-dividend day as the dependent variable. This approach, previously used by e.g., Green and Rydqvist (1999), McDonald (2001), Bell and Jenkinson (2002) and Florensen and Rydqvist (2002), produces two parameters; one intercept coefficient and one slope coefficient. Boyd and Jagganathan (1994) showed that the intercept coefficient should be negatively and statistically significant if non-tax factors were important for ex-dividend price behaviour, while the DORs can be estimated as the

slope coefficients in the regression. Hence, in comparision to the orginal approach of Elton and Gruber (1970), this methodology makes it possible to carry out more detailed hypothesis testing.

Following the methodology used by Boyd and Jagganathan (1994), the following regression was estimated in order to study whether the taxation of domestic individual investors in Sweden influenced the price change between the cum-and the ex-dividend day:

$$\begin{aligned} \frac{P_{cit} - P_{xit}}{P_{cit}} &= \alpha + \theta \left(\frac{D_{it}}{P_{cit}} \times I_{88-90} \right) + \gamma \left(\frac{D_{it}}{P_{cit}} \times I_{91,95} \right) \\ &\quad + \eta \left(\frac{D_{it}}{P_{cit}} \times I_{92-93} \right) + \mu \left(\frac{D_{it}}{P_{cit}} \times I_{94} \right) + \varepsilon_{it}, \end{aligned} \tag{6}$$

where the dependent variable is the percent price change between the cum - and the ex-dividend day in year t for stock i, D_{it} denotes as before the dividend per share, α is a constant, ε_{it} is the disturbance term, and I_{88-90}, $I_{91,95}$, I_{92-93} and I_{94} are indicator variables representing the differential taxation of dividends and capital gains for domestic individual investors in Sweden during the study period.

The period before the implementation of the 1991 tax reform, when long-term capital gains were taxed more favourably compared to dividends, is characterised by the first indicator variable (I_{88-90}). The second indicator variable ($I_{91,95}$) represents the period when capital gains and dividends were taxed equally at a flat rate of 30 percent, while I_{92-93} represents the years 1992 and 1993 when capital gains were taxed at a 5 percent lower rate than dividends. Finally, I_{94} represents the year 1994 when the tax on dividends

was removed, while capital gains were taxed at a rate of 12.5 percent. The Elton and Gruber (1970) model predicts that the slope coefficients should change because the taxation of dividends and capital gains was altered for domestic individual investors.

To study whether tax policy regime shifts for domestic individual investors influenced ex-dividend day prices, the years when the tax on capital gains and dividends were uniform at a rate of 30 percent were treated as the base period. If the price change on the ex-dividend day was solely driven by the differential tax treatment of dividends and capital gains for domestic individual investors, we expect significantly lower DORs in 1988-1990 and 1992-1993. In addition, we also expect to observe a significantly higher DOR in 1994 compared to the base period because dividends were tax exempt for domestic individual investors during this year.

Note that the ex-day price change also may be influenced by non-tax factors. Frank and Jagganathan (1998), for example, showed that stock prices in the Hong Kong stock market dropped less than the dividend amount due to microstructure effects and transaction costs. Bali and Hite (1998) argued and provided some empirical evidence that the tick effect, i.e., that stock prices change discretely, also leads to a DOR less than one. Thus, except for tax-induced clienteles and short-term trading, several non-tax factors may influence the ex-dividend day price change. The constant was included in the model to control for such effects. According to Boyd and Jagganathan (1994), the constant should be negative and statistically significant determined if non-tax factors were important for ex-dividend price behaviour.

In the next step, the dividend yield effect is studied separately for the

period preceding and following the 1991 tax reform. Note that when dividends and capital gains are taxed at a uniform rate regardless of the level of ordinary income, as in Sweden after the 1991 tax reform, domestic individual investors have no tax incentives to focus their trading on low dividend yield stocks. Hence, if ex-dividend prices were determined by the taxation of domestic individual investors, we should observe different DORs for dividend yield groups when the period before the implementation of the 1991 tax reform is compared with the post-reform period.

First, all stocks were categorised into four different dividend yield groups each year. The following regression was then estimated in order to test whether DORs were different between the two periods for low and high yielding stocks, respectively

$$\frac{P_{cit} - P_{xit}}{P_{cit}} = \alpha + \lambda \left(\frac{D_{it}}{P_{cit}} \times I_{88-90} \right) + \delta \left(\frac{D_{it}}{P_{cit}} \times I_{91-95} \right) + \varepsilon_{it}, \qquad (7)$$

where I_{91-95} is an indicator variable taking the value one for the post-1991 tax reform period, and zero otherwise.

5 Results

The percent price change between the cum - and the ex-dividend day was estimated on both an unadjusted and market adjusted basis. The results were, however, very similiar and only the results from the market-adjusted model are henceforth presented.

First, in accordance with the empirical methodology presented in the

previous section, we start investigating whether ex-dividend day prices were influenced by domestic individual investors tax treatment of capital gains and dividends. According to the results presented in Table 3, the percent price change between the cum - and the ex-dividend day was positively related to the dividend yield. Note that the tax-induced clientele hypothesis implies that the slope coefficients in in equation (6), reflecting the price-drop-to-dividend ratios (DORs), should change when the differential taxation of dividends and capital gains is altered for domestic individual investors. However, the results indicate that the DORs did not change when dividends and capital gains were taxed differently compared to the base period. This implies that the tax treatment of domestic individual investors has not influenced the price change between the cum and the ex-dividend day in Sweden.

Table 3 ABOUT HERE

An intercept was included in equation (6) to control for possible non-tax factors in ex-dividend day price movements. The constant was insignificantly determined, suggesting that non-tax factors (i.e., micro-market structure effects) cannot explain ex-dividend price behaviour in Sweden during the study period. This result is in accordance with Bell and Jenkinson (2002), who also did not find any significant effect of non-tax factors on ex-dividend price behaviour.

The tax-induced clientele hypothesis implicitly assumes that dividends and capital gains are taxed as ordinary income subject to a progressive scale. When dividends and capital gains are taxed at a flat tax rate, as in Sweden after the 1991 tax reform, domestic individual investors have no tax incen-

tive to focus their trading on any particular dividend yield group. To test whether the tax-induced clientele hypothesis can explain ex-dividend price behaviour, equation (7) was estimated separately for four different dividend yield groups. As can be seen from the results presented in table 4, the difference in slope coefficients between the two periods was insignificant for all dividend yield groups. Therefore, there is no evidence that the taxation of domestic individual investors influenced ex-dividend prices for any specific dividend yield group here either. These results support arguments contrary to the Elton and Gruber (1970) model, where ex-dividend price behaviour is solely driven by the tax treatment of domestic individual investors.

Table 4 ABOUT HERE

6 Conclusions

In this paper it has been argued that the tax policy changes in Sweden during the 1990s provide us with a unique opportunity to test two important questions. First, whether changes in the relative taxation of dividends and capital gains for domestic individual investors in Sweden has influenced the price change between the cum-and the ex-dividend day. Second, whether the implementation of a flat tax rate for domestic individual investors in Sweden has influenced ex-dividend day prices differently for specific dividend yield groups.

The Swedish case is especially interesting to study since several large tax changes for domestic individual investors occured during the study period, while over the same period there were no tax changes which had an effect

on institutional investors. According to the results presented in this paper, the ex-dividend price change was not directly related to these relatively large tax changes. Hence, in contrast to the predictions of the Elton and Gruber (1970) model, ex-dividend prices seem not to have been influenced by the taxation of domestic individual investors. This result is in accordance with previous findings (see e.g., Bell and Jenkinsson, 2002) suggesting that domestic individual investors are not the marginal investors and that ex-dividend price behaviour instead seems to be determined by the trading strategies of professional institutional traders.

The other interesting change in the Swedish tax code that occured during the study period was the implementation of a major tax reform in 1991. Prior to 1991, dividends and capital gains, as in most countries, were taxed as ordinary income subject to a progressive scale. After the 1991 tax reform, dividends and capital gains were separated from other sources of income and taxed as investment income subject to a flat tax rate. The tax clientele hypothesis implicitly assumes that dividends and capital gains are taxed as ordinary income. This means that domestic individual investors should have no tax incentive to focus their ex-dividend day trading on any specific dividend yield after 1991. We should, therefore, observe different DORs for dividend yield groups when the period before the implementation of the 1991 tax reform is compared with the post-reform period. However, the results presented in this paper provide no evidence that the taxation of domestic individual investors influenced ex-dividend prices for any specific dividend yield group.

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Table 1: Tax Regimes in Sweden 1988-95

	Dividend tax	Capital gain
Year	rate	tax rate
1988-90	54%	54%[a]
1988-90	54%	21.6%[b]
1991	30%	30%
1992-93	30%	25%
1994	0%	12.5%
1995	30%	30%

[a]Given that the individual faces an income tax rate of 54 percent.

[b]During 1988-90, long term capital gains (>2 years) were taxable at 40 percent.

Table 2: Sample Descriptives (standard errors reported in parantheses).

Variables	1988-90	1992-93	1994	1991, 1995	1988-1995
Relative taxation[a]	-[b]	0.933	1.143	1	-[b]
DOR[c]	0.58	0.34	0.74	0.64	0.57
	(2.77)	(2.64)	(2.13)	(1.35)	(2.29)
Dividend yield	2.01	3.38	2.40	3.15	2.72
	(1.13)	(1.89)	(2.41)	(1.61)	(1.79)
Beta-value	0.87	0.87	0.80	0.43	0.73
	(0.66)	(0.72)	(0.60)	(1.40)	(0.97)
Market return ex-day	0.0025	0.0005	-0.0019	0.0008	0.0008
	(0.0056)	(0.0083)	(0.0076)	(0.0079)	(0.0074)
Number of obs.	133	95	66	126	420

[a]Given by: $((1-\tau_d)/(1-\tau_g))$; where τ_d=marginal tax rate on dividends, and τ_g= marginal tax rate on capital gains.

[b]The relative taxation of dividends and capital gains cannot be computed because the value depends on how much income the individual earns.

[c]Given by: $((P_C-P_X)/D)$; where P_C=closing price on the cum dividend day, P_X=closing price on the ex-dividend day, and D=dividend per share.

Table 3: Regression estimates of the percent price change between the cum and the ex-dividend day (t-values reported in parantheses)

Variable (parameter)	Estimates	Diff. 1991, 95
Constant (α)	-0.002	
	(-0.29)	
Tax regime 1988-90 (θ)	0.726	-0.055
	(4.03)	(-0.36)
Tax regime 1991, 95 (γ)	0.781	-
	(6.50)	
Tax regime 1992-93 (η)	0.619	-0.163
	(5.25)	(-1.28)
Tax regime 1994 (μ)	0.572	-0.209
	(4.00)	(-1.38)

Table 4: Regression estimates of the percent price change between the cum and the ex-dividend day (t-values reported in parantheses)

Yield groups	Constant	Pre-reform	Post-reform	Difference
1 (=low yield)	-0.05	1.496	0.599	-0.897
	(-0.49)	(1.23)	(0.89)	(1.06)
2	-0.009	1.094	1.133	0.039
	(-0.59)	(1.11)	(1.73)	(0.08)
3	0.012	-0.073	0.378	0.451
	(0.88)	(-0.11)	(0.87)	(1.60)
4 (=high yield)	0.01	0.506	0.475	-0.031
	(0.88)	(1.36)	(2.36)	(-0.12)