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Ex-dividend date stock behavior and the clientele effect: Evidence around a tax reduction

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ABSTRACT

This study analyzes the behavior of stock prices around the ex-dividend date focusing on the effects of a major tax reduction. Using the 40 most heavily traded shares on the Santiago Stock Exchange, the study evaluates price drop ratios using various measures of ex-dividend day prices. The findings indicate that the dividend tax reduction has an effect on the price drop ratio; this result is consistent with the clientele effect hypothesis.

1. Introduction

Miller and Modigliani (1961) propose the clientele effect hypothesis to explain corporate dividend payout policies. According to this hypothesis, firms opt for different dividend payout ratios to attract specific investor profiles, i.e., unique groups of investors with different preferences for receiving dividend income. Firms that do not pay dividends are likely to attract high-tax-bracket investors, whereas firms that pay generous dividends are likely to attract tax-free institutions and low-marginal-tax-bracket investors.

Beginning with Elton and Gruber (1970), the empirical literature that has analyzed the clientele effect hypothesis has focused on the ex-dividend day stock behavior. According to Elton and Gruber (1970), the clientele effect hypothesis implies that a marginal investor in a share with a high dividend yield will likely be in a low-marginal tax bracket. Consequently, the after-tax dividend value should be similar to the payment received. Thus, the share price drop on the ex-dividend date should be higher for shares with high dividend yields than for shares with low dividend yields. Hence, according to Elton and Gruber (1970), a specific

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prediction related to the clientele effect is the positive relation between the dividend yield and the price drop ratio on the ex-dividend date.

Elton and Gruber (1970) and subsequent empirical studies (e.g., Elton, Gruber, & Blake, 2005; McDonald, 2001; Michaely & Vila, 1996) provide evidence that is consistent with the clientele effect hypothesis. However, other authors argue that the differences observed in share price drops can be explained by transaction costs of potential arbitrageurs (Kalay, 1982) or as a result of market microstructure effects (Bali & Hite, 1998). Thus, the literature provides no consensus regarding the clientele effect hypothesis.

In the particular case of Chile, inconsistent results have been obtained. Guzmán (1997) and Nash and Fuenzalida (2004) present results that are consistent with the clientele effect. Conversely, Castillo and Jakob (2006) analyze the ex-dividend day stock behavior and find no significant relation between the ex-dividend day price drop ratio and dividend yield; this result is inconsistent with the clientele effect hypothesis. Our objective is to study the relation between taxes and dividends in Chile and to reanalyze the clientele effect in the context of the 1998 income tax law modification. Given this objective, we analyze the stock behavior around the ex-dividend date both before and after this legal modification. By focusing on the tax reform, we can separate the impact of taxes from possible market frictions, such as transactional costs and the microstructure effects mentioned above. As for the clientele effect, the tax reform allows us to study our hypothesis more precisely because, as Whitworth and Rao (2010) explain, the clientele effect depends on the tax relationship between dividends and capital gains. Thus, the higher the tax differential between them, the higher the effect should be. In addition to our focus on the tax modification, our study differs from previous research regarding the Chilean market in two other aspects. First, we include opening prices on the ex-dividend date because in the Chilean case—in contrast with the United States—buy orders are not automatically adjusted according to the dividend amount on the ex-dividend day, and the price variation on the ex-dividend day is not related to the hypotheses under study. Second, from a statistical perspective, our estimate of the price drop ratio is more appropriate, as we discuss in the following section.

Our estimate of the price drop ratio indicates a significant increase in the dividend value during the dividend tax reduction period from 1999 to 2001. This finding suggests that beyond transaction costs and the market microstructure, tax factors are important for understanding dividend behavior. Furthermore, we identify a positive relationship between the dividend yield and the price drop ratio in both periods, i.e., pre- and post-deduction. This finding is consistent with the clientele effect and differs from the findings of Castillo and Jakob (2006); this difference may be explained by our use of opening prices on the ex-dividend day.

The reminder of this paper is organized as follows. Section 2 presents our hypotheses and methodology. Section 3 describes the data. Section 4 summarizes the empirical results. Finally, Section 5 presents our conclusions.

2. Hypotheses development and methodology

Elton and Gruber (1970) demonstrate that the indifference point between selling a share that pays dividends on the cum-dividend date and the ex-dividend date is given by equating the values on those dates:

$$Pc - tc(Pc - Pb) = Pe - tc(Pe - Pb) + D(1 - td) \tag{1}$$

where Pc is the share price on the last cum-dividend day, Pe is the share price on the ex-dividend day, Pb is the share price when it was acquired, D is the total dividend amount, and td and tc are the dividend (ordinary income) and capital gains taxes, respectively.

Rearranging Eq. (1), we obtain

$$\frac{Pc - Pe}{D} = \frac{1 - td}{1 - tc} \tag{2}$$

From Eq. (2), we can deduce that the price drop ratio on the ex-dividend day,

$$\frac{Pc - Pe}{D}$$

is less than 1 if *td* is greater than tc. Elton and Gruber (1970) emphasize this relation between share prices on the ex-dividend day and tax rates when they document that the price drop ratio increases with the dividend yield. This relation is consistent with the notion that investors affected by marginal rates on lower (higher) dividends prefer shares with a higher (lower) dividend yield.

The relation between marginal rates and dividend yield is a particular case of the clientele effect hypothesis (Miller & Modigliani, 1961). In addition, as previously discussed, the greater the difference between tax rates on dividends and capital gains is, the stronger this relation should be (Whitworth & Rao, 2010).

To empirically analyze this relationship, Elton and Gruber use the average price drop ratio:

$$RC = \frac{1}{N}\sum_{i}^{N}\left(\frac{Pc-Pe}{D}\right)_i \tag{3}$$

where *RC* is the estimate of the price drop ratio and *N* is the number of ex-dividend observations. This statistic may be estimated as the intercept of the following regression:

$$RC = \overline{RC} + \varepsilon \tag{4}$$

However, as Bell and Jenkinson (2002) note, this statistic should be avoided for two reasons. First, the empirical distribution of the ratio is not normal. Second, the error term is heteroskedastic because it is scaled by dividends, which vary widely among firms. To solve this problem, the ratio is estimated using the following regression (Bell & Jenkinson, 2002; Boyd & Jagannathan, 1994; Frank & Jagannathan, 1998):

$$\left(\frac{Pc-Pe}{Pc}\right) = \alpha + \beta\left(\frac{D}{Pc}\right) + \varepsilon \tag{5}$$

where the coefficient β is the price drop ratio on dividends that is estimated via the ordinary least squares (OLS) method with robust standard errors, following White (1980). We evaluate our hypotheses using both methods to aid comparisons with previous work, especially Castillo and Jakob (2006), who used the measurement obtained by Eq. (4).

Considering Eq. (2), the tax reform that reduced dividend taxes from 1999 to 2001, and the positive relationship between dividend yield and price drop ratio suggested by the clientele effect, we formulate two hypotheses:

Hypothesis 1. Given that the tax code in Chile favors capital gains, the price drop ratio is expected to be less than 1. The ratio is expected to be higher during the 1999–2001 period (pre-2002), when a tax reduction on dividend taxes (*td*) was in place, compared with the following period (post-2002), when the tax reduction was removed.

Hypothesis 2. Because of the clientele effect, we expect a positive relationship between the price drop ratio and the dividend yield in Chile. This relationship should be more evident when the differential between the tax rates on capital gains and dividends is greater, i.e., during the period without the tax reduction.

We evaluate both hypotheses using the ratios calculated with Eq. (4) to compare our results with those of Castillo and Jakob (2006) and the ratios calculated with Eq. (5) to strengthen those results. The first hypothesis corresponds to the ratio estimates for the sample during the complete pre-2002 and post-2002 periods. We estimate the following regression, which is a straightforward extension of Eq. (5):

$$\left(\frac{Pc-Pe}{Pc}\right) = \alpha + \beta_1\left(\frac{D}{Pc}\right) + \beta_2\lambda\left(\frac{D}{Pc}\right) + \varepsilon \tag{6}$$

where λ equals 1 if the observation is made between 1999 and 2001 and zero otherwise. β_2 is the change in the ratio value during the tax reduction period (pre-2002) compared with the period without it.

Finally, we analyze the positive relationship between the price drop ratio and the dividend yield (Hypothesis 2) suggested by the clientele effect by dividing the sample into quintiles according to dividend yield.

3. Data

The sample consists of stocks from the Santiago Stock Exchange IPSA Index, which is composed of the 40 most heavily traded stocks of the Chilean market for 2012. We obtain the time series for opening and closing prices for the firms in our sample from Bloomberg. We also obtain from Bloomberg the dividends paid according to dividend type, only considering final dividends (11.11%), interim dividends (24.6%), regular dividends (57.94%), and special dividends (6.35%), and the limit date or latest cum-dividend day, ex-dividend day, and amount paid per share. Lastly, we obtain the Chilean peso spot price/U.S. dollar and converted dividends in dollars into Chilean pesos.

The final sample, only considering events with valid prices on cum- and ex-dividend days, consists of 578 dividends paid from January 1999 to January 2012.

Prior U.S. studies used closing prices on the ex-dividend day because of the NYSE 118 and AMEX 132 rules. These adjust the opening price on the ex-dividend day, thereby reducing the dividend amount automatically. In Chile, these types of rules do not exist; therefore, there is no reason to avoid using opening prices. Moreover, the sample exhibits a major price variation between the opening and closing price on the ex-dividend day if we compare it to the cash amount paid as dividend. This difference may distort the ratio. Additionally, because price variation on the ex-dividend day has no relation with the proposed hypotheses, we use the opening price on the ex-dividend day, in contrast with the study of Castillo and Jakob (2006).

4. Empirical results

Table 1 presents descriptive statistics for two subsamples. The first sample includes all dividends with valid prices on the last cum-dividend day and the ex-dividend day. The second sample includes all observations that remain after winsorizing the data with cutoff values at the 2.5 and 97.5 percentiles, following Castillo and Jakob (2006) and Graham, Michaely, and Roberts (2003). We use the trimmed sample in our statistical analysis. On average, prices decreased 20 pesos from the cum-dividend day to the ex-dividend day. This amount is less than the average of 47 pesos paid per share and similar to that of the trimmed sample, with an average drop of 24 pesos and an average dividend of 48 pesos. The average price drop ratio on the dividend (estimated according to Eq. 4) is 0.44 in the complete sample and 0.47 in the trimmed sample. This value is less than that found by Castillo and Jakob (2006) using closing prices. Dividing samples into sub-periods according to the tax reform, we find that the ratio during the pre-2002 period was greater than that during the post-2002 period.

Table 2 presents the price drop ratio estimated according to Eq. (6) with robust standard errors. The first two regressions correspond to the ratio estimated excluding a dummy variable that indicates the tax decrease during 1999–2001. In the regressions, β_1 is the estimated value for the price drop ratio on dividends, β_2 is the ratio variation during the period with tax reduction compared with the period without it, and λ is a dummy that equals 1 if the dividend is between 1999 and 2001 and zero otherwise. Our estimates are based on the trimmed sample. However, the un-trimmed sample yields similar results. For the sample that does not control for the tax reduction, our drop ratio estimate is 0.88 when we estimate the model excluding the intercept and 0.98 when we include it. When we use the dummy variable that indicates the tax reduction period, the ratio increases during this period from 0.06 (without intercept) to 0.12 (with intercept). The increase is statistically significant. We include an intercept to control for factors that are not related to taxes, as in Boyd and Jagannathan (1994) and Frank and Jagannathan (1998). Our intercept estimate is statistically significant, thus suggesting possible relevant frictions that may be associated with microstructure effects.

To study the relation between the dividend yield and the price drop ratio on the ex-dividend day, we divide the sample into quintiles according to the dividend yield, including shares with the lowest dividend yield in the first quintile. Tables 3 and 4 present the price drop ratios on dividends for different quintiles calculated according to Eqs. (4) and (5), respectively. Considering the complete sample period, the relation between the price drop ratio and the dividend yield monotonically increases among quintiles. This finding is consistent with the clientele effect prediction described in Hypothesis 2. In our sample, a positive relationship exists both

Table 1
Descriptive statistics*.

	a) Full sample						b) Trimmed sample					
	Average	Median	Min.	Max	SD	Obs.	Average	Median	Min.	Max	SD	Obs.
Dividend	47	10	0.11	770	89	578	48	11	0.11	770	90	553
Dividend yield	0.03	0.02	0.00	0.60	0.05	578	0.04	0.02	0.00	0.60	0.05	553
$Pc - Pe$	20	4	−1932	837	114	578	24	4	−469	837	77	553
$(Pc - Pe)/D$—entire period	0.44	0.42	−17	8	1.32	578	0.47	0.42	−2	3	0.65	553
$(Pc - Pe)/D$—pre-2002	0.78	0.72	−3	5	1.00	81	0.65	0.61	−1	2	0.53	76
$(Pc - Pe)/D$—post-2002	0.39	0.37	−17	8	1.36	497	0.44	0.38	−2	3	0.67	477

* The trimmed sample includes only the observations between the 2.5 and 97.5 percentile. The dividend yield is calculated by dividing dividend paid by the closing price in the last cumulative dividend day.

Table 2
Regression estimates of price drop ratios.

						Wald test	
	Obs. Pre/Post	α	β_1	β_2	R^2	$\beta_1 = 1$	$\beta_1 + \beta_2 = 1$
Without dummy; without intercept	553		0.884*** (0.032)		0.92	0.00	Not applicable
Without dummy; with intercept	553	−0.009*** (0.001)	0.979*** (0.025)		0.91	0.42	Not applicable
With dummy; without intercept	76/477		0.833*** (0.016)	0.122** (0.05)	0.92	0.00	0.55
With dummy; without intercept	76/477	−0.008*** (0.001)	0.949*** (0.0185)	0.058* (0.035)	0.91	0.00	0.81

*** denote statistical significance at a 1% level.
** denote statistical significance at a 5% level.
* denote statistical significance at a 10% level.

prior to and after the tax reduction, except from the tax reduction period when estimating the ratios using regressions. In this case, the relationship is negative during the tax reduction period, which is consistent with the notion that the relation is stronger when the differential between the tax rates on dividends versus capital gains is higher and supports the theory of Whitworth and Rao (2010). In addition, during the tax reduction period, the estimated ratios per quintile are always greater than those without the tax reduction, in agreement with the previous result regarding the impact of the tax reduction on the pre- and post-2002 ratio.

5. Conclusions

This work analyzes stock price behavior from the IPSA Index shares listed on the Santiago Stock Exchange around the ex-dividend day, focusing on a major tax reduction. Using price drop ratios on dividends, we estimate a drop that is statistically less than the amount of dividends paid out. Without controlling for the tax reduction in place from 1999 to 2001, our estimate of the drop ratio increases from 0.88 to 0.98, depending on the regression includes an intercept. This result is higher than those of other studies but is consistent with national and international evidence.

Our results suggest that the tax reduction that affected dividends during the 1999–2001 period affected the price drop ratio on dividends. The average ratios during the period with the tax reduction are significantly greater than during the rest of the period, which is consistent with the theory of Elton and Gruber.

Using a dummy variable to indicate the tax reduction period, we find that the ratio increased from 0.06 to 0.12, depending whether an intercept was included in the regression.

Finally, when we divide the sample into quintiles according to dividend yield, we find that the price drop ratio on dividends increases with the dividend yield, thereby suggesting the existence of the clientele effect. This effect is stronger in the period with higher differences in the tax rates on dividends and capital gains, in agreement with the theory of Whitworth and Rao (2010). This result is the main difference found with respect to the previous work of Castillo and Jakob (2006).

Our result is robust to alternative price drop ratios estimation mechanisms, such as averages (Castillo & Jakob, 2006) and regressions.

Table 3
Price drop ratios by yield quintiles.

	a) Pre 2002				**b) Post 2002**				**c) Full período**			
Quintile	Dividend yield	Mean	SE	Obs.	Dividend yield	Mean	SE	Obs.	Dividend yield	Mean	SE	Obs.
1	0.01	0.24	0.17	16	0.06	0.15	0.10	96	0.01	0.13	0.09	111
2	0.02	0.61	0.16	15	0.01	0.27	0.07	95	0.01	0.36	0.07	111
3	0.04	0.72	0.10	15	0.02	0.40	0.06	96	0.02	0.40	0.05	110
4	0.08	0.79	0.08	15	0.04	0.57	0.04	95	0.04	0.63	0.04	111
5	0.18	0.93	0.05	15	0.09	0.82	0.03	95	0.11	0.84	0.02	110

Table 4
Price drop ratios by yield quintiles.

	a) Pre 2002				b) Post 2002				c) Full período			
Quintile	Dividend yield	β	SE	Obs.	Dividend yield	β	SE	Obs.	Dividend yield	β	SE	Obs.
1	0.01	0.34	0.15	16	0.06	0.27	0.10	96	0.01	0.21	0.09	111
2	0.02	0.49	0.11	15	0.01	0.28	0.07	95	0.01	0.38	0.07	111
3	0.04	0.83	0.13	15	0.02	0.43	0.05	96	0.02	0.43	0.04	110
4	0.08	0.81	0.08	15	0.04	0.60	0.05	95	0.04	0.67	0.04	111
5	0.18	0.98	0.04	15	0.09	0.89	0.02	95	0.11	0.93	0.03	110

The main explanation of the difference from previous works corresponds to the use of the opening prices on the ex-dividend day. When we replicate the complete empirical exercise using closing prices, we find contradictory results, which are in agreement with those of Castillo and Jakob (2006).

References

Bali, R., & Hite, G. L. (1998). Ex-dividend day stock price behavior: discreteness or tax-induced clienteles? *Journal of Financial Economics*, *47*, 127–159.

Bell, L., & Jenkinson, T. (2002). New evidence of the impact of dividend taxation and on the identity of the marginal investor. *The Journal of Finance*, *57*, 1321–1346.

Boyd, J. H., & Jagannathan, R. (1994). Ex-dividend price behavior of common stocks. *Review of Financial Studies*, *7*, 711–741.

Castillo, A., & Jakob, K. (2006). The Chilean ex-dividend day. *Global Finance Journal*, *17*, 105–118.

Elton, E. J., & Gruber, M. J. (1970). Marginal stockholder tax rates and the clientele effect. *The Review of Economics and Statistics*, *52*, 68–74.

Elton, E. J., Gruber, M. J., & Blake, C. R. (2005). Marginal stockholder tax effects and ex-dividend-day price behavior: evidence from taxable versus nontaxable closed-end funds. *The Review of Economics and Statistics*, *87*, 579–586.

Frank, M., & Jagannathan, R. (1998). Why do stock prices drop by less than the value of the dividend? Evidence from a country without taxes. *Journal of Financial Economics*, *47*, 161–188.

Graham, J. R., Michaely, R., & Roberts, M. R. (2003). Do price discreteness and transactions costs affect stock returns? Comparing ex-dividend pricing before and after decimalization. *The Journal of Finance*, *58*, 2611–2636.

Guzmán, M. (1997). *Presencia del Efecto Clientela en el Mercado Chileno.* (Tesis de Magíster en Finanzas) Universidad de Chile.

Kalay, A. (1982). The ex-dividend day behavior of stock prices : a re-examination of the clientele effect. *The Journal of Finance*, *37*, 1059–1070.

McDonald, R. L. (2001). Cross-border investing with tax arbitrage: the case of German dividend tax credits. *Review of Financial Studies*, *14*, 617–657. http://dx.doi.org/10.1093/rfs/14.3.617.

Michaely, R., & Vila, J. -L. (1996). Trading volume with private valuation: evidence from the ex-dividend day. *Review of Financial Studies*, *9*, 471–509.

Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *Journal of Business*, *34*, 411–433.

Nash, M., & Fuenzalida, D. (2004). The effect of dividend distribution on share return in Chile. *Estudios Gerenciales*, *93*, 99–113.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, *48*, 817–838.

Whitworth, J., & Rao, R. P. (2010). Do tax law changes influence ex-dividend stock price behavior? Evidence from 1926 to 2005. *Financial Management*, *39*, 419–445.