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Evidence of Financial Leverage Clienteles

JOHN M. HARRIS, JR., RODNEY L. ROENFELDT, and PHILIP L. COOLEY*

MILLER [9] SUGGESTS THAT PERSONAL taxes may give rise to financial leverage clientele. Kim, Lewellen, and McConnell (KLM) [8] extend Miller's analysis and provide both an explicit model and tests for the existence of financial leverage clientele. They find evidence of a bimodal distribution of capital structures, which supports their hypothesis of a leverage clientele. However, the estimates of the marginal, ordinary tax rates of investors, obtained from responses to a survey about their incomes, were found to be only slightly (negatively) correlated with the debt ratios of the firms whose stock they held. KLM's failure to observe a strong negative correlation raises doubts concerning the existence of financial leverage clientele.

The purpose of our study is to provide new evidence concerning financial leverage clientele based on a different estimator of tax rates of shareholders. The evidence indicates that personal tax rates tend to be highly negatively correlated with financial leverage, providing support for the existence of financial leverage clientele. In the following section, we discuss the Miller and KLM models of financial leverage clientele. Section II contains a description of the procedures used for estimating personal tax rates and a description of the data used to test the hypothesis of leverage clientele. Results and implications of the tests are presented in Section III, and Section IV contains the summary.

I. Financial Leverage Clienteles

Miller [9] includes the personal and corporate tax effects of corporate debt in an equilibrium model of corporate capital structure. He assumes a world in which no personal taxes are levied on returns from corporate stock and municipal debt, while returns from corporate debt are taxed at marginal, ordinary personal income tax rates, which progress from below to above the corporate income tax rate. Although there would be an equilibrium level of aggregate corporate debt, he concludes that the value of an individual firm would be invariant to its capital structure. In addition, he suggests that low levered firms would find a natural clientele for their securities among investors in high tax brackets, while highly levered firms would be preferred by investors in low tax brackets.

KLM [8] further examine this hypothesis of financial leverage clientele by constructing testable hypotheses using Miller's assumptions concerning taxes

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and his assumptions that municipal and corporate debt are riskless, agency costs are insignificant, capital markets are complete, and personal tax arbitrage is prohibited. Based on Miller's concept of the bondholder surplus, investors should demand shares only of highly levered or relatively unlevered firms. Consequently, KLM predicted a bimodal distribution of leverage ratios with "one mode centered at zero and the other centered around some high, but theoretically unspecified, level" [8, p. 92]. As predicted, one mode existed at very low debt levels and a second mode existed at a higher debt level, although firms were not tightly clustered around the higher mode.

KLM also hypothesized a negative correlation between tax rates of shareholders and debt ratios of firms. Since they found only a slightly negative correlation, they concluded that either their test procedure or their model of financial leverage clienteles was inadequate.¹ KLM note that their ability to detect significant clienteles may be reduced because their estimates of tax rates are based on survey responses to questions about personal income. They cite research showing that individuals with low incomes overstate their earnings on surveys, while individuals with high incomes understate their earnings. The resulting errors in income measurement would lead to underestimation of personal tax rates for shareholders in high tax brackets and overestimation of personal tax rates for investors in low tax brackets. Their negative conclusions concerning financial leverage clienteles are based on the small size of the differences in tax brackets of the clienteles. The potential bias resulting from measurement errors in income, however, could substantially reduce their estimates of these differences.

Since information about the existence and nature of financial leverage clienteles is extremely important to the theory and management of capital structure, we provide additional empirical evidence on the issue. In contrast to data from surveys, we use market data to estimate personal tax rates. The use of market data should eliminate the potential biases in measuring tax rates that result from the use of a questionnaire directed to the clientele of a single brokerage firm.

II. Estimation Procedures

A. *Estimator of Personal Tax Rate*

Elton and Gruber [3] derived an estimator for the marginal, ordinary tax rates of marginal investors in individual firms based on the change in the price of a stock going ex dividend. An investor who buys a stock just prior to the ex dividend date would receive an extra dividend (D) less the additional taxes on the dividend:

$$D - t_0 D = D(1 - t_0) \quad (1)$$

¹ Taggart extended the analysis of financial leverage clienteles by relaxing the assumptions of complete markets and insignificant agency costs. He concludes that "investors will not line up perfectly in tax bracket clienteles and that shareholder preferences for capital structure policy will not be unanimous" [13, pp. 658–9]. Recently, Modigliani [10] extended the theory of leverage clienteles by focusing on the demand side. He integrated the concepts of dividend and leverage clienteles with the portfolio choices of investors. Kim [7] also extended the analysis of leverage clienteles to include portfolio risk and the possibility of losing the interest tax shields of corporate debt.

where t_0 equals the investor's marginal, ordinary tax rate. If the stock is purchased ex dividend, the investor will save on the initial purchase price but incur an additional capital gains tax in the future. The incremental present value of purchasing the stock ex dividend equals

$$(P_0 - P_e) - (P_0 - P_e)t_g/(1 + k)^n = (P_0 - P_e)(1 - t_g/(1 + k)^n) \quad (2)$$

where P_e represents the ex dividend price; P_0 is the price on the prior trading day; t_g is the tax rate on the future capital gain; k represents the investor's required rate of return; and n is the number of years that the investor intends to hold the stock.

Because investors are free to delay their purchase one day, equilibrium prices of the stock, cum and ex dividend, would result when investors were indifferent between the two purchase prices. This condition can be shown by setting the right sides of Equations (1) and (2) equal to each other:

$$D(1 - t_0) = (P_0 - P_e)(1 - t_g/(1 + k)^n) \quad (3)$$

Solving Equation (3) for t_0 provides an estimator for the marginal, ordinary tax rate of an individual firm's marginal investor:

$$t_0 = 1 - \frac{(P_0 - P_e)}{D} (1 - t_g/(1 + k)^n) \quad (4)$$

Although Elton and Gruber recognize that, from the investor's perspective, the capital gains rate in the estimator is discounted for the delay in payment of capital gains taxes [3, p. 69, footnote 5], they assume an investor's time horizon is sufficiently short that the discount factor is insignificant (i.e., $t_g/(1 + k)^n \approx t_g$). Therefore, their estimator reduces to the following form:

$$t_0 = 1 - \frac{(P_0 - P_e)}{D} (1 - t_g) \quad (5)$$

Because we are testing the hypothesis of financial leverage clienteles of Miller and KLM, who assume personal tax rates on capital gains equal zero, we assume a time horizon sufficiently long such that $t_g/(1 + k)^n \approx 0$. Therefore, our estimator for marginal, ordinary tax rates as derived from Equation (5) equals

$$t_0 = 1 - \frac{(P_0 - P_e)}{D} \quad (6)$$

B. Data

Several factors were considered before selection of data for the test of the leverage clientele hypothesis. To facilitate comparison with KLM's findings, we needed to include data for 1970. To avoid possible temporary influences on the behavior of stock price, a time period longer than one year was required. In addition, Miller [9] notes that in 1976, changes were made in the tax laws for capital gains, which restricted the ability of investors to defer capital gains for their heirs. Based on these factors, the time period selected for the sample extends from 1968 to 1976.

Selection of firms for the sample was influenced by two factors: size of the firms and consistent payments of dividends. The sample was restricted to firms listed in the 1972 *Fortune* [12] survey of the largest corporations in the United States listed on the New York Stock Exchange. Manufacturing, utility and transportation firms were included; financial corporations were excluded because of problems associated with measurement of the capital structures for these firms.

Quarterly dividends were recorded for each firm for the years 1968, 1970, 1972, 1974, and 1976. Since the estimator relies on the price behavior of stocks going ex dividend, firms that paid dividends irregularly or infrequently would not provide useful estimates. Any firm that failed to pay dividends in each quarter for all five years was eliminated from the sample. The final sample consists of 316 firms.

Dividends and prices were recorded from Standard and Poor's *ISL Daily Price Index*. Following Elton and Gruber's procedure, closing prices on ex dividend dates serve as ex dividend prices (P_e). Closing prices on the prior trading day serve as cum dividend prices (P_0). Data for measuring financial leverage ratios for the firms in the sample were obtained from the *Compustat* tapes.

III. Tests and Implications

The sample provides 20 quarterly ratios of price change to dividends $[(P_0 - P_e)/D]$ for each of the 316 firms in the sample. The mean and median of these ratios equal .688 and .793, respectively. The use of averages compiled over a time period of nine years necessitates the assumption that financial leverage clienteles are relatively stable over time. Ang [1] and Scott and Martin [11] provide evidence that capital structures are relatively stable over time. To test the stability of the estimated tax rates over time, we ranked and separated the firms into quintiles according to their average ratio of price change to dividends for the four quarters in 1968. For each quintile, averages of the remaining 16 quarterly ratios of price change to dividends for 1970, 1972, 1974, and 1976 were calculated. The average ratios for these four years for each quintile are .294, .690, .797, .810, and 1.074, respectively.² This preserved ranking relative to the ranking in 1968 indicates that the estimated personal tax rates are relatively stable over time.

Because the purpose of this study is either to support or to refute the hypothesis that investors in high tax brackets hold shares of firms with low leverage, and investors in low tax brackets hold shares of firms with high leverage, selection of an appropriate financial leverage ratio is important. No particular leverage ratio, however, can be identified a priori as most suitable. Despite this problem, long-term debt to long-term capital, and total liabilities to total capital were selected to facilitate comparison of our results with those of KLM.³ In addition, interest

² Since the quintiles are based on rankings for 1968, the means of the 1968 quintiles reflect a large amount of order bias resulting from inclusion of negative estimation errors in the lower quintiles and positive estimation errors in the higher quintiles. The subsequent means for the quintiles reflect no such bias, however, except in the unlikely event that errors of the estimate correlate intertemporally.

³ Long-term debt to long-term capital is defined as the book value of long-term debt divided by the sum of book value of long-term debt and equity. Total liabilities to total capital is defined as the

expense divided by operating income was selected.⁴ The average of the annual value of each ratio from year-end 1967 to year-end 1976 was calculated for each firm. Similar to the results of KLM, the distribution of firms with respect to ratios of financial leverage is bimodal. For example, the ratio of long-term debt to long-term capital has two modes that center approximately at zero and 30 percent.

All firms were ranked according to each leverage ratio and stratified into quintiles. Table I contains the mean for each financial leverage ratio for each quintile and the corresponding ratio of price change to dividends and the marginal, ordinary personal tax rate. The estimated personal tax rate is negatively related to all three leverage ratios. For example, the ratio of long-term debt to long-term capital is only .099 for the quintile of firms with the lowest leverage. These firms attract investors with marginal, ordinary personal tax rates averaging 59.0 percent. In contrast, the quintile of firms with the highest ratio of long-term debt to long-term capital (.588) is associated with the lowest personal tax rate of only 8.7 percent.⁵

Although the quintiles presented in Table I are useful as a descriptive summary of the results, we also computed Kendall tau correlation coefficients between the estimates of individual tax rates and leverage ratios to avoid loss of information.⁶ The Kendall tau correlations between the tax rate estimates ($n = 316$) and all three financial leverage ratios are significantly negative at the .02 level.⁷

For each ratio the quintile with the highest financial leverage in Table I

book value of all liabilities divided by the sum of book value of all liabilities and the market value of equity.

⁴ Two other measures of financial leverage were also used with similar results—book value of all liabilities divided by book value of total assets, and interest expense divided by operating income before depreciation.

⁵ Recently, Kalay [6], Brooks and Edwards [2], and Hess [5] have questioned the use of Elton and Gruber's estimation procedure. For example, Kalay suggests that the positive correlation between dividend yields and the ratios of price change to dividends observed by Elton and Gruber is potentially biased from the use of closing prices on the ex dividend date because of the normal daily price change. Since dividend yield and systematic risk are negatively correlated, he argues that stocks with low dividend yields and high betas would appreciate in price on the ex dividend day more than stocks with high dividend yields and low betas. The ratios of price change to dividends would, therefore, exhibit a greater downward bias for stocks with low dividend yields. Since financial leverage and systematic risk are positively correlated [4], however, any potential bias in our results would be greater for the ratios of price change to dividends for highly levered firms. Correction for this bias would only strengthen the correlation between the financial leverage ratios and the ratios of price change to dividends.

⁶ Regression analysis was not employed because the relationship between the leverage ratios and tax rates is nonlinear. In addition, the sample distributions of the estimates of the tax rates and leverage ratios are nonnormal.

⁷ The correlations were calculated for the averages of the tax rates and leverage ratios rather than for each individual year for two reasons. First, estimates of personal tax rates for individual firms exhibit a high variance, which makes statistical inferences from yearly estimates quite difficult. Second, clienteles would be formed based on expectations of the financial leverage of a firm. Since capital structures are relatively stable over time, using an average financial leverage ratio for the entire period reduces the noise that would be introduced from using annual ratios. In spite of these limitations with annual estimates, Kendall tau correlations for each of the five years also indicate a negative relationship between personal tax rates and corporate leverage ratios, providing additional support for the hypothesis of leverage clienteles.

Table I
Relationships between Financial Leverage Ratios and Estimates of Investor Personal Tax Rates

Quintile based on Fi- nancial Le- verage Ratio	Long-Term Debt to Long-Term Capital			Total Liabilities to Total Capital			Interest Expense to Operating Income		
	Financial Leverage Ratio	$\frac{(P_0 - P_e)}{D}$	Personal Tax Rate	Financial Leverage Ratio	$\frac{(P_0 - P_e)}{D}$	Personal Tax Rate	Financial Leverage Ratio	$\frac{(P_0 - P_e)}{D}$	Personal Tax Rate
1	.099	.410	59.0%	.181	.355	64.5%	.035	.375	62.5%
2	.222	.666	33.4	.359	.773	22.7	.084	.799	20.1
3	.294	.717	28.3	.479	.626	37.4	.120	.654	34.6
4	.391	.698	30.2	.596	.807	19.3	.180	.643	35.7
5	.588	.913	8.7	.727	.842	15.8	.296	.933	6.7

corresponds to the lowest estimated tax rate. The tax rates for these quintiles, ranging from 6.7 to 15.8 percent, are much lower than the lowest tax rates for clientele cited in the KLM study, which exceed 30 percent. Similarly, firms in the quintile with the lowest financial leverage exhibit the highest tax rates for shareholders. These estimated personal tax rates all exceed the maximum statutory marginal tax rate for corporations. This latter result is consistent with the models of Miller and KLM, which imply that firms eschewing leverage will attract a clientele whose personal tax rates exceed the corporate tax rate.

For the middle three quintiles, no consistent pattern emerges. The range of estimated tax rates, however, does correspond approximately to the tax rates of 33 to 35 percent shown by KLM. For most investors in the middle tax brackets, tax considerations may be dominated by other preferences of investors.

IV. Summary

Studies of financial leverage ratios and their association with personal tax rates suggest that financial leverage clientele play important roles in the determination of capital structure. KLM's [8] findings of only a weak negative correlation between corporate debt ratios and estimates of investor tax rates, however, raises doubts about the relevance of financial leverage clientele.

Evidence presented in this study shows that estimates of tax rates for shareholders are strongly negatively correlated with corporate financial leverage. Evidence of a personal tax rate in excess of the corporate tax rate for firms with low leverage is consistent with Miller's [9] contention that shareholders of firms with low leverage will have a tax savings from personal leverage that exceeds the corporate tax savings on debt. Similarly, the estimated personal tax rates are low for the firms with high leverage, suggesting that firms with high leverage tend to attract a clientele for whom the tax savings on corporate leverage exceeds the tax savings on personal leverage. This is consistent with the hypothesis of Miller and KLM that investors in low tax brackets would obtain an advantage by using corporate instead of personal leverage. For the majority of firms that follow less extreme leverage policies, however, no consistent relationship prevails between tax rates and leverage ratios, and personal tax rates do not appear to dominate the other preferences of investors.

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