Dividend Stability and Firm Characteristics

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Abstract

Dividend stability is studied on 1,968 dividend paying firms using quarterly data from 2000 through 2005. Three groups are established: Group 1 (traditional) has firms that pay dividends every year which represents a stable dividend payment approach; Group 2 (irrelevance) has firms that stop paying dividends; and Group 3 (residual) pays dividends somewhat randomly (not annually). The residual policy group is the largest of the three groups and also is rewarded by investors with the highest growth rate in market to book value ratio in deciles. After investigating the underlying variables, it appears that larger firms tend to follow a traditional policy of stable dividends while smaller firms are more likely to follow a residual or irrelevance approach.

I. Introduction

The purpose of this study is to investigate the usage of the three major dividend theories by firms paying dividends from 2000 through 2005. The three theories of dividend policy studied are traditional or stable cash dividends, dividend irrelevance, and residual theory.

Brigham and Houston (2012), a popular finance textbook, describes traditional dividend theory as proposed by Gordon and Lintner. Investors prefer to receive current income in the form of dividends, rather than the potential of future income, through capital gains on a stock. An optimal dividend policy will raise market value of the firm and decrease cost of capital. Dividends do matter.

Dividend irrelevance theory as espoused by Miller and Modigliani is the direct opposite of the traditional viewpoint. Dividends do not matter. There is no optimum dividend policy; instead firms should re-invest net income into the company, and this will be reflected in capital gains growth. Investors decide when to sell their stock to capture income. Market value of stock and cost of capital are unrelated to dividend policy. There are tax advantages to this approach. It is always good to push taxes into the future where a dollar is worth less in an inflationary environment.

If one thinks of these two dividend theories, as opposite ends of a spectrum, in the real world the market moves back and forth between the two extreme positions. During the late 1990's bubble market, dividends were irrelevant to a great extent. In 2003 with the tax law change reducing taxes on dividends, coupled with a weak stock market, dividends mattered.

The third approach to dividend theory is the residual theory. From an academic viewpoint it is the best approach. Under pecking order theory, internal equity coming from net income should be used before selling more expensive new common stock to raise funds for projects. Net income is subject here under residual theory to two constraints: the optimal capital structure and the optimal capital budget. Whatever income remains (residual) is left over for common stock dividends. Because both net income and dollar value of new products will vary

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from year to year, the residual will also vary annually. Traditional theory says investors would not like this uncertainty of dividend pattern. However this approach would maximize the efficiency of the use of the net income and meet management's goal of maximizing stock price in the long run. This study will investigate the usage of these three different methods of dividend theory.

Nineteen hundred sixty-eight firms are divided into three groups using quarterly data to determine dividend payment pattern related to stability. Group 1 (traditional) is a stable pattern representing the traditional approach. Group 2 (irrelevance) is a stop payment pattern which represents dividend irrelevance. Group 3 (residual) is an intermittent approach to payments which represents residual theory.

Now that three groups have been established, representing three dividend theories, the purpose here is to investigate if degree of dividend stability for a firm has any relationship to growth rates of key firm characteristics: market to book value ratio, total assets, net income or loss, common shares outstanding, current ratio, and debt ratio. These variables have been chosen based upon results from three prior studies (Fama and French, 2001; Consler and Lepak, 2007; Havranek, Consler, and Lepak, 2009).

II. Literature Review

Fama and French (2001) provide the best study of firm characteristics relevant to dividends. These characteristics have changed over time (1978 to 1999), resulting in more small firms with low profitability and strong growth opportunities which are not likely to pay dividends. They also find, regardless of characteristics, firms have become less likely to pay dividends. Relevant variables for dividends proved to be profitability, investment opportunities, size, market value to book value, and share repurchase. This helps to determine which variables should be included in the current study.

Baker, Veit, and Powell (2001) found based on managers' responses the most important causes of dividend decisions are the pattern of past dividends, stability of earnings, and the level of current and expected future earnings. These factors were relevant for firms listed on both NASDAQ and the New York Stock Exchange. They also found great differences between financial versus non-financial firms. This study triggered the idea of looking at the relevance of dividend payment patterns for the current work.

Baker and Wurgler (2004) propose dividend decisions are driven by prevailing investor demand. Investor demand for dividends changes over time and firms react. They find non-payers tend to initiate dividends when demand is high. Payers tend to omit dividends when demand is low. Demand is based upon the relative stock price on dividend payers. Both past capital gains and future returns are part of the dividend model used. This is one of the reasons why the study here is limited to a short period of time when it was believed dividends should be important.

DeAngelo, DeAngelo, and Skinner (2004) build upon the work of Fama and French (2001). They find a concentration of dividends has occurred. Aggregate real dividends from

industrial firms increased over the past 20 years, even though the number of dividend payers has decreased by over 50%. Increased dividends from top payers overwhelm the slight dividend reduction from the loss of many small payers. The largest aggregate dividend payers in 2000 account for over 50% of all dividends paid by industrial firms. When looking at a sample for future work, it had best include these large, dominant, dividend payers to be relevant.

Chetty and Saez (2005) document a 20 percent increase in dividend payments by non-financial, non-utility publicly traded firms following the 2003 dividend tax cut. This should support an expectation of increasing dividends per share in the post-2000 period of the current study. This provides further proof that the study period of 2000 to 2005 should be an appropriate choice where dividends matter.

Consler and Lepak (2007) build upon Fama and French's (2001) earlier work. Different characteristics such as price, size, debt level, shares outstanding, and profits are found to vary by risk and dividend level for firms paying dividends. Appropriate variables are shown to be key characteristics necessary for use in this current study.

Havranek, Consler, and Lepak (2009) show that dividends per share declined prior to 2000 and increased thereafter. The market break of 2000 appears to have changed how investors perceive dividends. Firms responded by increasing dividends per share. The tax change in 2003 most likely helped to continue the increase in dividends per share. Dividends appear to be more important during the post-2000 period. Market/book value, size of assets, number of shares outstanding and debt ratio are all significant variables related to dividends per share in both periods of the study. Net profit is only significant after 2000. These results helped determine both the relevant time period and variables for the current work.

This current study builds upon this prior supporting work. The foundation has been laid to now investigate how dividend theory is related to these important firm characteristics.

III. Sample and Data

Firms that declared cash dividends, excluding payments made as liquidations, acquisitions or reorganizations, during the period 1/1/2000 to 12/31/2005 were identified in CRSP. This yielded a total of 24 quarters of data on 1,968 firms with 24,272 observations. The short time period attempts to limit the study's focus on those years after the 2000 market break where dividends should have importance. The down market and 2003 tax decrease on dividends both support this view. This should be a fertile period to study dividend stability patterns.

The firms are separated into three groups based upon cash dividend pattern. Group 1 (traditional) with 792 firms (17123 observations) is the stable pattern: firms that consistently pay a dividend at least once a year throughout the study period (each firm has 24 data points). Group 2 (irrelevance) with 358 firms (2096 observations) is the stop pattern: firms that start off by paying a dividend at least once a year, but stop paying before the final year of the study period (each firm has at least 1 data point). Group 3 (residual) with 818 firms (5053 observations) is the intermittent pattern: all firms that paid at least one dividend during the study period but do not meet the criteria for Groups 1 or 2 (each firm has at least 2 data points).

Quarterly data were obtained on several financial variables at all measurement occasions for which a dividend was paid: common shares outstanding (millions shares), closing price per share in third month of quarter ($ per share), total stockholders' equity (millions $), total assets (millions $), total liabilities (millions $), net income/loss (millions $), total current assets (millions $), total current liabilities (millions $), and monthly high and low stock prices. Some ratios that were calculated include book value per share (total stockholders' equity ÷ common shares outstanding), market to book value ratio (average price per share ÷ book value per share), debt ratio (total liabilities ÷ total assets), and current liquidity measure (total current assets ÷ total current liabilities).

IV. Model

In longitudinal research settings, the objective is to characterize patterns of response and change over time while analyzing the effects of covariates on these patterns. With applications involving financial data, repeated observations on each firm will be correlated and not independent. This dependency must be considered to correctly model the relationship between a response variable and selected covariates in regression applications. Linear mixed-effects models (see, for example, Pinheiro and Bates, 2000) are very appealing in such applications: (1) they generally result in a very flexible and parsimonious covariance structure for measurements repeated over time and (2) they can accommodate unbalanced longitudinal data (i.e., the number of observations on each firm can be different and the observations do not have to be obtained at the same measurement occasions).

We use a linear mixed-effects model to analyze the unbalanced financial data collected for this study. In particular, the model for selected response variable Y_{ij} for the ith firm at time t_{ij}, $j = 1, \ldots, n_i$, can be expressed as

$$E(Y_{ij} \mid b_i) = (\beta_0 + \alpha_{02}\text{Group2}_i + \alpha_{03}\text{Group3}_i + b_{0i}) + (\beta_1 + \alpha_{12}\text{Group2}_i + \alpha_{13}\text{Group3}_i + b_{1i})\, t_{ij} + \varepsilon_{ij}. \quad (1)$$

For this representation, Group2_i (irrelevance) = 1 if the ith firm stops paying dividends, zero otherwise; Group3_i (residual) = 1 if the ith firm pays dividends intermittently, zero otherwise. The regression coefficients are defined as follows: β_0 and β_1 are the population average intercept and average slope for firms that have the traditional dividend pattern, respectively; α_{0k} is the average difference in intercept between firms in Group k and firms in Group 1 (traditional); α_{1k} is the average difference in slope between firms in Group k and firms in Group 1. The vector containing the random effects b_{0i} and b_{1i} is assumed to follow a multivariate normal distribution with the zero vector as mean and unknown covariance matrix $\boldsymbol{D}$; and the ε_{ij} is the independent (within-firm) normally distributed measurement error with mean zero and variance σ^2. The within-firm error is assumed to be independent of the random effects.

This model is used to estimate fixed effects that are common to all firms, and random effects that are specific to individual firms over time. The random effects reflect heterogeneity across firms in the regression coefficients thereby resulting in correlation between observations from the same firm, i.e. the individual observations from firm i are correlated since they share a common intercept ($\beta_0 + b_{0i}$) and a common slope ($\beta_1 + b_{1i}$). In the case of random intercepts and

slopes, the induced covariance between Y_{ij} and Y_{ik} can be expressed as a function of time. As mentioned above, this covariance structure can be described with a relatively small number of parameters, regardless of the number and timing of the observations.

In this study, firms within each group have different numbers of repeated observations as well as different measurement times on several variables that have been shown to be of scientific interest in research on dividends. It is evident that the model in (1) is particularly well suited for analyzing unbalanced financial data collected over time, as is the case when studying dividend patterns where different firms can have unique sequences of dividend payments. For each selected response variable, our substantive focus is on the difference in slope (growth rate) between the three dividend paying groups. To address non-normality in some of the data a log transformation is performed on the values for the following variables: dividends per share, total assets, common shares outstanding, and debt ratio. The calculated values for market to book, current liquidity, and net income were assigned to deciles to limit the effect of non-normality, negative values, and outliers. For convenience of representation, the following abbreviations denote the transformed data: DPS = log(dividends per share + 1), ASSETS = log(total assets), SHARES = log(common shares outstanding + 1), DEBT = log(debt ratio + 1), MARKET = decile ratings of market to book value ratio, LIQUIDITY = decile ratings of current liquidity, and PROFIT = decile ratings of net income.

V. Analysis and Results

Table 1 presents the estimated results for the seven regressions run for the three groups for each response variable using restricted maximum likelihood estimation. The Hausman (1978) specification test confirmed the need for random intercepts and random slopes in the fitted mixed-effects models in Table 1.

Regression 1 for log dividends per share (DPS) shows there is no significant difference in growth rates between Group 1 (traditional) and Group 2 (irrelevance). The growth rate for Group 3 (residual) is significantly higher than the growth rate for both Group 1 (traditional) and Group 2 (irrelevance). Perhaps this can be explained if Group 3 (residual) has better investment opportunities than the other two groups and uses the residual theory approach to dividend payments. Years where good investment opportunities exist would result in no earnings being left over for dividend payments (Fama and French, 2001).

Group 3 represents the highest growth rate in log dividends per share, yet it does not follow a stable dividend payment pattern. Traditional dividend theory is not supported by these results in the sense that there is more uncertainty present in Group 3 than in Group 1. If dividends matter as much as traditional theory expects, why is Group 3 the largest of the three groups with its intermittent payment pattern? One might have expected Group 1 to be the largest group. So one could conclude, dividends matter, but they do not have to be as stable as theory would expect. Of firms that paid dividends over the study period it is found that most pay intermittently or stop paying.

The results for log total assets (ASSETS) are given in Regression 2, which shows that the growth rate for Group 3 is significantly higher than the growth rate for Group 1. The growth rate

for Group 1 is also significantly higher than Group 2's rate. This rapid growth rate in log total assets for Group 3 supports the possibility that member firms have better investment opportunities than do the other two groups. It is noteworthy that an analysis of the raw (untransformed) data on total assets shows that there is no significant difference between the mean response for Group 2 and Group 3, with means calculated over all firms and time points in each respective group. However, mean assets for Group 1 are significantly higher than mean assets for both Group 2 and Group 3. Group 1 has mean assets of $7566.4 million while Group 2 has $4175.0 million and Group 3 has $5386.8 million, which shows that Group 2 firms are 55% and Group 3 firms are 71% the size of Group 1 firms. Thus, large firms appear to be more likely to follow a traditional stable dividend policy than smaller firms.

Table 1
Mixed-Effects Model Estimation Results

	(1) DPS		(2) ASSETS		(3) MARKET		(4) SHARES	
	Coef (SE)	p-val	Coef (SE)	p-val	Coef (SE)	p-val	Coef (SE)	p-val
Fixed								
β_0	.15(.001)	<.00	7.18(.07)	<.00	5.16(.12)	<.00	3.98(.06)	<.00
β_1	.00(.00)	<.00	.02(.00)	<.00	.04(.01)	<.00	.01(.00)	<.00
α_{02}	.01(.01)	.71	-.47(.13)	.00	-1.14(.21)	<.00	-.57(.10)	<.00
α_{03}	.04(.01)	.00	-.73(.10)	<.00	-1.21(.19)	<.00	-.45(.08)	<.00
α_{12}	.00(.00)	.16	-.01(.00)	.00	-.02(.01)	.09	-.00(.00)	.07
α_{13}	.00(.00)	<.00	.01(.00)	<.00	.052(.01)	<.00	.01(.00)	.00
α_{13}-α_{12}		<.00		<.00		<.00		.00
Random								
D matrix	.04 .00 .00 .00		4.02 -.01 -.01 .00		10.18 -.26 -.26 .02		2.56 -.01 -.01 .00	
Var(ε_{ij})	.01		.01		1.10		.01	
	(5) DEBT		(6) PROFIT		(7) LIQUIDITY			
	Coef (SE)	p-val	Coef (SE)	p-val	Coef (SE)	p-val		
Fixed								
β_0	.43(.01)	<.00	5.34(.08)	<.00	5.25(.11)	<.00		
β_1	-.00(.00)	.09	.03(.00)	<.00	.02(.00)	<.00		
α_{02}	.03(.01)	.01	-.86(.16)	<.00	-.01(.20)	.96		
α_{03}	-.04(.01)	<.00	-1.17(.16)	<.00	.74(.18)	<.00		
α_{12}	.00(.00)	.00	-.11(.01)	<.00	-.03(.01)	.00		
α_{13}	.00(.00)	.01	.04(.01)	<.00	-.03(.01)	<.00		
α_{13}-α_{12}		.12		<.00		.87		
Random								
D matrix	.03 -.00 -.00 .00		5.11 -.03 -.03 .01		9.25 -.15 -.15 .01			
Var(ε_{ij})	.00		2.76		.86			

Regression 3 for the decile ratings of the market value to book value ratio (MARKET) finds there is no significant difference in growth rates between Group 1 and Group 2. More importantly, Group 3 has a growth rate significantly higher than both of the other two groups. This might reflect investors' recognition of a brighter future for Group 3 firms. The higher valuation probably results from greater investment opportunities compared to the other two groups. An analysis of the original (untransformed) market to book value ratio shows that there is no significant difference between the mean response for Group 1 and Group 3, where both means are significantly higher than the mean for Group 2. This implies that investors are rewarding both groups that continue to pay dividends, no matter what the payment approach is, traditional or residual.

The mixed-effects model estimates for log total common shares outstanding (SHARES) in Regression 4 show there is no significant difference in growth rate between Group 1 and Group 2. The growth rate for Group 3 is significantly higher than that of both Group 1 and Group 2. Perhaps log shares in Group 3 are growing so quickly due to large capital needs. This could be because of more investment opportunities than the other two groups. Certainly this growth would be consistent with such a hypothesis.

The log debt ratio (DEBT) is the response variable analyzed in Regression 5. Findings show that there is no significant difference in growth rate between Group 2 and Group 3. Both of these groups have a growth rate significantly higher than the growth rate of Group 1. Group 1 with a stable dividend payment pattern may have the lowest investment opportunities and therefore needs less debt. Group 3 may have greater capital needs which are logically financed by the cheapest capital component, debt, as much as possible. Group 2 stops dividend payments either because of great investment opportunities or more likely because of low opportunities resulting in low profits.

Regression 6 for the decile ratings of net income (PROFIT) shows that the growth rate for Group 1 is significantly higher than the growth rate for Group 2. Also, the growth rate for Group 3 is significantly higher than the growth rate for Group 1. This is as one would expect, if the theme of greater investment opportunities for Group 3 holds. Higher growth in profits as measured by net income is a reasonable result.

The final regression we consider is for decile ratings of the current ratio (LIQUIDITY). Regression 7 shows that there is no significant difference in growth rate between Group 2 and Group 3. The growth rate for Group 1 is significantly higher than that for both Group 2 and Group 3. Perhaps Group 1 has lower investment opportunities and therefore does not use current assets as efficiently as do the other two groups. One might expect the higher the capital needs of a firm, the lower its liquidity as measured by the current ratio.

VI. Conclusions

Having looked at the individual variable regressions from Table 1, now an overview is appropriate. Group 1 (traditional) represents those firms that follow a stable payment pattern that traditional theory says should be valued most highly (Brigham and Houston, 2012). Investors like certainty over uncertainty. A bird in the hand is worth two in the bush. However,

here Group 3 (residual) which represents an intermittent payment pattern has the highest growth rate in market to book value ratio in deciles. One also might expect Group 1 (traditional) to be the majority of firms in the study. That turns out not to be the case. Group 3 (residual) is the largest group. More firms are following a residual approach than a traditional approach to dividend payments.

Group 3 (residual) has the highest growth rate for all variables except for log debt ratio and decile ratings of the current ratio. As previously explained, this is consistent with Group 3 having greater investment opportunities than the other two groups and with it following some type of residual approach to paying dividends. In textbooks, residual approach is called best in theory, but should only be practiced by firms for long run planning. This study supports the idea that more firms are applying the residual approach in the short term, and investors are rewarding them with the highest growth rate in decile ratings of market to book value ratio.

Further investigation found that Group 2 (irrelevance) firms are 55% and Group 3 (residual) firms are 71% the size of Group 1 (traditional) firms. Only somewhat smaller firms are using the residual and dividend irrelevance approaches. Larger firms are still following a stable traditional approach. Finally, both groups paying dividends are being rewarded by investors with higher market to book value ratios over the group that stopped paying dividends.

Future work could concentrate on which industries tend to fall into which of the three study groups. Could industry affiliation help to explain the stability of dividend payments? Do some industries tend to follow the short term residual approach to dividends more than others?

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