Changes in Both Dividends Per Share and Important Characteristics ofDividend Paying Firms Over Time

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Abstract

The market break of 2000 appears to have changed how companies perceive dividends. This study shows dividends appear to be more important during the post-2000 period. While some financial variables had significant relationships with dividends per share (DPS) over both pre-2000 and post-2000 periods, others such as current ratio, beta risk measure, and net profit had significant relationships with DPS in only one period. This knowledge may help investors improve decisions regarding dividend-paying firms.

I. Introduction

The purpose of this study is to characterize the trends in dividends per share for all firms reported in CRSP paying cash dividends any time between the last quarter of 1994 and the first quarter of 2006. The first quarter of 2000 includes a market downturn in stock prices. Study results show dividends per share prior to this time (pre-2000) generally declined, while they increased in the post-2000 period.

In addition, the relationship between dividends per share and selected time-varying financial variables are tested for differences between the two periods. An unbalanced panel data methodology is used to assess the data. This is a longitudinal analysis of a cross-section of firms which allows firms to enter and exit the data set. Study results show market value to book value, asset size, number of shares outstanding, and debt ratio are significant in both time periods. Liquidity ratio is significant only in the pre-2000 period, while net profit and beta are only significant in the post-2000 period.

II. Literature Review

Articles since 2000 provided the relevant literature review. Kalay and Michaely (2000) find no evidence of a link between tax structure and dividend yield. This would argue that dividend tax changes in 2003 should not affect dividend yields or influence study results.

Pan (2001) showed managers change dividends proportionally larger than the change in permanent earnings. This linkage demonstrates the importance of changes in permanent earnings to the study of dividends. Several earnings components will be addressed in the current work as a result.

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

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opportunities, size, market value to book value, and share repurchase.

Baker et al. (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.

Nissim and Ziv (2001) find dividend changes are positively related to earnings changes in each of two years after the dividend change. Once again, expected future earnings have great relevance for current dividends.

Grullon and Michaely (2002) investigate the relationship between share repurchases and dividends. They find that firms are repurchasing shares with funds that otherwise would have been used to increase cash dividends. Larger firms have not tended to cut their dividends. Firms have gradually substituted repurchases for dividends. Based upon this, common shares outstanding is an important variable for the current work.

Arnott and Asness (2003) provide support for the signaling hypothesis, higher dividend payout forecasts future aggregate earnings growth. Relatively low current dividend payouts (compared to historical rates) do not predict good earnings ahead. Once again the strong linkage between dividends and expected future earnings appears to be evident.

Mougoué and Rao (2003) study the temporal behavior of dividends and earnings. Non-utility firms that followed the signaling hypothesis tended to be smaller, have a lower growth rate of total assets, and have a higher leverage ratio. All variables are relevant 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.

De Angelo et al. (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 represent 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.

Zhou and Ruland (2006) find that high dividend pay out companies tend to experience

strong, not weak, future earnings. This may have implications for dividends per share.

DeAngelo, DeAngelo, and Stulz (2006) find a large increase in negative retained earnings from 1978 to 2002. These firms were found to have no propensity to change their payment of dividends while those with positive retained earnings were more likely to change.

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.

Denis and Osobov (2008) provide international results on dividends. In the U.S., Canada, UK, Germany, France, and Japan, the propensity to pay dividends is higher among larger, more profitable firms, and those for which retained earnings comprise a large fraction of total equity. Aggregate dividends were found to have not declined.

An event (Chetty and Saez 2005) can have an effect upon level of dividend payment. The level of dividends changes over time (Consler and Lepak 2007). This study builds upon this prior work. An event, the market downturn of 2000, is used to divide into pre- and post-periods to see if traditional variables identified in prior work as important to dividend paying companies change over time.

III. Sample and Data

Firms that declared cash dividends, excluding payments made as part of liquidations, acquisitions or reorganizations, during the period of 1/1/95 to 3/31/06 were identified in CRSP. It was assumed that dividend declarations made during the last 15 days of a quarter and anytime during the following quarter prior to the last 15 days were dependent on the quarter of interest. For example: if the first quarter runs 1/1 – 3/31, dividends declared 3/16 until 6/15 would be assumed to be dependant on financial activity during the first quarter.

Some industries were observed to have monthly dividend payments or multiple types of cash dividends as coded by CRSP. When this was the case, the multiple dividend amounts were summed and reported as a single observation for the quarter. In order to use a panel data methodology, time identifications based on calendar quarters were assigned. Firms with fiscal quarters ending between 10/1/94 and 12/31/94 are labeled as time period 0. All fiscal year and quarter ends were retained in the sample. Quarterly beta was calculated for fiscal quarters using daily prices and NYSE equal-weighted market index data from CRSP. Monthly high and low market prices, quarterly balance sheet and income statement values and outstanding share data were collected from Compustat. Observations with missing balance sheet and income statement data were deleted. Missing data for high and low market price and outstanding shares was hand collected where possible; otherwise the observations were deleted. In addition, firms with the term "Trust" in the company name were deleted from the sample.

The response variable used in this study contains quarterly cash dividends per share (DPS, $ per share) from the fourth quarter of 1994 to the first quarter of 2006. The data has been partitioned into two time periods; pre- and post-2000. The authors believe it is

reasonable to assume that the market downturn in stock prices during the first quarter of 2000 will have an impact on dividend policy. Quarterly measurements were not obtained for all firms at all forty-six time points; in fact, the number of measurements on dividends per share for each firm varied from 1 to 46, producing a median of 13 observations per firm. There were a total of 48478 observations involving 2672 firms in all industries. In the pre-2000 set there were 23,098 observations over 21 quarters from 1,852 firms. The median number of observations per firm was 13. In the post-2000 set there were 25,390 observations over 25 quarters from 2,011 firms. The median number of observations per firm was 11.

The trend in the mean response is represented by a *lowess18* smoothed curve using two time spans in Figure 1: the fourth quarter of 1994 to the fourth quarter of 1999 (time span 0-20) and the first quarter of 2000 to the first quarter of 2006 (time span 21-45). We believe investors shifted their perception of dividends as the market rapidly declined. Before 2000, dividends were not as important as after.

In order to reduce skewness, all analyses are based on the natural log transformed DPS values, log (DPS values + 1). Figure 1 shows a very distinctive difference in movement in the log DPS values before and after the first quarter of 2000. The curves show generally that the values decline before the first quarter of 2000, and increase thereafter. Clearly, a time trend can be influenced by the exact choice of starting dates. However, there are quite evident trend differences in time span 0-20 versus time span 21-45. It appears that a linear curve is a reasonable approximation to model both the decline and increase in log DPS values. Accordingly, this study employs a model for the mean response that allows the rates of change in the DPS values to differ between and within firms using the separate time spans. The response pattern for each firm in each time span consists of an intercept at baseline and a slope, where the intercepts and slopes are allowed to vary randomly.

One of the objectives of this study is to assess the effect of selected time-varying covariates on DPS values. Quarterly data were obtained on several financial variables at all measurement occasions at which a DPS value was available: common shares outstanding (SHARES, millions shares), closing price per share in third month of quarter ($ per share), total stockholders' equity (millions $), total assets (ASSETS, millions $), total liabilities (millions $), net income/loss (NET, 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 (DEBT, total liabilities ÷ total assets), current liquidity measure (total current assets ÷ total current liabilities) and the quarter's beta. An indicator variable to represent the fourth fiscal quarter (IQTR) was included based on prior research.

To address non-normality in some of the data a log transformation is performed on the values for ASSETS, SHARES and DEBT: log(ASSETS), log(SHARES+1), and log(DEBT+1). Calculated values for market to book, current liquidity, and beta were assigned to deciles to limit the effect of non-normality, negative values, and outliers (Market, Liquidity, BETA respectively). NET appeared to have a reasonably normal distribution

18 The Loess process used a span of 0.3.

therefore raw values were used in the analysis. In the next section, we test whether time-dependent covariates are associated with changes in dividends per share over time.

IV. Analysis and Results

A. Fourth Quarter 1994 – Fourth Quarter 1999

The investigation starts by fitting a linear mixed effects model (see, for example, Pinheiro and Bates 2000) to the pre-2000 data. This flexible approach can be used in financial analysis to model population characteristics that are common to all firms as well as random response patterns that correspond to individual firms over time. Both between-firm and within-firm sources of variation are used to describe changes in the population mean dividends per share. Linear mixed effects models allow the analyst to account parsimoniously for the covariance structure of data collected over time. They accommodate inherently unbalanced longitudinal data as well, i.e. the number of measurements on each firm can be different and the measurements need not be collected at the same set of measurement occasions.

We consider the following linear mixed effects model in each of the two time spans:

$$E(Y_{ij} \mid b_i) = (\beta_1 + b_{1i}) + (\beta_2 + b_{2i})\, t_{ij} + \beta_3\, MARKET_{ij} + \beta_4 \log(ASSETS)_{ij}$$

$$+ \beta_5 \log(SHARES)_{ij} + \beta_6 \log(DEBT)_{ij} + \beta_7\, NET_{ij} + \beta_8\, LIQUIDITY_{ij}$$

$$+ \beta_9\, BETA_{ij} + \beta_{10}\, IQTR_j + \varepsilon_{ij}, \quad i=1,...,N;\ j=1,..., n_i\ ,$$

where Y_{ij} represents the log DPS value for the ith firm at the jth measurement occasion, t_{ij} is the time since baseline ($t_{ij} = 0$ in the fourth quarter of 1994); $IQTR_{ij}$ is a 4th quarter indicator, i.e., $IQTR_{ij}=1$ if the jth measurement occasion for the ith firm is in the 4th quarter and 0 otherwise. The fourth quarter DPS are expected to be larger than the other three quarter DPS figures. The vectors of random coefficients $b_i = (b_{1i}\ ,\ b_{2i})$ are independent and identically distributed with a multivariate distribution N(0, G), and the ε_{ij} are within-firm errors, which are independent and identically distributed with a $N(0, \sigma^2)$ distribution, independent of the random effects. The random effects corresponding to the intercepts and slopes induce covariance among the repeated measures.

Results of fitting the model in time span 0-20 using restricted maximum likelihood estimation are given in Table 1. Hausman (1978) specification test confirmed the need for random intercepts and slopes (see also Greene 1997). The principal findings regarding the estimated fixed effects and variance components in time span 0-20 are as follows:

1) There is an approximate 0.12% quarterly decrease in mean DPS from baseline to quarter 20, while controlling for other variables in the model. The estimated decrease in mean DPS during the first 21 quarters is 2.5%. The estimated variances of the random effects in Table 1 indicate significant firm-to-firm variability in the rates of change in DPS values in time span 0-20. Specifically, approximately 95% of firms are expected to have changes in log DPS values from baseline to quarter 20 between -0.0136 and 0.0112. While the majority of firms (nearly 58%) are expected to have

decreases in log DPS values, a large percentage of firms (approximately 42%) are expected to have increases during the first 21 quarters. There is also a significant component of variability corresponding to measurement error.

2) A 10% increase in ASSETS is associated with approximately a 0.9% increase in DPS in time span 0-20.
3) A 10% increase in SHARES is associated with approximately a 1.0% decrease in DPS in time span 0-20.
4) A 10% increase in DEBT is associated with a 2.6% decrease in DPS in time span 0-20.
5) NET does not have a significant impact on DPS at the 0.05 level in time span 0-20.
6) An increase in beta to the next decile is associated with a marginally significant (p-value = 0.0539) decrease of 0.03% in DPS in time span 0-20.
7) A one decile increase in the distribution of market to book ratios is associated with a 0.2% increase in DPS in time span 0-20.
8) A one decile increase in the distribution of current liquidity measures is associated with a 0.1% decrease in DPS in time span 0-20.
9) DPS values increase by 0.3% in the fourth quarter in time span 0-20.
10) Findings are not significantly impacted by the inclusions of dummy variables for exchange.
11) Findings are not significantly impacted by the exclusion of firms with one observation or firms with two or fewer observations.

B. First Quarter 2000 – First Quarter 2006

Results of fitting the model in time span 21-45 using restricted maximum likelihood estimation are given in Table 1. Likelihood ratio tests confirmed the need for random intercepts and slopes. Note that for this analysis, $t_{ij} = 0$ in the first quarter of 2000.

The principal findings in time span 21-45 are as follows:

1) There is an approximate 0.23% quarterly increase in mean DPS in time span 21-45, while controlling for other variables in the model. The estimated increase in mean DPS during the 25 quarters beginning in the first quarter of 2000 and ending in the fourth quarter of 2006 is 5.9%. Table 1 indicates that there is more variability in the slopes during time span 21-45 compared with time span 1-20. Beginning in the first quarter of 2000 through the first quarter of 2006, 95% of firms have changes in log DPS between -0.0141 and 0.0187. Nearly 61% of firms are expected to have increases in log DPS but a large percentage of firms (approximately 39%) are expected to have decreases during this time span.
2) A 10% increase in ASSETS is associated with approximately a 0.8% increase in DPS in time span 21-45.
3) A 10% increase in SHARES is associated with approximately a 0.9% decrease in DPS in time span 21-45.
4) A10% increase in DEBT is associated with a 2.2% decrease in DPS in time span 21-45.
5) A one unit increase (million dollars) in NET is associated with a 0.0008% increase in DPS in time span 21-45.

6) A one decile increase in the distribution of beta is associated with a 0.066% decrease in DPS in time span 21-45.
7) A one decile increase in the distribution of market to book ratios is associated with a 0.4% increase in DPS in time span 21-45.
8) LIQUIDITY does not have a significant impact on DPS at the 0.05 level in time span 21-45.
9) DPS values increase by 0.4% in the fourth quarter in time span 21-45.
10) Findings are not significantly impacted by the inclusions of dummy variables for exchange.
11) Findings are not significantly impacted by the exclusion of firms with one observation or firms with two or fewer observations.

V. Conclusion

DPS declined prior to 2000 and increased thereafter. The market break of 2000 appears to have changed how investors perceive dividends. Firms responded by increasing DPS. The tax change in 2003 most likely helped to continue the increase in DPS. 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 DPS in both periods of the study. Net profit is significant only in period two. Perhaps, in the late 1990's market price dominated with the speculative market bubble ongoing. After 2000 when it burst completely, profit became relevant again.

The inverse significant relationship between current ratio (LIQUIDITY) and DPS for only period one says that as liquidity increases, DPS decreases. This makes sense if cash is necessary to pay a cash dividend. Firms prefer not to borrow money to pay dividends. Why this isn't significant in the second period is unknown.

Beta (risk measure) shows a negative significant relationship to DPS only in period two. Apparently risk wasn't as much of a consideration during the market bubble years at it was later. After 2000 riskier firms were less likely to have high DPS than previously.

The fourth quarter dividend did prove to be significant in both periods as would be expected. Any bonus dividends are normally paid in the fourth quarter.

Since all firms in all industries were included in this study, a next logical step for future work would be to see if differences exist in dividend levels between different industries. Such information would be useful to investors seeking dividend opportunities.

Also work on identifying the relationships between macro economic variables and important characteristics for dividend-paying firms over time would be of significance to investors.

Figure I. Loess smoothed curve for log(DPS+1) against quarter for (a) time span 1-20 and (b) time span 21-45.

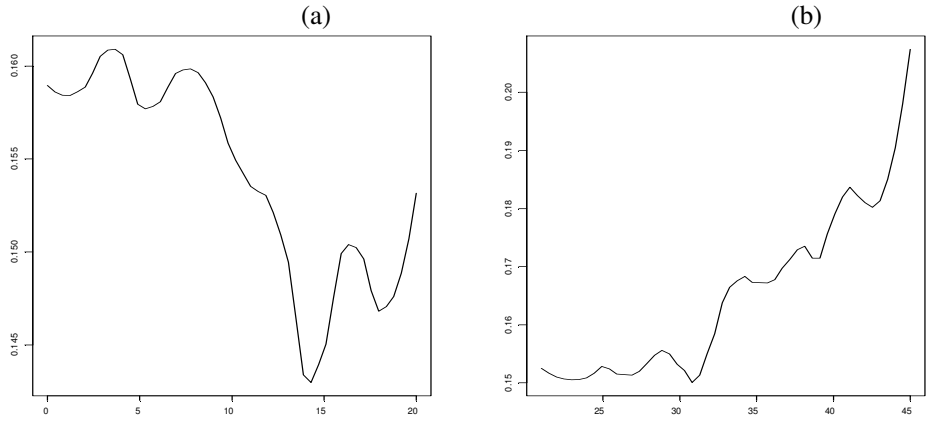

Table I. Estimated Model for Different Time Spans

Estimated Model: Time Span Quarters 0-20				Estimated Model: Time Span Quarters 21-45			
	Estimate	SE	p-value		Estimate	SE	p-value
Constant	0.0487	0.0137	0.0004	Constant	0.0152	0.0171	0.3751
t_{ij}	-0.0012	0.0002	< 0.0001	t_{ij}	0.0023	0.0002	< 0.0001
MARKET	0.0020	0.0003	< 0.0001	MARKET	0.0041	0.0005	< 0.0001
log(ASSETS)	0.0906	0.0025	< 0.0001	log(ASSETS)	0.0808	0.0032	< 0.0001
log(SHARES)	-0.1025	0.0026	< 0.0001	log(SHARES)	-0.0884	0.0036	< 0.0001
log(DEBT)	-0.2589	0.0127	< 0.0001	log(DEBT)	-0.2160	0.0182	< 0.0001
NET	0.000004	0.000003	0.1831	NET	0.000008	0.000002	0.0004
LIQUIDITY	-0.0012	0.0004	0.0060	LIQUIDITY	0.0009	0.0006	0.1189
BETA	-0.0003	0.0002	0.0539	BETA	-0.00066	0.00029	0.0225
IQTR	0.0030	0.0008	0.0003	IQTR	0.0040	0.0013	0.0023
$Var(b_{1i})$	0.03882			$Var(b_{1i})$	0.0366		
$Var(b_{2i})$	0.00004			$Var(b_{2i})$	0.00007		
$Cov(b_{1i}, b_{2i})$	-0.00050			$Cov(b_{1i}, b_{2i})$	0.00055		
$Var(\varepsilon_{ij})$	0.00286			$Var(\varepsilon_{ij})$	0.00748		
AIC	-58389.24			AIC	-41617.68		

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