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The Moderating Impact of Individual Ownership on The Relationship between Dividend Yield and Ex-dividend Day Excess Return

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Abstract- *This study investigates the moderating impact of individual ownership on the relationship between dividend yield and ex-dividend excess return. Our sample includes US listed companies for years 2002 to 2010. A cross-sectional regression analysis is done to reveal the moderating impact of individual ownership. Our findings show that there is a positive relationship between dividend yield and ex-dividend day excess return in line with tax clientele theory. We also found that the relationship between dividend yield and the ex-dividend day excess return is positively moderated by individual ownership. These findings reveal that the positive relationship between dividend yield and ex-dividend day excess return stems from individual investors' dividend tax misgiving in line with tax clientele theory. Moreover, we found a negative relationship between corporate size and ex-dividend day excess return that supports the short selling theory. We conclude that tax-induced dynamic trading theory is the premier justification of ex-dividend day pricing as the mixture of both tax clientele and short selling theories.*

Keywords- *Ex-Dividend Day Excess Return; Dividend Yield; Individual Ownership*

1. INTRODUCTION

The price drop on the ex-dividend day should be equal to the dividend amount. However, several studies have shown that the price drop is less than the paid dividend as reported by Campbell and Beranek (1955) and Durand and May (1960). Four major propositions try to explain the ex-dividend day price abnormality. The first proposition is the tax clientele theory of Elton and Gruber (1970). They argued that the individual investors' dividend tax misgiving is the main reason of ex-dividend day price abnormality. Individual investors should pay higher tax on dividend than capital gains. Therefore, they resist against the ex-divided day price drop to compensate their tax losses.

Second proposition is the short-selling theory of Kalay (1982). He asserted that the ex-dividend day price abnormality is due to the dividend capturing activities. They explained that the excess return on the ex-dividend day can be captured by arbitrageurs, and the price abnormality can be only occurred within the transaction costs' boundaries. On the other hand, tax-induced dynamic trading theory of Michaely and Vila (1995) proposed that the ex-dividend day price abnormality is the consequence of both individual investors' dividend tax misgiving and institutional investors' short-selling activities. This theory is a fair mixture of both tax clientele and short selling theories. In contrast, Bali and Hite (1998) and Frank and Jagannathan (1998) proposed the market microstructure theory. They related the ex-dividend day price abnormality to the price discreteness and bid-ask spread that dictated by the stock exchanges' mechanisms.

The relationship between dividend yield and ex-dividend day excess return stems from both tax clientele and short selling theories. Elton and Gruber (1970) found a positive relationship between dividend yield and the ex-dividend day price drop ratio. Naranjo, Nimalendran, and Ryngaert (2000) explained that corporate investors are typically ex-dividend day traders for high dividend yield companies, and they can reduce ex-dividend day price abnormality through short selling activities. Yi, Farrell, and Brown (2008) showed that there is a positive relationship between dividend yield and ex-dividend day price drop. Their findings were consistent with the tax clientele theory.

By increasing dividend yield, the amount of dividend's tax misgiving increases for individual investors. Therefore, higher dividend yield leads to a higher ex-dividend day excess return. However, this expectation is uncertain, since higher dividend yield also encourages institutional investors (arbitrageurs) to participate in dividend capturing activities, which leads to a lower ex-dividend day excess

return. This uncertainty provides a research gap to investigate the relationship between dividend yield and ex-dividend day excess return. We argued that if the individual investors' dividend tax misgiving is the cause of positive relationship between dividend yield and ex-dividend day excess return, this relationship should be positively moderated by increase in individual ownership level.

We used US listed companies to investigate the accuracy of our proposition. The research sample includes years 2002 to 2010. The results of regression analyses show that the relationship between dividend yield and ex-dividend day excess return positively moderates by the individual ownership. The overall relationship between dividend yield and the ex-dividend excess return is positive. However, this relationship turns to negative by considering the moderating impact of individual ownership. This finding shows that the positive relationship between dividend yield and ex-dividend day excess return stems from individual investors' dividend tax misgiving. We also found a positive relationship between corporate size and ex-dividend day excess return that revealed the short selling activities around the ex-dividend day.

This study has an important theoretical contribution that shows the relationship between dividend yield and ex-dividend day excess return is in line with the tax clientele theory. According to tax clientele theory, individual investors' dividend tax misgiving is the main determinant of ex-dividend day pricing. By investigating the moderating impact of individual ownership on the relationship between dividend yield and ex-dividend day excess return, the accuracy of the tax clientele theory is supported. However, the evidence of short selling activity besides the tax clientele effect reinforces the tax-induced dynamic trading theory as the fair combination of both theories.

Next section reviews the literature review and elaborates the research hypothesis. Then, Research methodology, data collection and empirical results are explained, subsequently. This study is concluded in the final section.

2. REVIEW OF LITERATURE

Initially, Elton and Gruber (1970) found a positive relationship between dividend yield and the ex-dividend day price drop ratio, which was deemed to be in line with the tax clientele effect. Other researchers such as Whitworth (2005), Yi et al. (2008), Whitworth and Rao (2010) and Kim (2011) integrated dividend yield as a control variable into their research models.

Naranjo et al. (2000) explained that corporate investors are typically ex-day traders for high dividend yield companies. Corporate investors reduce ex-dividend day price abnormality through short selling activities. Yi et al. (2008) showed that there is a positive relationship between dividend yield and ex-dividend day price drop ratio in both the pre and post–implementation of the US Tax Act 2003. Their finding was consistent with the tax clientele theory. They also analyzed the relationship between dividend yield and ex–dividend day excess return. Their results showed that dividend yield is positively related to the ex-dividend day price drop ratio pre–implementation of the US Tax Act 2003. However, this relationship is insignificant during the post–implementation period. Cloyd, Zhen Li, and Weaver (2006) speculated that the positive relationship between dividend yield and the ex–dividend day abnormal pricing caused by heterogeneous tax rates across investors. They speculated that by the equalization of tax rates in May 2003, the relationship between dividend yield and ex-dividend day abnormal return should degrade. This explanation is consistent with the tax clientele theory, which states that ex-dividend share prices are reflective of the dividend tax penalty. They also found that the relationship remains positive despite the removal of the dividend tax penalty for domestic individual investors. Their results indicated that investors' tax heterogeneity is an important determinant of ex-dividend day pricing.

Whitworth and Rao (2010) confirmed Elton and Gruber's (1970) findings and showed that the ex-dividend day price drop ratio is positively related to dividend yield. They also showed that the relationship between ex-dividend day price drop ratio and dividend yield strengthens when the gap between dividend tax rate and capital gain tax rate widens.

Hardin, Huang, and Liano (2010) also reported on the insignificant relationship between dividend yield and ex-dividend day excess return of REITs. They conclude that the interpretation of positive relationship between dividend yield and ex-dividend day excess return as a sign of tax clientele effect may be spurious.

On the other hand, individual ownership and its effect on the ex-dividend day trading volume and pricing were the subjects of several studies. Perez-Gonzalez (2003) studied the effect of large individual shareholders on respective firms` dividend policy. He also demonstrated that firms possessing a large number of individual investors suffer from a greater effect of tax-heterogeneity on the ex-dividend day pricing. They argued that dividend policy decisions are related to the taxation experienced by individual investors, which is in line with tax clientele theory.

In another research, Graham and Kumar (2006) analyzed the effect of retail investors on the ex-dividend day trading behavior. They posited that both low-income group and older investors buy stocks prior to the ex-dividend day due to their lower dividend tax rates. Furthermore, their results demonstrated that the ex-dividend day price drop ratio is positively (negatively) associated with the investors` income (age) in line with the tax-clienteles effect.

Li (2010) employed a different methodology to investigate the effect of individual and institutional investors on the ex-dividend day trading volume via quoted data. His results proved that both individual and institutional investors increase their purchase during the cum-day. However, institutional investors form the bulk buyers due to their tax preferences. On the contrary, excess buying

activities on the ex-dividend day are noticeably absent. On top of that, their work also analyzed the relationship between the ex-dividend excess return and the cum- and ex-day order imbalance. His findings were consistent with the tax-induced dynamic trading theory, as he showed that tax-motivated dividend capturing activities by institutional investors played the main role on the ex-dividend day pricing.

Finally, Kim (2011) analyzed whether the individual ownership impacts the ex-dividend pricing. Individual ownership in his research was measured as a proportion of institutional investors, reduced from one. His results showed that the ex-dividend day price drop ratio is inversely proportional to individual investors, in line with the tax clientele theory. Moreover, he demonstrated that the ex-dividend day price drop ratio is enhanced by ex-dividend day excess trading volume, revealing dividend capturing activities. His research findings were consistent with the tax-induced dynamic trading theory.

Considering the shortfall on the accuracy of relationship between dividend yield and ex-dividend day excess return, we proposed that individual ownership is the main factor that can affect the relationship between dividend yield and ex-dividend day excess return. If the individual investors' dividend tax misgiving is the cause of positive relationship between dividend yield and ex-dividend day excess return, this relationship should be positively moderated as the individual investors increase. Therefore, we hypothesized that individual ownership positively moderates the relationship between dividend yield and ex-dividend day excess return in line with tax clientele theory. This speculation is unique since we considered the joint impact of individual ownership and dividend yield on the ex-dividend day pricing.

3. METHODOLOGY

3.1 Data Description

We obtained ownership data from Datastream. Other data were collected from the Centre for Research and Security Prices (CRSP). We limited our sample to companies that pay taxable regular cash dividends to their ordinary shareholders. We followed Yi et al. (2008) study to clean data. Therefore, we deleted the observations that were not traded on the cum or ex-day, penny stocks cheaper than five dollars, small dividend yield (less than 0.1) or cash dividends less than one cent. We sorted data based on price drop ratio, and we deleted outliers below 2.5 and above 97.5 percentiles. If stock split happened on the ex-dividend day, we deleted that observation. We only hold those observations with the summation of 100 percent on ownership data to avoid overlapped between ownership groups. After data cleaning, 26,012 observations remained for further analysis.

3.2 Methodology

To investigate the moderating impact of individual ownership on the relationship between dividend yield and ex-dividend day excess return, we developed the following regression model:

$$\begin{aligned} MMAR_i = {} & \alpha_0 + \alpha_1 TaxCut_i + \alpha_2 Yield_i \\ & + \alpha_3 Individuals_i + \alpha_4 Yield_i \\ & \times Individuals_i + \alpha_5 Size_i + \alpha_6 Risk_i \\ & + u_i \qquad (1) \end{aligned}$$

Where $MMAR_i$ is the ex-dividend day excess return as measured by equation 2. $Yield_i$ is calculated as the ratio of dividend amount over cum-dividend day price for each observation. $Individuals_i$ is the proportion of shares in each company that held by individual investors. Three control variables are $TaxCut_i$, $Size_i$ and $Risk_i$. $TaxCut_i$ is considered as a dummy variable equal to one, if the observation falls in the years post-implementation of US Tax Act 2003 and zero if otherwise. $Size_i$ is defined as the standardized value of total market capital on cum-dividend day for each observation. $Risk_i$ is measured through dividing the variance of share return over the market return for the estimation period of [-45, -6] and [+6, +45], by considering day 0 as the ex-dividend day.

In line with Whitworth and Rao (2010), the ex-dividend day excess return (MMARi) for each ex-dividend day observation is defined as:

$$MMAR_i = \frac{\frac{P_i^{ex}}{1 + \hat{\alpha}_i + \hat{\beta}_i R_m^{ex}} - P_i^{cum} + D_i}{P_i^{cum}} \qquad (2)$$

Where P_i^{ex} and P_i^{cum} are closing prices on the ex-dividend day and the day before, respectively. D_i is the dividend amount. R_m^{ex} is the return on value-weighted market index on each share's ex-dividend day. Coefficients $\hat{\alpha}_i$ and $\hat{\beta}_i$ have been independently estimated per ex-dividend day observation through regressing returns of each stock over the returns of value-weighted market index during the period of [-45, -6] and [+6, +45], by considering day zero as the ex-dividend day. Five days before and after the ex-dividend day are omitted from this estimation since stocks' return might be distorted by the ex-dividend day trading activities.

We expect a positive sign for $Yield_i$ coefficient in line with tax clientele theory, since by increase in dividend yield the individual investors' tax heterogeneity increase. A positive sign is also expected for the coefficient of individual ownership due to their higher dividend tax disfavor. This expectation is also in line with tax clientele theory. However, we expect a significant positive sign for the interaction term of dividend yield and individual ownership to reveal the moderating impact of individual ownership on the relationship between dividend yield and capital gains. As the individual ownership level increases, the high dividend yield stocks are more prone to dividend tax losses. Therefore, the level of individual ownership is expected to moderate the relationship between dividend yield and ex-dividend day excess return.

A negative sign is expected for $TaxCut_i$ since individual investors' dividend tax-misgiving and tax clientele effect reduced after US Tax Act 2003. In line with tax-induced

dynamic trading theory, a negative sign is expected for $Size_i$. However, The coefficient of risk is expected to be insignificant as Michaely and Villa (1995) stated that the beta risk can only be valued while the excess return has been formerly beta-adjusted.

Besides the abovementioned regression analysis, ANOVA F test utilized to differentiate the ex-day excess return across individual ownership levels, namely low, medium and high. We also ran the regression analysis for each of these sub-samples for the purpose of confirmatory analysis. The results of data analysis are demonstrated in the next section.

4. DATA ANALYSIS & RESULTS

In this section, first, we reported descriptive statistics, such as mean, median, minimum, maximum, kurtosis and skewness for the research variables. As shown in Table 1, the mean of the market model adjusted return ($MMAR_i$) is 0.1545, in the range of -17.6111 to 24.1815. The kurtosis and skewness for market model adjusted return are 0.3975 and 11.5094, respectively. The range of individual ownership ($Individuals_i$) is from 2 to 100 percent, with a mean and median of 78 and 85 percent, respectively. The kurtosis statistic is 3.5026, which shows that the individual ownership distribution is slightly peaked. The skewness statistic (-1.1552) shows that the distribution of individual ownership is also skewed to the left. The range of dividend yield ($Yield_i$) is from 0.0010 to 0.1995 with a mean and median of 0.0066 and 0.0057, respectively. The kurtosis statistic is 210.7756, which shows the distribution of dividend yield is peaked at zero. The skewness statistic (7.9307) shows that the distribution of dividend yield is greatly skewed to the right.

Table 1 Descriptive Statistics

Variable	Mean	Median	Min.	Max.	Kurtosis	Skewness
$MMAR_i$	0.1545	0.1153	-17.6111	24.1815	11.5094	0.3974
$Individuals_i$ (Percent)	78	85	2	100	3.5026	-1.1552
$Yield_i$	0.0066	0.0057	0.0010	0.1995	210.7756	7.9307
$Size_i$ (USD Million)	6,986	987	7	501,271	118.9909	8.9426
$Risk_i$	5.3594	3.6566	0.0097	240.3608	138.4776	7.2704

Descriptive statistics on $Size_i$ (market capital) are reported in USD million and calculated based on cum-dividend day closing price multiplied by outstanding shares for each ex-dividend day observation. The range of market capital starts from 7 and ends up at 501,271, with a mean and median of 6,986 and 987, respectively. The kurtosis statistic (118.9909) shows the distribution of market capital is highly peaked. The skewness statistic (8.9426) indicates that the distribution of market capital is moderately skewed to the right. The standardized value of market capital has been used for data analysis to adjust the magnitude of market capital (big numbers) to the magnitude of other explanatory variables that are small. The mean and median of trading risk ($Risk_i$) are 5.3594 and 3.6566, respectively, ranging from 0.0097 to 240.3608. The kurtosis statistic is 138.4776, which shows that the distribution of trading risk is highly peaked. The skewness statistic (7.2704) indicates that the distribution of trading risk is moderately skewed to the right.

Most of the research variables are not normally distributed. However, research sample size is quite large (26,012 observations), and the central limit theorem (CLT) provides a theoretical justification for the assumption of normality. Gujarati and Porter (2009) explained that:

> *"If we are dealing with small, or finite, sample size, say data of less than 100 observation[s], the normality assumption assumes a critical role. ... in large samples, t and F statistics have approximately the t and F probability distributions so that the t and F tests that are based on the assumption that the error term is normally distributed can still be applied validly. These days there are many cross-section and time series data that have a fairly large number of observations. Therefore, the normality assumption may not be very crucial in large data sets." (Gujarati and Porter, 2009, page 99).*

Table 2 shows the result of ANOVA F test that compares the average of market model adjusted return across three levels of dividend yield, namely: low, medium and high. These three levels are categorized based on 33.3 and 66.6 percentiles.

As can be seen in Table 2, the F statistic is 24.4734 which is statistically significant at 0.01 significant level. This result shows that the average of MMAR is not equal across three levels of dividend yield; and mean MMAR increases from low (0.0529) to medium (0.1704) and high (0.2404) levels of dividend yield. These increments indicate that there is a positive relationship between market model adjusted return and dividend yield levels.

Table 2 ANOVA: Ex-dividend Day Excess Return across Dividend Yield Levels

Variable	$Yield_i$ Quantiles									
	Low Level			Medium Level			High Level			
	N	Mean	SD	N	Mean	SD	N	Mean	SD	F test
MMAR	8,670	0.0529	1.2534	8,669	0.1704	1.6855	8,673	0.2404	2.2646	(24.4734)***

Note: F-statistics designated by *, **, * represent the 1 per cent, 5 per cent and 10 per cent significant levels, respectively.**

Similarly, Table 3 shows the result of ANOVA F test which compares the average of market model adjusted return across three levels of individual ownership, namely: low, medium and high. These categories are created based on break points on 33.3 and 66.6 percentiles. The F statistic (3.5028) shows that the average of MMAR is not similar across three levels of individual ownership (at 0.05 significant level). It is also clear that the average of MMAR increase from low level of individual ownership (0.1219) to the medium (0.1462) and high (0.1918).

Comparing Tables 2 and 3, there is a positive relationship between market model adjusted return and both dividend yield and individual ownership. However, this relationship is more significant for dividend yield (at 0.01 significant level) than individual ownership (at 0.05 significant level). These finding support the positive relationship between ex-dividend day excess return and dividend yield, and the possibility of moderating role of individual ownership on this relationship. However, more robust regression analyses were done to support this justification.

Table 3 ANOVA: Ex-dividend Day Excess Return across Ownership Structure Levels

Variable	Individual Ownership ($Individuals_i$) Quantiles									
	Low Level			Medium Level			High Level			
	N	Mean	SD	N	Mean	SD	N	Mean	SD	F test
MMAR	8,368	0.1219	1.7031	8,422	0.1462	1.7397	9,222	0.1918	1.8945	(3.5028)**

Note: F-statistics designated by *, **, * represent the 1 per cent, 5 per cent and 10 per cent significant levels, respectively.**

As shown in Table 4, we divided research sample into three sub-samples based on individual ownership levels (low, medium and high). Then, we estimated the following regression equation for each of sub-samples.

$$MMAR_i = \alpha_0 + \alpha_1 TaxCut_i + \alpha_2 Yield_i + \alpha_3 Size_i + \alpha_4 Risk_i + u_i \quad (3)$$

Previously similar, $MMAR_i$ is the ex-dividend day excess return. $Yield_i$ is calculated as the ratio of dividend amount over cum-dividend day price for each observation. Three control variables are $TaxCut_i$, $Size_i$ and $Risk_i$. $TaxCut_i$ is considered as a dummy variable equal to one, if the observation falls in the years post-implementation of US Tax Act 2003 and zero if otherwise.

Referring to Equation 3, $Size_i$ is defined as the standardized value of total market capital on cum-dividend day for each observation. $Risk_i$ is measured through dividing the variance of share return over the market return for the estimation period of [-45, -6] and [+6, +45], by considering day 0 as the ex-dividend day.

We expect a positive sign for $Yield_i$ coefficient in line with tax clientele theory. A negative sign is expected for $TaxCut_i$ since individual investors' dividend tax-misgiving and tax clientele effect reduced after US Tax Act 2003. In line with tax-induced dynamic trading theory, a negative sign is expected for $Size_i$. However, the coefficient of risk is expected to be insignificant as Michaely and Villa (1995) state that the beta risk can only be valued while the excess return has been formerly beta-adjusted.

The results of estimated regressions in Table 4 are based on the White heteroskedasticity-consistent standard errors and covariance method to avoid heteroskedasticity problem. Durbin-Watson statistics for low (1.9447), medium (1.9727) and high (2.0705) sub-samples as well as the full sample (1.9721) show that the estimations are free of autocorrelation problem. Considering the large sample size for each of estimations, the central limit theorem (CLT) provides a theoretical justification for the assumption of normality (Gujarati & Porter, 2009).

Table 4 The Relationship between Dividend Yield and the ex-Dividend Excess Return across Three Levels of Individual Ownership (Robust Estimation)

	Individual Ownership ($Individuals_i$) Quantiles			
MMAR	**Low**	**Medium**	**High**	**Full Sample**
Intercept	0.1610 ***	0.3009 ***	0.34936 ***	0.2093 ***
	(2.6146)	(3.2553)	(3.8940)	(4.7048)
TaxCut	-0.0313	-0.2531 ***	-0.2713 ***	-0.1247 ***
	(-0.5604)	(-2.8688)	(-3.4479)	(-3.0926)
Yield	-3.0868	16.2640 ***	13.8595 **	10.1186 ***
	(-0.5077)	(2.9859)	(1.9860)	(2.7463)
Size	-0.050731 ***	-0.0492 ***	-0.0409 ***	-0.0466 ***
	(-3.5063)	(-3.1482)	(-3.8914)	(-6.1652)
Risk	0.0008	-0.0045	-0.0004	-0.0017
	(0.2212)	(-1.1967)	(-0.0908)	(-0.7355)
Adj. R2	0.0003	0.0043	0.0030	0.0019
F-Statistic	1.6379	10.1421 ***	7.9248 ***	13.1797 ***
Durbin-Watson	1.9447	1.9727	2.0705	1.9721
No. of obs.	8,368	8,422	9,222	26,012

Note: Values designated by *, **, * represents the 1 per cent, 5 per cent and 10 per cent significant levels, respectively. t-statistics are shown in parentheses.**

The F-statistics are significant at the 1% level for medium (10.14212), high (7.9248) and full (13.1797) estimates, implying that collectively, the independent variables explain the variation in the ex-dividend day excess return as a dependent variable. However, the insignificant F-statistic (1.6379) of low level shows that dividend yield and other control variables are not collectively good explanatory factors of ex-dividend day excess return for companies with a low level of individual ownership. This finding is reasonable since US Tax Act 2003 removed individual dividend tax disfavors. Moreover, dividend yield is an important explanatory variable for companies with high individual ownership. Therefore, the explanatory power of dividend yield and US Tax Act 2003 could be negligible where the individual ownership is low.

We justify that the insignificant coefficient of Yield (-3.086804) in the low level of individual ownership (Table 4) is due to the fact that the tax-disadvantage of dividend yield is minimal for companies owned less by individual investors. However, considering the medium (16.26395) and high (13.85947) levels of individual ownership as well as the full sample (10.11862), the coefficient of Yield is significantly positive (1% level for medium and full sample, 5% for high). Consistent with Yi et al. (2008), the investors' tax heterogeneity is perhaps the primary justification for the positive association of ex-day excess return and dividend yield.

According to Table 4, the coefficient of TaxCut (-0.031320) is insignificant at the low level of individual ownership. However, considering the medium (-0.253065) and high (-0.271331) levels of individual ownership and the full sample (-0.124654), the coefficient of TaxCut is significantly negative at the 1% level. This suggests that overall decreases in individual investors' dividend tax advantages reduced the ex-day excess return after the implementation of US Tax Act 2003. Since the coefficients of TaxCut decrease from low (-0.031320) to medium (-0.253065) and high (-0.271331) levels of individual ownership, we can conclude that the negative impact of US Tax Act 2003 on the ex-day excess return is higher for companies with higher levels of individual ownership.

Similar to the findings of Whitworth and Rao (2010), the coefficient of Size is significantly negative at the 1% level for all estimates, which confirms that stocks with higher capital (Size) lean toward higher liquidity, more short selling activities, and less ex-day excess return. Risk, however, is insignificant in conjunction with Michaely and Villa's (1995) findings. They state that the beta risk can only be valued. Since ex-day excess return has been formerly beta-adjusted, the ex-day excess return is not

proportional to trading risk, implying the insignificant coefficient of Risk for all estimates in Table 4.

As can be seen in Table 4, the adjusted R^2 are 0.000305, 0.004324, 0.002995 and 0.001870 for low, medium, high and full estimates, respectively. These values are quite low. The adjusted R^2 is a measure of the goodness of fit of the regression, showing how well the variation in ex-day excess return is explained by exogenous variables. The closer the value of R^2 is to one, the higher the explanatory power of independent variables and consequently, the model. The low values of adjusted R^2 in previous studies posit that the low R^2 is acceptable in the area of this research. This is reflected in work of Kim (2011), which has adjusted R2 equal to 0.011, while Whitworth and Rao (2010) obtained a lower value of 0.0013 for OLS estimations of ex-dividend day price drop ratio.

In summary, the significant positive relationship between ex-day excess return and dividend yield points towards the existence of the tax clientele effect. In addition, the tax clientele effect is more obvious for companies with higher individual owners that identify the moderating impact of individual ownership on the relationship between dividend yield and ex-dividend day excess return. On the other hand, the significant relationship between ex-day excess return and size revealed the occurrence of short selling activities. Therefore, our findings are consistent with tax-induced dynamic trading theory as a combination of both short-selling and the tax clientele theories.

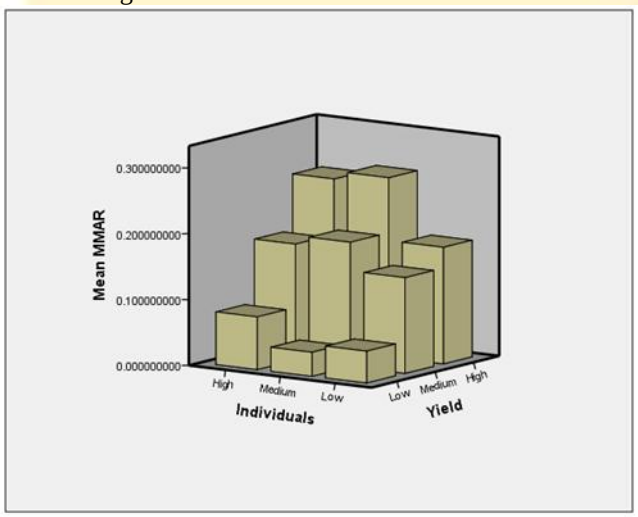

Figure 1 The Average of Ex-Dividend Day Excess Return across Dividend Yield and Individual Ownership Levels

Figure 1 demonstrates a 3D histogram of mean MMAR across three levels of dividend yield and individual ownership. As can be seen, the average of MMAR increases from low to medium and high levels of dividend yields. However, the rate of increment is much slower for low level of individual ownership than other levels. This finding demonstrates the fact that individual ownership is capable of moderating the strength of the relationship between dividend yield and ex-dividend day excess return (MMAR).

To comprehensively investigate the moderating impact of individual ownership on the relationship between dividend yield and capital gains, two comparable regression estimations were done (Table 5), in line with research methodology. The first estimation (1*) is without interaction term of $\text{Individuals}_i * \text{Yield}_i$ while the second estimation (Equation 1) includes it. We expect a significant positive sign for the interaction term in support of moderating impact of individual ownership on the relationship between dividend yield and capital gains.

Table 5 The Moderating Impact of Individual Ownership on Relationship between Dividend Yield and Ex-Dividend Day Excess Return

MMAR	Without Moderator (Equation 1*)	With Moderator (Equation 1)
Intercept	0.2214***	0.2187***
	(4.9226)	(4.9105)
TaxCut	-0.1365***	-0.1381***
	(-3.3683)	(-3.4123)
Yield	9.7779***	9.7526***
	(2.6538)	(2.7364)
Individuals	0.0238**	-0.0376*
	(2.1173)	(-1.6474)
Individuals *Yield		9.4878**
		(2.5171)
Size	-0.0473***	-0.0464***
	(-6.2497)	(-6.1378)
Risk	-0.0015	-0.0014
	(-0.6554)	(-0.5970)
Adj. R2	0.0020	0.0026
F-Statistic	11.3905***	12.5119***
Durbin-Watson	1.9723	1.9728
No. of obs.	26,012	26,012

Note: Values designated by *, **, * represents the 1 per cent, 5 per cent and 10 per cent significant levels, respectively. t-statistics are shown in parentheses.**

Previously similar, the results of estimated regressions in Table 5 are based on the White heteroskedasticity-consistent standard errors and covariance method to avoid heteroskedasticity problem. Durbin-Watson statistics for the first (1.9723) and second (1.9721) estimations show that the results are free of autocorrelation problem.

Moreover, the normality assumption is not a critical issue, considering the large sample size (26,012) as previously explained.

Table 5 shows the F-statistic is significant at the 1% level for both estimates. The adjusted R^2 are 0.0020 and 0.0026 for estimates 1* and 1, respectively, which is slightly higher for second estimation. The closer this value is to one, the higher the explanatory power of the independent variables and the model.

This research will contend itself with low values of R^2, as per Whitworth and Rao (2010) (adjusted R-squared =0.0013). Comparative analysis of this research low R^2 with previous studies evidenced that this limitation in the research context may be caused by the high volatility or unpredictability of stock prices on the ex-dividend day.

As can be seen in Table 5, the coefficient of TaxCut is significantly negative at the 1% level for both estimates 1* and 1. It suggests that overall decreases in dividend's tax disadvantage of individual investors reduce the excess ex-day return after the implementation of the US Tax Act 2003.

We also found that the coefficient of Yield is significantly positive (at 1% level) for both estimates 1* (9.7779) and 1 (9.7526). Consistent with Yi et al. (2008), the investors' tax heterogeneity is perhaps the primary justification for the positive association of ex-day excess return and dividend yield. The Individuals coefficient (0.0238) is significantly positive at the 5% level for estimate 1*, but it is negative (-0.0376) and insignificant for estimate 1 (only significant at 10% level). Similarly, we justify that the insignificant coefficient of individual ownership is due to the fact that by including the moderating effect of individual ownership, its direct effect on the ex-dividend day excess return reduced significantly. In other words, individual ownership is more likely to be a moderator than an explanatory factor for the ex-dividend day pricing.

Interestingly, we found a significant positive (9.4878) relationship between the interaction term of (Individuals*Yield) and ex-day excess return (estimate 1). This result shows that the individual ownership positively moderates the relationship between dividend yield and ex-dividend day excess return. Since the positive relationship between dividend yield and ex-dividend day excess return is due to individual investors' tax heterogeneity, this relationship should be strengthened (positively moderated) for companies with higher individual ownership, in which tax heterogeneity is higher. This finding is in line with tax clientele theory and research hypothesis.

Similar to Whitworth and Rao (2010), the coefficient of Size is significantly negative at the 1% level, which confirms the short-selling theory. Risk, however, is insignificant for both estimates in conjunction with Michaely and Villa's (1995) findings. They stated that the beta risk can only be valued while the ex-day excess return has been formerly beta-adjusted, which renders the coefficient of Risk insignificant.

In summary, the analysis pertaining to the hypothesis H1b enhances the tax clientele theory. We found that the positive relationship between dividend yield and ex-day excess return was positively moderated by individual ownership, since investors' tax heterogeneity is higher to companies with the higher level of individual ownership. One the other hand, the overall significant relationship between ex-dividend day excess return and Size revealed the occurrence of short selling activities. This study concludes that findings are more consistent with tax-induced dynamic trading theory as the mixture of both short-selling and tax clientele theories. This outcome is similar to Kim (2011), who investigated the direct impact of ownership structure on ex-dividend day price abnormality. He similarly concluded that tax-induced dynamic trading theory provides the best justification for the ex-day price abnormality.

5. DISCUSSION & CONCLUSION

This study examines the moderating impact of individual ownership on the relationship between dividend yield and ex-dividend day excess return. We proposed that if the individual investors' dividend tax disfavor is the cause of positive relationship between dividend yield and ex-dividend day excess return, this relationship should be positively moderated by increases in individual ownership. A sample of US listed companies from 2002 to 2010 is used to test the hypothesis. Our finding shows that individual ownership positively moderates the relationship between dividend yield and ex-dividend day excess return in line with tax clientele theory. Moreover, we find a positive relationship between ex-dividend day excess return and size, as a control variable, that verifies the short selling activities around ex-dividend day. Therefore, our findings support the tax-induced dynamic trading theory of Michaely and Vila (1995) as a fair combination of both short-selling and tax clientele theories.

The implications of this study are beneficial for both managers and shareholders. Managers are advised to consider the individual investors' dividend tax disfavor to make a better decision regarding dividend policy. Especially, for companies that dominantly owned by individual investors, managers should reduce dividend payouts to alleviate the ex-dividend price abnormality. On the other hand, individual shareholders should invest their money in the companies that pay lower cash dividends. This can help them to suffer less from the high dividend tax losses.

Further comparative investigations can be done in other countries and stock markets in line with this study. Other methods of analysis are also suggestible to reexamine the research findings, such as panel data and structural equation modeling. Panel Data analysis helps to investigate the research model by considering individual differences that cannot measure by research variables, while Structural Equation Modeling is useful for the purpose of confirmatory (causality) analysis. In the recent years, Structural Equation Modelling (SEM) has confirmed as the main statistical method for modeling in different

fields of knowledge such as Engineering (Ismail & Jenatabadi, 2014; Jenatabadi & Ismail, 2014), computer science (Jenatabadi, 2014a; Jenatabadi, Huang, Ismail, & Satar, 2013), and Management (Jenatabadi, 2014b; Moghavvemi & salleh, 2014). We suggest future studies to develop a new framework based on SEM.

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