Financial Decisions, Spring 2015, Article 4

Financial Crisis and Dividends

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Abstract

This paper re-examines Michael Rozeff's study of 1982 on variables affecting dividend payout ratios using data surrounding the Great Recession of 2008-2009. The research suggests that his findings do not necessarily translate into periods of financial distress. However, there are two variables that are consistent with his findings, namely past and future growth of firms. Results are mostly consistent with Boban (2011) conducted on a different dataset from the same time period.

[1] The author thanks the Editor and reviewer(s) for their valuable comments and Jeff Kurzeja for providing excellent research assistance.

1. Introduction

Numerous studies have been published on the enigma called stock dividends. Various reasons have been proposed to rationalize dividend payments by firms. These include *bird in hand,* taxes, agency costs, financial risk (debt), market risk (*beta* of the firm), past growth of the firm, future growth of the firm, and so on. Some researchers have investigated the effects within and across industries while others have studied regulated *versus* unregulated industries as influencing managerial decisions on dividend policy. In a widely cited article Rozeff (1982) studies the effects of several of these variables on a firm's dividend policy using seven years of data from 1974-1980. Dempsey, Laber and Rozeff (1993) utilize data from 1981-1987 to do a similar research study. This paper replicates Rozeff (1982) using the latest dataset over a seven year period as the other two studies. While this research is similar to Rozeff (1982), an important difference is that the period of this study includes the years of the Great Recession (2008-2009). Therefore, an important contribution of this paper is to see whether Rozeff's findings are applicable to corporate dividend policy during times of financial distress. Inferences can also be made whether there have been any significant structural changes in the 30 years since Rozeff's paper.

The rest of the paper is organized as follows: Section II reviews the extant literature on dividend policy relevant to this research particularly emphasizing the two Rozeff studies (1982 and 1993). Section III describes the research design and regression variables. Data description and some descriptive statistics of the data are presented in Section IV. Section V discusses the empirical results. Finally, the paper concludes in Section VI with a summary.

2. Relevant Literature

Starting with the seminal paper by Miller and Modigliani (1961), numerous researchers have written about the possible motivations behind corporate dividend policy. The view of Miller and Modigliani is that, in a tax-free world, dividend payment is irrelevant as the investor is indifferent between dividend payment and capital gains. However in corporate (and personal) world, taxes are as real as dividend payments are. Therefore, Lintner (1956 and 1962) and Gordon (1963) came up with what later became known as the *bird in hand* hypothesis. Other things equal, investors would like to receive their dividends now rather than wait with the uncertainty of future capital gains. This was followed by several research articles trying to investigate and rationalize the corporate dividend puzzle (Black 1976) postulating several alternative theories. Some of the more significant research relevant to this paper includes theories on signaling (Bhattacharya 1979, Myers and Majluf 1984, and Miller and Rock 1985), agency costs (Rozeff 1982, Easterbrook 1984, and Collins *et al* 1996), financial and market risks (Rozeff 1982), corporate insiders as delegated monitors (Collins *et al* 1996), and regulated *versus* unregulated firms (Collins *et al* 1996, Saxena 1998), among others.

Dempsey, Laber, and Rozeff (1993) used the Rozeff (1982) model to study any possible industry effects, and found only mild support, thereby refuting Lintner's (1956) findings. Collins, Saxena,

and Wansley (1996) and Boban (2011) replicate Rozeff (1982) with slight variations. While unlike Rozeff, Collins *et al* include regulated industries in their data, Boban's data consist of firms from the United Kingdom. This paper replicates Rozeff (1982) with a couple of important differences. First, it utilizes much recent data (2006-2012) but like Rozeff (and Dempsey *et al*) this study also uses seven years data. Second and more important, this time period includes the years of the Great Recession (2008-2009). Another difference is the use of debt-to-equity variable as a proxy for financial risk. Neither of the two Rozeff studies uses this variable. Possibly, debt-to-equity ratio (financial risk) has some bearing on dividend policy of firms. However, like Collins, Saxena, and Wansley (1996) and the two Rozeff papers, this study includes insider holding as a dependent variable.

3. Research Design and Variables

This section discusses the methodology and the statistical model employed in this paper. Both, the methodology and the model are similar to Rozeff's, as discussed in the following paragraphs.

3a. The Statistical Model

Like most studies on the topic ordinary least square (OLS) regressions are run to determine which variables explain dividend payments. The dependent variable in this model is the dividend payout ratio (PAY), whereas the independent variables include:

1. Growth of the firm over the past five years (GROW 1)
2. Growth of the firm expected over the next five years (GROW 2)
3. Beta value of the firm as a proxy of market risk (BETA)
4. Fraction of shares held by corporate insiders, or insider holdings (INS)
5. Debt-to-Equity ratio as a proxy of financial risk (D/E)

With the variables defined above, the regression equation used in this study is as follows:

PAY = f (GROW 1; GROW 2; BETA; INS; D/E)

3b. Detailed Description Of Regression Variables

This paper is based on Rozeff (1982) for determining key factors that affect dividend payments. It also investigates whether current data still support his following propositions:

1. Firms establish lower dividend payout ratios when they are experiencing or anticipating higher revenue growth.

2. Firms establish lower dividend payout ratios when they possess higher beta coefficients, presumably because higher betas represent higher risk due to market forces.

3. Firms establish higher dividend payouts when insiders hold a lower fraction of the equity and/or a greater number of stockholders own the outside equity.

The number of stockholders variable included in Rozeff (1982) is excluded as Value Line Investment Survey does not report it for the years in this study. However, another variable is included to proxy a firm's financial leverage, namely the ratio of long term debt to shareholders' equity. A more detailed explanation (definition) of the variables employed in this study follows.

The dependent variable:

PAY: This is the dependent variable. DPS and EPS data are gathered for each firm to calculate the payout ratio for each of the seven years. The average is taken and defined as the payout ratio for that firm.

The independent variables:

GROW 1: The reported average of the firm's revenue growth rate for the past five years.

GROW 2: The reported average of the firm's expected revenue growth rate for the next five years.

BETA: This is a five-year *beta* value reported by Value Line.

INS: The percent of common stock held by insiders in the seventh (final) year of the period examined

D/E: This is the financial leverage ratio obtained by dividing the firm's long-term debt by shareholders' equity for the seven year period. An average is then computed.

When analyzing D/E, a number larger than one would mean that the firm is relying more heavily on debt to finance their assets, putting them in a riskier position. If D/E is less than one, it indicates that the firm is relying less on debt and more on equity to finance their assets, which is relatively less risky. The data collected for each of these variables are then analyzed as a whole. Results for correlation and other metrics are then compared to the results obtained by Rozeff.

3c. Hypothesized Signs Of Explanatory Regression Variables

The cost of internally generated funds is generally much less than raising new capital. It is hypothesized that, if a firm has had a significant growth in the last five years and is expected to continue that growth during the next five years, it will hold back on dividends and retain its income. Therefore, the signs on the coefficients of GROW 1 and GROW 2 will be negative. Similarly, the BETA and D/E variables will have negative coefficients as firms with higher systematic and financial risks will retain more of their income for unforeseen future financial downturns. During normal business cycles the INS variable will have a negative coefficient to signify lower agency costs. But in a recession, it is not clear if the interests of agents and principals stay aligned as theorized in a perfect world. In a selfish manner, many insiders will be more concerned about maximizing their own wealth rather worrying about sending appropriate signals to the outside world. Therefore, during a recession it is difficult to predict the sign of

coefficient on INS variable. Firms with lower agency cost will have a negative sign whereas other firms will have a positive sign. Table 1 summarizes the hypothesized signs.

Table 1
Summary of Hypothesized Signs of Explanatory Regression Variables

VARIABLES	GROW 1	GROW 2	BETA	INS	D/E
	-	-	-	+ or -	-

4. Data and Descriptive Statistics

4a. Data Description

Data used by Rozeff (1982) consist of 1000 *unregulated* firms paying dividends over a seven year period from 1974–1980 taken from Value Line Investment Survey. Firms belonging to *regulated* industries are culled. Dempsey, Laber and Rozeff (1993) replicate Rozeff (1982) with 739 firms for the years 1981-1987. The smaller sample size is attributed to a recession during that time period. Like the other two studies data for this study is collected from several volumes of Value Line spread over several industries, filtered for regulated industries over the seven year period 2006-2012.

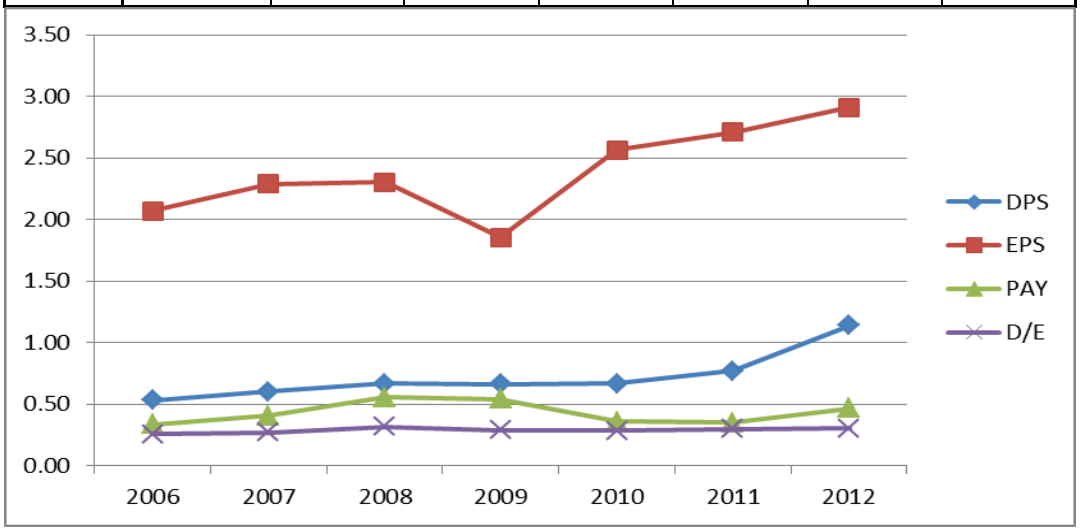
The collection of data itself is intentionally performed to include a time of extreme financial crisis to examine what effect, if any, decreased earnings had on management decisions in regard to dividend payouts. Acceptance of periods in which dividends were not paid was extended to two years of the seven examined to allow for broader observation of changes to existing payout policies. The resulting data set contains 404 firms.

4b. Trend & Descriptive Statistics

The trend in the mean values of select variables for each of the years 2006 thru 2012 for the 404 firms in the sample are presented in Table 2.

Table 2
Seven year trend analysis of relevant variables

	2006	2007	2008	2009	2010	2011	2012
DPS	0.53	0.60	0.67	0.66	0.67	0.77	1.14
EPS	2.07	2.29	2.30	1.85	2.57	2.71	2.91
PAY	0.34	0.41	0.55	0.54	0.36	0.35	0.47
D/E	0.26	0.27	0.32	0.29	0.29	0.30	0.30



As seen in Table 2 (and the graph), dividends per share (DPS) grew steadily during the years 2006, 2007, and 2008 and stabilized during 2009 and 2010 before increasing post recovery from the Great Recession. Possibly as a signal to investors and the market, managers increased DPS but the earnings drop was so severe that the increase resulted in PAY reaching very high levels and exceeding one in many cases. This means that some firms were paying dividends that were not commensurate with their earnings. Earnings per share (EPS) of the sample firms show a consistent growth from 2006 thru 2008. However, the financial crisis caused a sharp drop in earnings for firms resulting in an equally sharp decline in EPS in the following year. It actually dropped significantly in 2009 before starting to grow once again. The sample firms demonstrate a significant increase in their dividend payouts from 2006 to 2008. But it seems like the recession took a heavy toll, driving them into a shell and they did not quite recover until 2012. Lastly, their debt-to-equity ratio has been fairly stable throughout, understandably dipping a little following the recession as they tried to get a handle on the fixed cost of debt financing.

Table 3 presents the mean, median, and standard deviation values for the regression variables for the 404 firms included in the data set. These values are computed over the period 2006-2012.

Table 3
Descriptive statistics of regression variables

	INS	GROW 1	BETA	GROW 2	D/E	PAY
Mean	8.77	4.47	1.25	6.92	0.30	0.44
Median	3.10	5.25	1.19	7.00	0.29	0.32
Standard Deviation	15.41	7.19	0.57	3.61	0.20	0.56

The mean (median) values of insider holdings presented in Table 3 suggest that insiders held 8.77% (3.10%) of the total common stock outstanding. The mean and median values also suggest that on average, sample firms' future growth (GROW 2) is more than their past growth (GROW 1). The *beta* values suggest that on average these are a bunch of reasonably aggressive firms with moderate systematic risk. These firms were also reasonably financially leveraged with a debt-to-equity ratio around 30% with a relatively small variation (standard deviation of 0.20).

4c. Correlations Among Regression Variables

Table 4 presents the results of bivariate correlation tests for Spearman's rho coefficient at a two-tailed level of significance 0.01.

Table 4
Correlation matrix of the regression variables (N=404)

	PAY	GROW 1	GROW 2	BETA	INS	D/E
PAY	1	-0.168*	-0.235*	0.023	0.049	0.022
GROW 1		1	0.203*	-0.374*	-0.057	-0.146*
GROW 2			1	0.049	-0.064	-0.134*
BETA				1	-0.064	0.150*
INS					1	-0.133*
D/E						1
*Denotes significant at the 0.01-level						

Table 4 demonstrates that PAY is negatively correlated with past growth (GROW 1) and future, potential growth (GROW 2). Further, these correlations are statistically significant. Rozeff (1982) had similar relationships for dividend payouts with past and future growths of firms. In contrast to the findings of Rozeff (1982) but in support of the findings of Dempsey, Laber and Rozeff (1993), this analysis finds that PAY is not statistically significant with INS or BETA. It is also not correlated with the newly tested D/E variable. The reliability of the Rozeff model in times of financial stress does not hold up completely as these results are supported by a study by

Boban (2011). Boban's research was conducted on a sample of 155 firms from the London Stock Exchange from 2005-2010. It was divided into three segments sampling before, during, and after the financial crisis. The conclusions largely support Rozeff's propositions in the pre-crisis periods but fail to sufficiently support them in the "during" and "after" segments. The following charts present the correlation coefficients. Similarities between them in regard to correlation of independent variables to the dependent variable "PAY" are striking given that the results are from analysis of two totally different data sets.

4d. Multicollinearity Test

Apparently the figures presented in the correlation matrix in Table 3 do not suggest any multicollinearity problem. Nevertheless, to confirm this apparent conjecture the multicollinearity test is performed and the tolerance statistic and variance inflation factor (VIF) recorded for each independent variable. In SPSS, a tolerance statistic of less than 0.20 and a VIF of greater than 5 imply a multicollinearity problem. Table 5 presents the results of this test and compares them with the results obtained by Boban (2011) on data from UK firms for the years 2005-2010.

Table 5

Multicollinearity statistics for the regression variables and comparison with Boban (2011) study.

	Constant	BETA	GROW 1	GROW 2	INS/INS	D/E	STOCK	R^2
This Study*	0.81	-0.11 (0.82)	-0.01 (0.80)	-0.04 (0.92)	0.00 (0.96)	-0.06 (0.93)	----	0.072
Boban**	0.75	0.15 (0.95)	-0.65 (0.94)	-0.57 (0.99)	0.009 (0.92)	----	-0.0003 (0.86)	0.04

Figures in parentheses are *tolerance statistic* ($1-R^2$) of the multicollinearity tests from SPSS.
*This study uses data from 2006-2012
**Boban (2011) uses data from 2005-2010 consisting UK firms

As may be noted in Table 5, Boban does not include debt-to-equity ratio in his study. The results of both studies are strikingly similar for other variables. There is no multicollinearity problem as all tolerance statistics are greater than 0.20. Though not reported in the Table, all VIF figures are also below the threshold of 5.

5. Discussion of Regression Results

After reviewing the correlations among all variables and ruling out any multicollinearity problems in the explanatory variables, an ordinary least square regression analysis is carried out using the following model as described in Section III above.

$$PAY = f(GROW\ 1;\ GROW\ 2;\ BETA;\ INS;\ D/E)$$

The results of the regression analysis are presented in Table 6 below.

Table 6

Results of an OLS regression using the model: PAY = *f* (GROW 1; GROW 2; BETA; INS; D/E); N=404

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.810	.115		7.039	.000	.584	1.037		
GROW 1	-.014	.006	-.132	-2.442	.015	-.026	-.003	.802	1.247
GROW 2	-.039	.009	-.209	-4.151	.000	-.057	-.021	.923	1.083
BETA	-.011	.055	-.011	-.205	.838	-.119	.097	.828	1.208
INS	.001	.002	.025	.506	.613	-.003	.005	.967	1.070
D/E	-.062	.151	-.021	-.411	.681	-.360	.235	.934	1.070

A t-statistic of greater than 1.96 with a significance of less than 0.05 indicates that the independent variable is a significant predictor of the dependent variable within and beyond the sample.

The regression results show that only past growth (GROW 1) and future growth (GROW 2) are significant predictors of dividend payouts by the sample firms. The coefficients of both variables are negative and statistically significant, suggesting a negative relationship with dividend payouts. These results are consistent with most studies, including Rozeff (1982) and Collins, Saxena, and Wansley (1996), and Saxena (1998). The negative sign of the coefficient of BETA is consistent with early studies and intuitively understandable. As a firm's systematic risk increases, the firm will be less likely to payout significant amounts in dividends. The same explanation can be extended to the newly added D/E variable, used to proxy a firm's financial leverage. However, neither variable is statistically significant. The INS variable is also statistically insignificant.

One plausible reason for BETA, INS, and D/E not being statistically significant can be attributed to the Great Recession. Despite facing financial distress, some firms continued their stable dividend policies hoping that the financial downturn would be short and not as devastating. Therefore, while their financial condition was deteriorating, their dividend policy did not reflect any change with respect to their market risk, financial risk, or insider holdings. Moreover, as the firms faced the chaotic financial environment, their *beta* values changed randomly and were not a true measure of their systematic risk. For this reason the BETA variable does not demonstrate any statistical relationship with dividend payments. A similar explanation can be applied to the debt-to-asset ratio (D/E). This time period saw wildly swinging market values of debt and equity of firms, making their debt-to-equity ratios unreliable.

6. Summary and Conclusion

Rozeff (1982) study is replicated in this paper with a few variations. The most important being the updated data set that includes years of financial distress during the Great Recession. Dividend payouts are regressed against five explanatory variables: past growth, future growth, *beta* value, insider holdings, and debt-to-equity ratio. The reasoning for adding the last variable is that financial risk would have some influence over dividend payments. Descriptive statistics of variables are computed. Correlations between all regression variables are reviewed followed by the test to rule out any multicollinearity problem. Ordinary least square regression is run and coefficients and signs of each explanatory variable carefully analyzed.

Boban (2011), using Rozeff's model over a period of financial distress, fails to support Rozeff's findings. This study also tests the model during nearly the same time period as Boban but using a different data set. The results are similar to Boban's leading to the conclusion that most Rozeff's findings do not carry over in a financial crisis. The results do support the first proposition that claims that payout ratios are lower in times of growth (past and future). To avoid a potential trip to the financial markets to raise new capital to finance growth, a firm will most likely not pay huge sums in dividends. The statistically significant regression results support this reasoning.

The second and third propositions are not statistically borne out by the data that include years of the Great Recession. The negative signs on the beta and debt-to-equity coefficients show the correct hypothesized relationship with dividend payouts, but they are not significant. This suggests that during a financial crisis the expected relationship between these variables gets fuzzy. The same conclusion can be inferred between the relationship of insider holdings and dividend payout during a recession. There are so many outside stockholders dumping their holdings that the percentage of insider holdings is not a stable, true, and accurate measure showing no statistical relationship with payouts. However, to confirm the above explanations, further research is necessary.

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