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An Examination of Ex-Dividend Day Stock Price Movements: The Case of Nontaxable Master Limited Partnership Distributions

WAYNE H. SHAW*

ABSTRACT

This study examines the unit (stock) price and volume behavior of master limited partnerships (MLP) around the ex-dividend day. Since the dividends of MLPs are not taxable to the unitholder, tax based hypotheses predict no abnormal unit movements around the ex-day. Significant positive excess returns and volume are found before the ex-dividend day, and significant negative excess returns are found on the ex-dividend day. The findings which are not significantly impacted by the Tax Reform Act of 1986 suggest ex-day stock movements are not solely a function of investor marginal tax rates or corporate trading behavior.

ELTON AND GRUBER'S (1970) findings that in 1966-67 stock prices fell on average by less than the amount of the dividend on the ex-dividend date and that the ratio of the price decrease to the dividend was correlated with the dividend yield have led to the development of a tax clientele hypothesis relating to investor behavior. One puzzling result from their study was the finding that the price decreases for the highest yielding securities were significantly greater than the dividends which in their analysis implied an investor clientele with negative tax rates. While Michaely (1989) using 1986-87 data was unable to find support for the tax clientele hypothesis across different yield groups, he also documented the large price drop for the highest yielding securities. Michaely (1989) suggested that his results may demonstrate a preference of corporations for dividend over capital gains because of favorable tax treatment corporations receive on dividend income (corporate trader hypothesis). Shefrin and Statman (1984), however, suggest that preferences for dividends over capital gains may exist for nontax reasons such as self-control or a desire to segregate gains and losses.

The purpose of this paper is to examine the ex-dividend day stock price behavior of master limited partnership (MLP) units during the 1985-88 period. Dividends from these high yielding securities are not taxable. Therefore, support for either the tax clientele hypothesis or the corporate trader hypothesis would be found only if the average ex-day price change on MLPs equalled the dividend. This result would also be consistent with Barclay's (1987) finding that before the enactment of an income tax in 1913 even high

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yield securities on average had a price change to dividend ratio equal to one. A finding of the price decline exceeding the dividend for these securities would be consistent with Shevrin and Statman's (1984) theory that preferences for dividend are motivated, at least in part, by nontax preferences. Finally, data from 1988 is included to determine if the results are affected by changes made in the Tax Reform Act of 1986.

The rest of the paper is structured as follows. Section I summarizes the prior research. The hypotheses to be tested are developed in Section II. Section III describes the sample and research methodology. The results and conclusions are provided in Section IV and V, respectively.

I. Prior Research

The relation between ex-dividend day stock price behavior and investor marginal tax rates was first studied by Elton and Gruber (1970). They hypothesized that the ex-day price change is affected by the differential taxation of ordinary income and capital gains as follows:

$$\frac{P_B - P_A}{D} = \frac{1 - t_o}{1 - t_c} \quad (1)$$

where P_B = the price on the day before the stock goes ex-dividend (cum day),

P_A = the price of the stock on the ex-dividend day (ex-day),

D = The amount of the dividend,

t_o = the tax rate on ordinary income, and

t_c = the tax rate on capital gains.

Based on equation one, periods in which investor tax rates on ordinary income exceed the rates on capital gains (prior to 1988) should be symptomatic of an ex-day price decrease less than the amount of the dividend. Furthermore, Elton and Gruber (1970) proposed that the differential tax rates on ordinary income and capital gains should negatively affect the desire of a high tax bracket investor to hold high yielding stocks. They found support for this tax clientele hypothesis using data from 1966-67 by finding on average the stock price dropped by less than the amount of the dividend and that the ratio in equation one was positively correlated with the yield on the security. In fact, for the highest yielding decile of stocks, the price actually dropped more than the amount of the dividend.

Barclay (1987) found that prior to the enactment of an income tax in 1913 stock prices fell on average by the full amount of the dividend. He also found that the amount of stock price decrease was approximately equal to one for all dividend yield levels. He interpreted these results to support the hypothesis that in the pretax period investors viewed dividends and capital gains to be perfect substitutes and that differential tax rates on dividends and capital gains have since caused investors to discount the value of taxable cash distributions relative to capital gains.

Kaley (1982) questioned the ability to infer marginal investor tax rates

from the relative ex-day price drop. Lakonishok and Vermaelen (1983) supported this skepticism of the tax clientele hypothesis when examining the effect of major tax reform on the ex-day price behavior of the stocks of Canadian firms. They found that the relative ex-day price drop, which was smaller in Canada, was less correlated to dividend yields and was not affected by changes in taxation differences of ordinary income and capital gains in the direction predicted by equation one.

Michaeli (1989) used 1986–87 data (1) to attempt to replicate the results of Elton and Gruber (1970) under current market conditions, (2) to test the sensitivity of the results to adjustments for heteroskedasticity in the ex-day premium variance, and (3) to examine the effects of the Tax Reform Act of 1986 on his results. He found that current ex-day prices on average fell by the amount of the dividend. However, for the highest yielding securities, he also found prices fell in excess of the dividend amount. He surmised that the high yield stock price behavior was consistent with a preference by corporate traders for dividends over capital gains since corporations received an exclusion of 85% (80% in 1987) of dividend income from taxation causing dividends to be taxed at a rate significantly less than capital gains (corporate trader hypothesis).

The results of Eades, Hess, and Kim (1984) question the appropriateness of using either the tax clientele hypothesis or corporate trader hypothesis to explain ex-day stock price behavior on high yield securities. Examining ex-day price movements for 935 nontaxable cash distributions occurring between July 2, 1962 and December 31, 1980, they found negative ex-day excess returns averaging -0.139% (equivalent to a price change to dividend ratio exceeding one). Since these securities yielded on average 2.12% on a quarterly basis, this result would be consistent with either tax hypothesis only if investors mistakenly thought the dividends were taxable.

Negative excess ex-day returns on both taxable and nontaxable high yield securities is consistent with the theory developed by Shefrin and Statman (1984). They suggest that investors prefer dividends over capital gains for self-control reasons and a desire to segregate gains and losses. Self-control motivations are demonstrated in investor's views that the sale of stock is not a perfect substitute for dividends since the former is viewed as an invasion of corpus and the later is not. They argue that the receipt of a dividend provides a silver lining to a potential capital loss on a stock sale. They suggest therefore that investors may be willing to pay a premium for dividends over capital gains. This reasoning would explain not only the negative ex-day returns but also the upward price movements on days preceding the ex-day found in prior studies (see Eades, Hess, and Kim (1984) for an example) which were caused possibly by buying pressures to secure the dividend.

II. Hypotheses Development

One problem with viewing the Eades, Hess and Kim (1984) results as a rejection of either tax-based hypothesis is that the tax status of the dividends they examined was not completely resolved until after the end of the firm's

fiscal year end. Since a market belief that some portion of the dividend might be taxable would make the negative return finding consistent with either hypothesis, a test based on high yield dividends known *ex ante* to be nontaxable would be a more appropriate approach to address the issue. While Barclay (1987) seems to support a tax-based hypothesis, his results are subject to criticisms that changes have occurred not only in tax laws in the last 70 years, but also in many other factors affecting asset pricing and investor behavior. To address criticisms of both the Barclay (1987) and the Eades, Hess, and Kim (1984) studies, this paper addresses the *ex-day* behavior of high yield nontaxable securities by examining units prices and volume of MLPs traded in the period 1985–88. This includes a period of substantial overlap with the Michaely (1989) study of high yield taxable dividends. The addition of volume analysis to the study allows for stronger tests of the presence of short-term traders as discussed in Lakonishok and Vermaelen (1986).

A. Taxation of Master Limited Partnerships

One of the primary motivations for the formation of MLPs in the mid-1980's was to avoid the double taxation of corporate income. While corporate income is taxed when earned at the corporate level and again at the shareholder level when a dividend is paid, MLP income is taxed only once when earned, with the tax being imposed on the unitholders.¹

The effect of the tax differences can be shown in a simple example. Suppose the corporate tax rate, the individual tax rate, and the capital gains tax rate equalled 40%, 30%, and 20%, respectively. Assume an individual investor purchased 10% of an entity's shares for \$5,000 on January 1, 1990 and sold the shares for \$6,000 on December 31, 1990. Also, assume the entity earned \$6,000 during 1990 and distributed \$2,000 during the year. If the entity was a corporation, a \$2,400 tax ($\$6,000 \times 40\%$) would be imposed at the corporate level. The investor would also pay a tax on the dividends of \$60 ($\$2,000 \times 10\% \times 30\%$) and a capital gains tax of \$200 ($\$1,000$ profit on the sale $\times 20\%$). The tax paid by both entities on the shareholder's 10% interest for 1990 would total \$490 ($\$240 + \$60 + \200).

In comparison, if the entity was formed as an MLP, no tax would be paid at the partnership level. Instead, the income tax on earnings would be imposed on each unitholder on his (her) pro rata share of the partnership income. For the 10% unitholder in this example, the tax on income earned would be equal to \$180 ($\$6,000 \times 10\% \times 30\%$). The unitholder would also increase the basis in his units from \$5,000 to \$5,600 since he paid tax on \$600 of partnership income. The \$200 dividend received by the unitholder is not taxed since the entity is treated as a partnership. Instead, the unitholder would reduce his

¹Distributions received affect the gain (or loss) to be reported upon sale of the securities since the amount of the distribution reduces the cost basis of the units. The following discussion focuses on U.S. tax law. However, to the extent that other countries recognize the partnership form of business, similar tax consequences would be achieved.

basis in the units by \$200 to \$5,400. Finally, the unitholder would pay a capital gains tax of \$120 ($\{\$6,000 - \$5,400\} \times 20\%$). The total tax incurred in 1990 on the 10% unitholder's interest would be \$300 in this scenario.

While in this example the entire tax bill was paid in 1 year, it should be noted that the capital gains tax would not have been payable in either case if the investor had not sold the shares (units). Also, 70% of the dividend paid by the corporation would be excluded from taxation if the investor was another corporation.² The tax on dividends at the shareholder level would also have been avoided if the corporation did not pay a dividend. In comparison, a unitholder in an MLP must pay a tax on his pro rata share of the partnership's income even if the partnership does not pay a dividend. Also, there is no partial exclusion of dividend income from taxation for corporate investors since partnership distributions are not currently taxed.

B. Hypotheses Concerning Price Reactions Around the Ex-Day

As discussed earlier, studies of high yield taxable securities have demonstrated positive excess returns prior to the ex-day and negative excess returns on the ex-day. These results are consistent with tax-based dividend capture hypotheses where low tax rate taxpayers, primarily corporate investors with the dividend received deduction, purchase the security immediately prior to the ex-day to obtain the favorable taxation of dividends relative to capital gains.³

Since dividends from MLPs are not taxed, there is no reason to believe that tax-based hypotheses should explain ex-day return behavior. Any tax paid is deferred until the sale of the partnership units since the dividend received simply reduces the investor's basis in the partnership. Based on the lack of tax-induced trading, prior research would suggest:

HYPOTHESIS 1: No excess returns behavior would be found around the ex-dividend day.

One added finding from Michaely (1989) was that the pattern of positive pre-ex-day returns and negative returns for high yielding taxable securities on and after the ex-day persisted in 1987 after enactment of the Tax Reform Act of 1986 even though the tax advantage of capital gains to individual investors was limited. He attributes this result to the continued availability of the dividend received deduction to corporate traders after the 1986 Act. In this study, returns will be separated between ex-days pre-1988 and ex-days in 1988 since 1988 was the first year in which individual investors received no tax preference for capital gains over ordinary income. Although the

²The dividend-received deduction for dividends received by a corporation was decreased to 70% for dividends received after 1987 from levels of 80% in 1987 and 85% prior to 1987. However, if a corporation owns more than 20% (80%) of the dividend paying corporation, the dividend-received deduction for years after 1987 equals 80% (100%).

³Section 246 of the Internal Revenue Code requires that a corporation must hold a security more than 45 days to qualify for the dividend-received deduction.

dividend-received deduction on taxable dividends remained in 1988 and may support Michaely's (1989) results, MLP distributions do not create a dividend-received deduction since they are not taxable. Therefore,

HYPOTHESIS 2: *Excess return behavior of MLPs around the ex-day should not be affected by the Tax Reform Act of 1986.*

For a trading strategy to be effective, the investor must make a profit sufficient to overcome transaction costs. Support for trading arguments is found in a negative correlation between ex-day returns and dividend yield (i.e., the largest negative excess returns are found for the highest taxable yielding stocks). A second indication of price pressure created by dividend capture trading might be found by examining the relation between cum day positive excess returns and ex-day negative excess returns. Assuming buying pressures cause the cum day positive excess returns, release of the buying pressure might cause those stocks that increased the most on the cum day to fall the most on the ex-day. Hypotheses based on transaction costs and price pressures are summarized as follows:

HYPOTHESIS 3: *Ex-day excess returns are negatively correlated with dividend yield.*

HYPOTHESIS 4: *Ex-day excess returns are negatively correlated with cum day excess returns.*

C. Hypotheses Concerning Trading Volume Around the Ex-Day

Lakonishok and Vermaelen (1986) pointed out that price reaction studies are unable to discriminate between the various hypotheses concerning ex-day price behavior. They argue that the influence of short-term traders on ex-day security prices could be more clearly demonstrated by examining trading volume. The presence of short-term traders influencing ex-day security pricing would be shown through positive abnormal volume around the ex-day. Green's (1980) analysis implies that this abnormal volume will be greatest on the cum day and ex-day.⁴ Lakonishok and Vermaelen (1986) found support for an influence of short-term traders for taxable distributions in that trading volume increased around the ex-day. This increased volume was most pronounced for high yield securities. In contrast, they found negative abnormal volume around the ex-day for nontaxable stock splits and stock dividends. If short-term trading is tax induced, then for the nontaxable MLP cash distributions we should expect the following:

HYPOTHESIS 5: *No abnormal trading volume should occur around the ex-day.*

⁴Green's argument for buying or selling on these days is that trading earlier or later will require the short-term to assume greater risks unrelated to the play on the dividend.

III. Sample Selection and Methodology

A. Sample Description

A list of MLPs trading on the New York and American Stock Exchanges was obtained from issues of *Stocks and Bonds*. Ninety firms were found to have made at least one dividend payment during a period from January 1985 to December 1988. In all, 579 firm ex-dividend dates were found for which there was complete daily price and volume data during the period from January 1985 and December 1988.⁵ Table I provides some summary information about the firms in the sample. Of the 90 firms in the sample, 68 were equally divided between oil and gas activities and real estate. Other than five firms dealing in natural resources and six investment firms, no other industry was represented by more than two firms. As shown in Panel B, these firms paid relatively large dividends. The mean (median) quarterly dividend yield equalled 3.1% (2.9%). This compares to industry averages for the period of 1.3% for non-MLP real estate firms.⁶ One obvious reason for the higher dividend yield is that MLPs distribute profits on which no corporate level tax has been paid.

Table I
Sample Firms

This table summarizes the industry affiliation, stock price, and dividend levels of the 90 master limited partnerships for which ex-dividend day returns were available on the CRSP data base between 1985 and 1988. Quarterly dividend yield is equal to the quarterly dividend per share divided by the cum day stock price.

Panel A. Industry affiliation.		
Industry	Number of Firms	
Oil & Gas	34	
Real Estate	34	
Natural Resources	5	
Investments	6	
Other	11	
Total	<u>90</u>	
Panel B. Descriptive statistics.		
	Mean	Median
Cum Day Price Per Share	\$13.465	\$13.250
Quarterly Dividend Per Share	\$ 0.397	\$ 0.373
Quarterly Dividend Yield	3.1%	2.9%

⁵ While the results contain observations from the fourth quarter of 1987, no observations came from the 2-week period centered on the October 1987 "crash". The study was replicated deleting all observations from October 1987 (and the entire fourth quarter of 1987) because of concern over the influence of the event. The results were virtually identical to those reported in the paper.

⁶ Industry averages were obtained from *Valueline* for the 1985–1987 period.

B. Calculation of Excess Returns Around the Ex-Day

Daily returns for the 11 days centered on the ex-day were collected from the CRSP daily return file for the 579 MLP observations. To be consistent with prior studies, an excess return was then calculated for each day in the 11-day period by subtracting the CRSP value-weighted return on each day from the raw unit return on that day.⁷ Some prior studies (see Barclay (1987) for example) expressed concern that a market adjustment does not adequately address the assumption of independent observations because, in some instances, more than one observation occurs on the same day. These studies suggest that portfolios should be formed for each day on which more than one ex-day occurs. Using this procedure, 211 independent daily observations are calculated. Results will be presented based on average excess returns (579 observations) and average excess portfolio returns (211 observations).⁸

The significance levels on excess returns reported throughout the paper are based on a *t*-statistic calculated for each day as follows:

$$t(AR_j) = (AR_j \cdot \sqrt{N}) / SXR_j \quad (2)$$

where AR_j = the average excess return for day j ,
 N = the number of ex-dividend day announcements, and
 SXR_j = the standard deviation of excess returns on day t .⁹

C. Calculation of Excess Volume Around the Ex-Day

Volume data was collected from the *S&P Daily Price Record* microfiche for the 11 days around the ex-day. Percentage excess volume for a given day is calculated by subtracting from that day's volume the average daily volume for the 4 weeks preceding the examination period. The estimate is scaled by the 4 weeks preceding average volume to obtain percentage excess volume.

In calculating a test statistic, skewness concerns must be addressed with volume data. The distribution for each of the 11 days in this study was found to be significantly skewed. Therefore, the test statistic provided throughout the paper is calculated based on a redefinition of excess volume. First, the natural logarithm is taken of each of the 11 days' volumes and the 4 week average volume. Excess volume is then defined as the difference between the log of a day's volume and the log of the 4-week average. A Wilcoxon signed-rank test is then calculated on excess volume. While percentage

⁷Throughout this study, excess returns will be examined rather than ex-day premiums based on equation (1) since equation (1) does not account for heteroscedasticity in the variance. A complete discussion of the problems caused by heteroscedasticity in the price change to dividend ratio is contained in Michaely (1989).

⁸Virtually identical results were found examining raw returns.

⁹Similar results were obtained using the nonparametric Wilcoxon signed-rank test.

excess volume as defined above is positively skewed, excess volume based on the difference in logs is not.¹⁰

IV. Results

A. Excess Returns on the Ex-Dividend Day

Table II provides a summary of the average ex-dividend day excess returns in prior studies and for this study for high yield taxable and nontaxable securities. The average excess return for MLPs of -0.385% (-0.358% if a portfolio is used for each day's returns) is similar to most prior studies. Only Barclay's study from the early 1900's has a different finding. The significant negative reaction persists across both taxable and nontaxable high yield securities.

To examine whether MLPs demonstrate the same pattern of positive excess returns before the ex-day and negative return afterwards, columns 1 and 2 of Table III detail the average excess returns for the 11 days centered on the ex-day. Column 1 treats each of the 579 firm ex-days as an independent observation (labeled returns in the table) while column 2 treats the average portfolio return on each of the 211 days on which at least one firm ex-day occurred as an independent observation (labeled as days). Since both calculations of excess returns produce substantially similar results, discussion is

Table II
Comparison of Ex-Dividend Day Excess Returns for High Yielding Securities across Relevant Studies

This table summarizes the percentage excess return on the ex-dividend day for this study and previous studies of high yield taxable and nontaxable securities. The percentage excess return for the Elton and Gruber study is an estimate contained in Table 4 of Eades, Hess, and Kim (1984). The percentage excess return for Michaely (1989) is a weighted average of the data from 1986 and 1987 presented in Table 6 of his study. The significance levels are in parentheses.

Percentage Excess Return on the Ex-Dividend Day		
Study	High Yield Taxables	Nontaxable Distributions
Elton and Gruber (1970)	-0.311	N.A.
Eades, Hess and Kim (1984)	-0.159 (< 0.01)	-0.139 (< 0.01)
Barclay (1987)	N.A.	0.016 (0.22)
Michaely (1989)	-0.306 (< 0.01)	N.A.
Shaw (1990)	N.A.	-0.358 (0.02)

¹⁰Throughout the tables, the median percentage excess volume is provided since the mean value is not meaningful due to outliers. Also, parametric test statistics based on excess volume (the difference in logs) provide substantially identical results to those reported in the table.

Table III
**The Percentage Daily Excess Returns for the 11 Days
 Surrounding the Ex-Dividend Day with Separate Analysis of
 Observations from 1988**

Each column provides the average excess return (return minus the CRSP value-weighted market index) first for all 579 observations and then for the portfolio of firms for each of 211 days on which one or more firms went ex-dividend. For the portfolio based on days, the average excess return for all securities going ex-dividend on the same calendar day is treated as one observation. (*t*-statistic in parentheses.)

Trading Day Relative to Ex-Day	All Observations		Observations Prior to 1988		Observations from 1988	
	Returns (<i>n</i> = 579)	Days (<i>n</i> = 211)	Returns (<i>n</i> = 334)	Days (<i>n</i> = 129)	Returns (<i>n</i> = 245)	Days (<i>n</i> = 82)
-5	0.367 (0.001)	0.283 (0.035)	0.341 (0.035)	0.167 (0.373)	0.400 (0.008)	0.466 (0.010)
-4	0.044 (0.709)	0.050 (0.783)	-0.163 (0.343)	0.001 (0.995)	0.325 (0.024)	0.126 (0.513)
-3	-0.021 (0.863)	-0.078 (0.623)	-0.039 (0.812)	-0.009 (0.969)	0.004 (0.984)	-0.187 (0.362)
-2	-0.024 (0.833)	0.175 (0.273)	-0.002 (0.991)	0.261 (0.272)	-0.055 (0.672)	0.039 (0.820)
-1	0.612 (0.000)	0.541 (0.000)	0.541 (0.000)	0.577 (0.004)	0.708 (0.000)	0.484 (0.027)
0	-0.385 (0.000)	-0.358 (0.018)	-0.391 (0.008)	-0.392 (0.074)	-0.375 (0.008)	-0.305 (0.097)
1	-0.229 (0.027)	-0.068 (0.622)	-0.235 (0.112)	0.102 (0.605)	-0.221 (0.111)	-0.336 (0.048)
2	-0.332 (0.001)	-0.411 (0.001)	-0.434 (0.002)	-0.667 (0.000)	-0.191 (0.119)	-0.009 (0.955)
3	-0.116 (0.228)	-0.052 (0.698)	-0.144 (0.295)	-0.052 (0.776)	-0.078 (0.547)	-0.051 (0.785)
4	-0.097 (0.289)	-0.098 (0.426)	-0.186 (0.145)	-0.127 (0.408)	0.025 (0.844)	-0.053 (0.798)
5	-0.063 (0.587)	-0.206 (0.136)	-0.183 (0.308)	-0.238 (0.238)	0.101 (0.409)	-0.156 (0.337)

limited to the calculation based on the 579 observations. For the 5 days preceding the ex-day, the MLPs exhibited generally positive excess returns of approximately 1% with two-thirds of the upward price movement occurring on the cum day. Both the cum day and day -5 exhibited significant excess positive returns. Starting on the ex-day, the average excess return becomes negative and falls approximately 1.2% for the 6-day period ending day +5 with days 0, +1, and +2 significant at the 0.05 level. These results are similar to results for the highest yielding two deciles of taxable distributions from 1986 and 1987 reported in Table 9 of Michaely (1989).

One explanation of this return pattern for high yielding taxable distributions given by both Lakonishok and Vermaelen (1986) and Michaely (1989) is the tax-induced preference for dividends by corporate traders. However,

corporate traders would not be predicted to play a prominent part in pricing MLP securities for two reasons. First, since they do not get a dividend-received deduction on MLP distributions, they are not tax advantaged relative to individual investors. For both sets of investors, receipt of an MLP distribution simply reduces the investor's basis in the MLP units and defers any taxation effects until the units are sold. Second, corporate investors have not traditionally been the natural clientele of major MLP firms, namely oil and gas drilling and real estate operations. Tax exempt entities also have not generally traded in MLP securities because the income from an MLP is defined to be unrelated business income to the tax exempt entity and therefore taxable to the entity for the pro rata share of time it holds the security. All investors would pay tax on their shares of the partnership income for as long as they hold the securities at ordinary income rates.

B. Impact of the Tax Act of 1986

The Tax Reform Act of 1986 phased out the tax preference given capital gains. In 1987, the difference in maximum tax rates for individuals narrowed from 30% (a 20% capital gain rate to a 50% rate on ordinary income) to 10.5% (28% to 38.5%). The differential was then eliminated in 1988 with all income being taxed at a maximum rate of 33%. At the same time, the \$3,000 limitation of the deduction of capital losses against ordinary income was maintained. These tax law changes effectively eliminated tax-induced preferences for capital gains over ordinary income.¹¹ Prior studies, such as Lakonishok and Vermaelen (1983), argue that the relative demand for capital gains should change with changes in the tax law for tax-based hypotheses to hold.

Since MLP distributions are simply a return of basis to an investor, there is no reason to expect the 1986 tax law changes would effect ex-day MLP pricing. To examine this issue, the 579 returns (211 days) are separated between the 334 returns (129 days) occurring prior to 1988 and the 245 returns occurring in 1988. Figure 1 and the final four columns of Table III detail the result of the separation. The return behavior for the 11-day period was virtually identical for the two subperiods with significant positive excess returns on day -1 and significant negative returns on day 0. The main difference is the downward drift in unit prices did not persist as long after the ex-day in 1988 as it had in the prior years. The change in tax laws appears to have had little, if any, affect on the pricing of MLP securities.

C. Effect of Dividend Yield

While MLPs generally are high yielding securities, the quarterly dividend yield for the securities ranged from 0.7% to 20%. As argued earlier, tests of price pressure hypotheses can be examined by relating the dividend yield to

¹¹Capital gains for corporations are also taxed at the ordinary income rates (maximum 39%) beginning in 1988. The dividend-received deduction was maintained but is not relevant to MLP distribution.

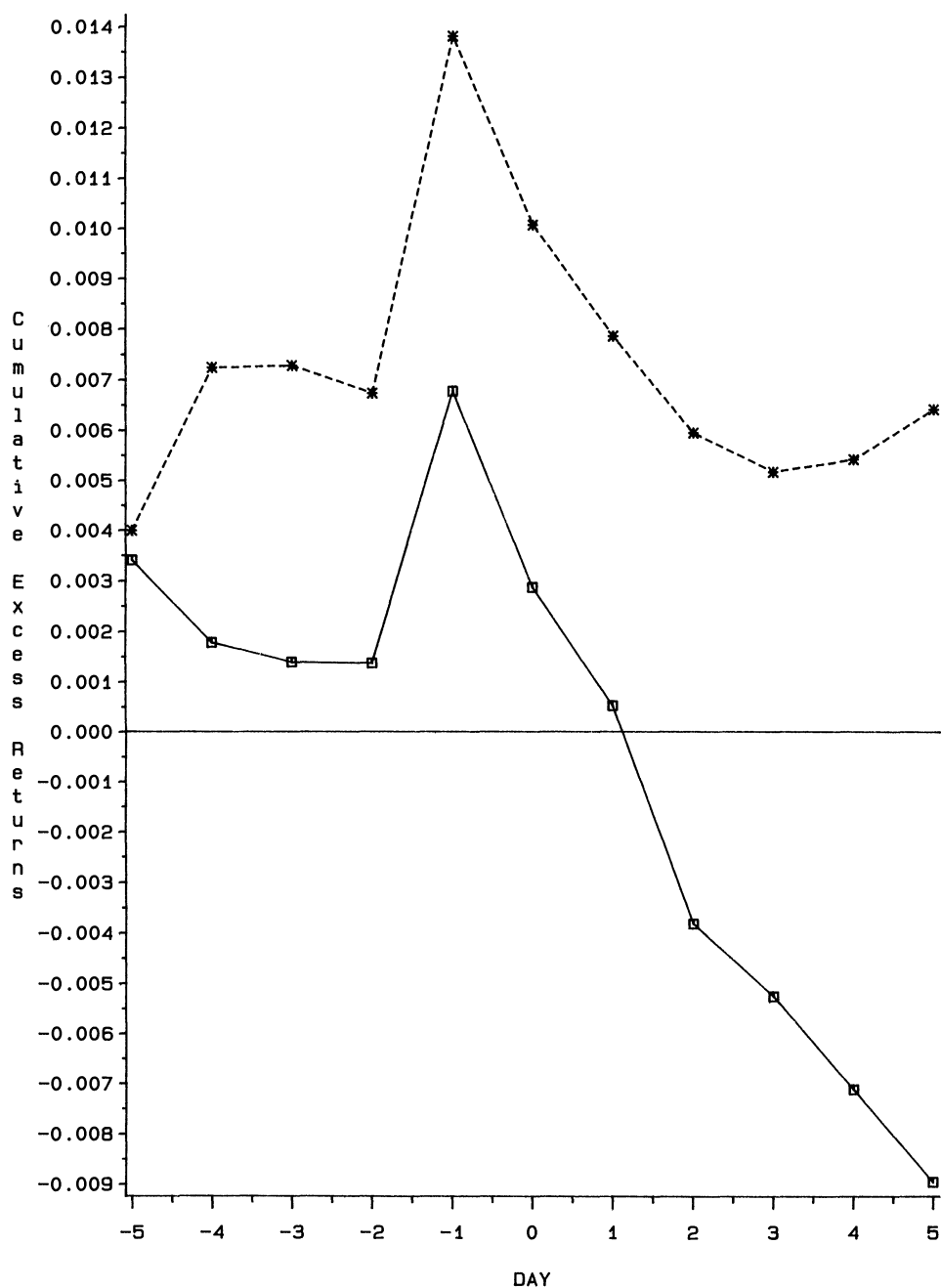


Figure 1. Cumulative excess returns for the 11 days around the ex-dividend day. The solid line represents the pre-1988 ex-day average excess return and the dashed line represents the 1988 ex-day average excess return.

excess returns around the ex-day and relating returns before the ex-day to returns on and after the ex-day. Evidence of price pressure would be found if the ex-day return is negatively correlated with the dividend yield and also with the cum day return. As shown in Table IV, these relationships are supported for all observations and in both subperiods by the data. The securities with the largest positive excess returns on day -1 also had the largest negative excess returns on day 0. Also, the ex-day returns were negatively correlated with dividend yields (i.e., the largest price drops occurred for the highest yielding securities). The only puzzling result is that the dividend yield is not correlated with the day -1 price movements.

D. Volume Effects Around the Ex-Day

Lakonishok and Vermaelen (1986) argue that the influence of short-term traders around the ex-day can best be investigated by examining abnormal volume around the ex-day. Their results showing positive abnormal volume around the ex-day for taxable securities supports the presence of short-term traders for those securities. However, the trading phenomena do not extend to stock splits and stock dividends since they find negative abnormal volume around the ex-day of those securities.

Table V details the changes in the trading volume around the ex-day for the MLP for the entire period and both subperiods. Consistent with stock splits and stock dividends the general trend in trading was below that of the average volume for the prior 4 weeks. However, significant positive abnormal volume is found for days -2 and -1 . Excess trading immediately prior to the ex-day supports Green's (1980) hypotheses that changes in trading

Table IV
Correlations among the Ex-Dividend Day Excess Return (R_0),
the Day before the Ex-Day Excess Return (R_{-1}), and the
Dividend Yield.

This table reports correlations for the 579 returns around the ex-dividend day with the quarterly dividend yield. A separate analysis is also provided for the 334 observations occurring prior to 1988 and the 245 observations in 1988 to provide evidence of the impact of the Tax Reform Act of 1986. Dividend yield is the dividend per share divided by the cum day stock price. The significance level of the Spearman Rank Coefficient is shown in parentheses.

Variable	Spearman rank correlations					
	All Observations ($n = 579$)		Observations Prior to 1988 ($n = 334$)		Observations from 1988 ($n = 245$)	
	R_0	Yield	R_0	Yield	R_0	Yield
R_{-1}	-0.1384 (0.001)	-0.0113 (0.786)	-0.1018 (0.063)	-0.0230 (0.675)	-0.1971 (0.002)	-0.0167 (0.794)
R_0		-0.1519 (0.001)		-0.1526 (0.005)		-0.1278 (0.046)

Table V
Percentage Daily Excess Volume for the 11 Days Surrounding
the Ex-Dividend Day with Separate Analysis of Observations
from 1988

Each column provides the median excess volume first for the 579 observations (Returns) and then based on a daily portfolio of 211 days (Days) on which one or more firms went ex-dividend. For the portfolio based on days, the average excess volume of all securities going ex-dividend on the same calendar day is treated as one observation. (Wilcoxon signed-rank test statistic in parentheses.)

Trading Day Relative to Ex-Day	All Observations		Observations Prior to 1988		Observations from 1988	
	Returns (<i>n</i> = 579)	Days (<i>n</i> = 211)	Returns (<i>n</i> = 334)	Days (<i>n</i> = 129)	Returns (<i>n</i> = 245)	Days (<i>n</i> = 82)
- 5	-10.624 (0.003)	-7.613 (0.017)	-19.897 (0.001)	-13.195 (0.007)	0.804 (0.904)	-2.237 (0.836)
- 4	-3.097 (0.096)	-2.223 (0.413)	-3.495 (0.155)	-3.331 (0.563)	-1.189 (0.367)	0.100 (0.589)
- 3	-1.042 (0.703)	2.808 (0.634)	-3.239 (0.334)	-2.274 (0.436)	-0.459 (0.660)	10.937 (0.066)
- 2	5.633 (0.002)	5.618 (0.021)	0.727 (0.440)	-0.990 (0.420)	21.372 (0.001)	22.001 (0.007)
- 1	19.315 (0.001)	14.466 (0.003)	12.234 (0.021)	8.759 (0.135)	35.060 (0.001)	28.558 (0.003)
0	-17.126 (0.001)	-11.793 (0.007)	-26.999 (0.001)	-22.182 (0.006)	-5.948 (0.245)	1.653 (0.512)
1	-20.168 (0.001)	-15.327 (0.005)	-22.263 (0.001)	-14.135 (0.030)	-16.505 (0.001)	-16.464 (0.064)
2	-19.474 (0.001)	-15.902 (0.001)	-19.353 (0.001)	-17.236 (0.013)	-19.474 (0.001)	-12.826 (0.022)
3	-16.082 (0.001)	-9.389 (0.011)	-10.301 (0.007)	-8.173 (0.069)	-24.840 (0.001)	-14.005 (0.076)
4	-24.056 (0.001)	-25.526 (0.001)	-20.593 (0.001)	-21.268 (0.003)	-27.962 (0.001)	-29.533 (0.001)
5	-20.766 (0.001)	-18.252 (0.001)	-21.086 (0.001)	-19.628 (0.016)	-20.766 (0.001)	-12.384 (0.002)

behavior induced by dividends should show up as increased trading immediately before the ex-day with a fall off in volume in other periods from which potential traders moved. This pattern is consistent across both subperiods. These results would suggest that active buying occurred immediately before an MLP security went ex-dividend to secure the dividend, but that investors did not immediately dispose of the security after the stock went ex-dividend.

One potential problem with using volume to conclude that dividend induced trading exists is the assumption that nondividend related "normal" trading levels in the ex-dividend week are equal to trading levels in the estimation period. The ex-dividend week generally does not include earnings and dividend announcements which are included in the estimation period. For MLPs these two announcements are the primary sources of information

picked up by the *Wall Street Journal*. If we assume higher volume occurs around these announcements, then abnormal volume related to ex-dividend trading would be understated in this and prior studies.¹²

Lakonishok and Vermaelen (1986) recognize this problem. They suggest two additional tests to gain insights into the volume of trading around the ex-day. First, if the investor prefers dividends for some reason (tax motives in prior studies), greater benefits are available to be derived from higher yielding securities. Therefore, a positive correlation is expected between the yield on the security and the abnormal volume on the security. Second, for any transaction to be profitable, the investor must be able to overcome transaction costs. The abnormal trading volume should therefore be positively correlated with transaction costs. As in Lakonishok and Vermaelen (1986), this study uses average estimation period volume as a surrogate for transaction costs. Since transaction costs should be negatively correlated with normal volume, normal volume would be expected to be positively correlated with abnormal volume.

To examine these relationships, 2-day average percentage excess volume is computed for days -2 and -1 (defined as PRIOR) and the ex-day and day $+1$ (defined as AFTER).¹³ The median of each of these two variables for the upper and lower 50% of the distribution based first on yield and then on average normal volume are shown in Panel A of Table VI. Correlations between PRIOR, AFTER, yield, and normal volume are shown in Panel B.¹⁴ The results demonstrate that securities with higher yields traded with higher volume both in the cum period and in the ex-day period, supporting the arguments related to yield above. However, unlike Lakonishok and Vermaelen (1986), a significant negative relation is found between excess volume and prior period volume. No economic interpretation of this result can be offered.

V. Conclusions

In this paper, I have examined the ex-dividend unit price and volume behavior of Master Limited Partnership securities. Since distributions on these securities have no current tax consequences, consistency with prior studies would suggest no abnormal price or volume behavior around the ex-dividend day if ex-day trading is driven solely by tax motivations. I examine price and volume behavior for 11 days centered on the ex-day for 579 MLP distributions made during 1985–88. Several inconsistencies with a no-effects hypothesis were found. First, similar to high yield taxable securi-

¹²For further discussion of this issue see Lakonishok and Vermaelen (1986).

¹³Virtually identical results are obtained using -1 and 0 in place of the 2-day variables PRIOR and AFTER.

¹⁴A multivariate regression equation with excess volume as a dependent variable and yield and normal volume as independent variable provides substantially identical results.

Table VI
**Relationship of Percentage Excess Volume around the Ex-Day
to Dividend Yield Levels and Average Volume**

PRIOR (AFTER) is defined as the average percentage excess volume on days - 2 and - 1 (0 and + 1). Dividend Yield is the dividend per share divided by the cum day stock price. Prior Average Volume is the average estimation period volume. Median Values with Wilcoxon signed-rank test are in parentheses in Panel A. Significance level of the Spearman rank coefficient is shown in parentheses in Panel B.

Panel A. Median values conditioned on yield and average volume.				
	Based on Yield		Based on Average Volume	
	Below Median Yield	Above Median Yield	Below Median Volume	Above Median Volume
PRIOR	7.368 (0.906)	32.215 (0.000)	36.375 (0.000)	8.658 (0.103)
AFTER	-18.735 (0.000)	-6.368 (0.009)	-4.875 (0.002)	-17.193 (0.001)
Panel B. Spearman rank correlations.				
	PRIOR	AFTER	YIELD	AVERAGE VOLUME
PRIOR	1.000 (0.00)	0.428 (0.00)	0.229 (0.00)	-0.133 (0.00)
AFTER		1.000 (0.00)	0.119 (0.00)	-0.091 (0.03)
YIELD			1.000 (0.00)	0.034 (0.41)
AVERAGE VOLUME				1.0000 (0.00)

ties, I find, on average, positive excess returns and volume for the days (especially day - 1) preceding the ex-day and negative excess returns on the ex-day and for the following days. Also, the dividend yield on the units is negatively correlated with ex-day price movements and positively correlated with excess volume around the ex-day. The results, however, deviate from those on high yield taxable securities in that excess volume is on average negative for MLPs on and after the ex-day and volume around the day is negatively correlated with prior average volume. Finally, since the dividends on MLPs have no current tax consequences, as might be expected, the change in tax laws enacted in the Tax Reform Act of 1986 had little (if any) impact on the results.

These results along with those from Eades, Hess, and Kim (1984) question whether the price and volume reactions observed around the ex-dividend day are totally tax motivated. The results of this study suggest that even for nontaxable distributions investors time their purchases to capture (or avoid) the receipt of a dividend on high yielding securities.

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