Volume 5 • Number 1
Fall 2015

JURF
Journal of Undergraduate
Research in Finance

Multi-Factor Model Analyzing Dividend Growth: A Metric for Stock Returns and Outperformance

DARWIN LI

Submission for JURF
The Journal of Undergraduate Research in Finance
JEL Code: G110

University: Omitted
Department: Omitted
Adviser: Omitted

May 2015

Abstract

Using a multi-factor model for returns, we looked at the statistical significance of two dividend growth parameters: annual dividend per share percentage growth (dgp) and years of dividend growth (dgy). We confirmed empirical research and found dgp to be significant both as a non-lagged variable from 2005-2014 (p-value of 0.013), and a lagged predictor variable during non-bullish periods as defined by low equity fund inflows (p-value of 0.021). The evidence suggests that the dividend growth factor in a dividend contender universe partially explains excess returns and can serve as a predictor in non-bullish years.

Chapter 1

Introduction

1.1 Background

A firm's dividend policy plays a considerable role in the firm's stock price. Though neither the first nor only one to popularize the concept, Professor Myron J. Gordon established the renowned Gordon Growth Model, also known as the dividend discount model (1962). The model equates the share price to the present value of a stock's future dividends and is a highly regarded method for calculating the intrinsic value of a stock, exclusive of current market conditions.

$$P = \frac{D}{k - g} \tag{1.1}$$

P is the value of the stock

D is next year's expected dividend per share

k is the investor's discount rate

g is the expected dividend growth rate

This simplistic model is but one of many approaches to security pricing, but it shows the importance of dividends and dividend growth in the valuation of stocks.

Much research has come to show the correlation between the performance of a stock and its dividend philosophy (see Figure I). Dividend policy is divided into five categories: dividend growers and initiators, dividend payers, no change in dividend policy, dividend non-payers, and dividend cutters and eliminators. The study shows that a $100 investment in the universe of dividend growers and initiators in 1972 returned $4,168 by the end of 2012, compared to $1,622 for an investment in the S&P 500. Those who invested $100 in 1972 in non-dividend payers and dividend cutters & eliminators ended up with only $193 and $88 respectively after 41 years (see Figure I).

Furthermore, academic research reveals that in general, dividend to price ratios tend to be good predictors of total stock market returns. Campbell and Shiller show that high dividend to price ratios are indicative of a slow down in dividend growth which in turn leads to lower returns (1988). More recent research in this space builds off of this model to evaluate and debate its thesis (Welch & Goyal, 2004; Ghosh & Constantinides, 2011). These results are quite telling of dividend yield and the predictability of dividend growth, but no research has established a causal relationship between the dividend growth parameter itself and outsized returns. This may be the case as, for most managers who consider many factors when making an investment decision, a correlation with the underlying fundamental metrics such as earnings is often enough.

Many explanations attempt to explain why dividend growth tends to result in outperformance. RealityShares, an asset manager with a specific focus on dividend growth, claims that dividend growth stocks as an asset class offers benefits including: greater persistence and lower drawdowns in times of economic recession, lower volatility and correlation to equities, favorable risk and return profile, and hedges against inflation (RealityShares White Paper, 2014). Yet these factors, in explaining high returns, may also just be a result of the competitive dynamics and thus underlying

fundamentals enjoyed by these companies and not a result of the dividend growth itself. These fundamental metrics include returns such as ROIC, sales and its growth, free cash flow and its growth, and others (Graham, 1949; Klarman, 1991; Greenblatt, 2006).

Copeland Capital, an investment management firm focused on dividend growth, offers a reason for how dividend growth is a causal determinant of outsized returns, i.e. unrelated to fundamentals: "companies with growing dividends not only signal their ability to generate strong cash flows, but also send an explicit message to investors about their expectations for growth of those cash flows in the future." Firms in other dividend policy buckets might use the same rhetoric as the management teams from dividend growers, but they are not "putting their money where their mouths are" (Copeland Capital White Papers, 2014). Or in other words, a dividend growth philosophy is quantitative assurance of management's confidence moving forward and thus justifies a share price premium. Furthermore, Copeland Capital also asserts that if investors expect year after year dividend growth, it forces management to be more wary of its capital allocation, which tends to yield outsized returns (Copeland Capital White Papers, 2014).

From these above assertions, one can make the argument that dividend growth serves not just as a proxy for but also a causal factor in outsized returns. It would be particularly useful, especially for funds that are dividend growth-oriented, to know if dividend growth in it of itself is a cause of outsized returns, or if it is just an indicator for other fundamentals that generate alpha. We take a quantitative and academic approach to investigate the correlations among and predictive power of these various parameters. If it were the case that dividend growth significantly impacts returns, after accounting for fundamentals, the argument for dividend growth fund managers would be further strengthened.

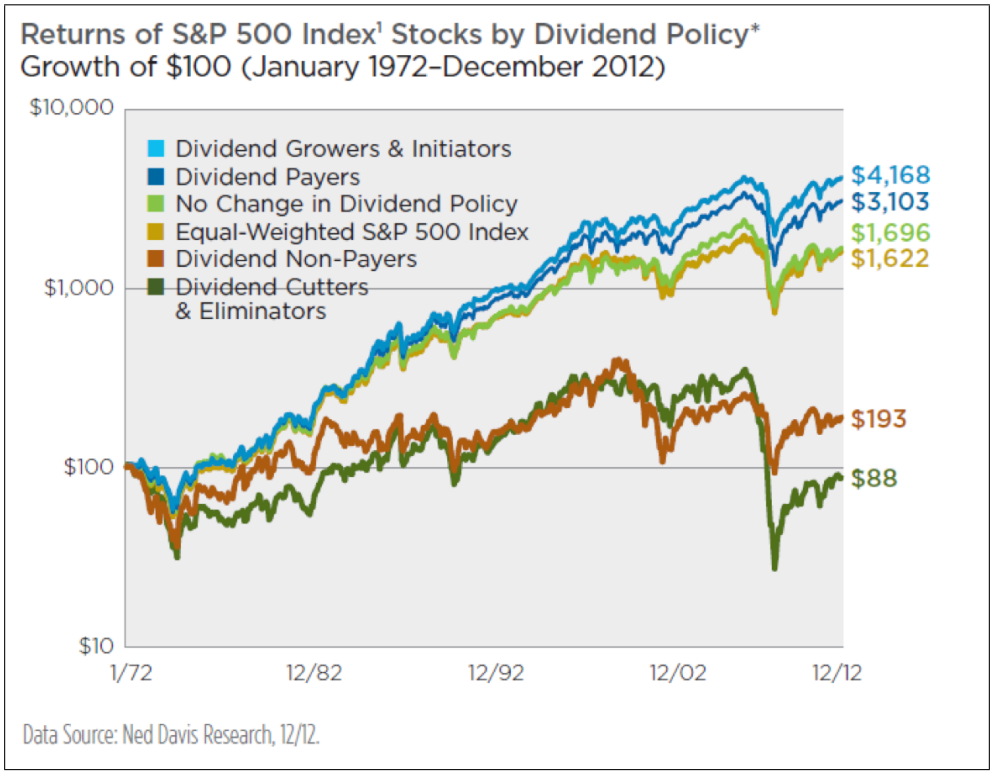

Figure I: Dividend policy returns 1972-2012. Based on equal-weighted geometric average of total return of dividend-paying and non-dividend-paying historical S&P 500 stocks, rebalanced annually. Chart uses indicated annual dividends to identify dividend-paying stocks and changes on a calendar-year basis (Ned Davis, 2012).

1.2 Motivation

Though dividend growth has been a highly regarded metric considered by fund managers in investment decisions for decades, the development of funds geared specifically towards dividend growth is recent. The first dividend growth fund launched is Franklin Rising Dividends (ticker: FRDPX), in 1987. Today, according to a MorningStar-based analysis conducted by Barron's, there are over 150 dividend-oriented mutual funds and more than 30 ETFs, a large proportion of which launched less than five years ago. From a more short-term perspective, the dividend growth strategy has received a fair amount of attention from yield-hungry investors. Open-end mutual funds generating higher dividend growth attracted almost $12 billion, or 82% more than the net inflows into funds with higher dividend yields in 2014. Compare this to the time frame 2011-2013, during which the inflows split almost evenly on average (2014).

The research in this space is relatively minimal despite the growing popularity of the investing strategy. Though a correlation of dividend growth with other return-driving parameters has been somewhat well established, a corroboration of this as well as a look into the significance of the dividend growth factor itself would have widespread importance for investors, fund managers, and the working class and retirees who invest their income and savings with these managers. Such significance will also contribute to important ongoing academic debates.

Chapter 2

Literature Review

Up to this point, there appears to be an implicit assumption that companies, which grow their dividend over time, yield outsized returns on average. However, we cannot ignore published empirical and academic research, which suggest the opposite, that paying dividends may have either a negative or no impact on the company's financial performance and shareholder return.

2.1 Dividend Irrelevance Theorem

The dividend irrelevance theorem was first developed by Franco Modigliani and Merton Miller (from here, called MM) in a seminal paper (1961). The authors claim that a firm's dividend policy affects neither the price of its stock nor its cost of capital. The dividend irrelevance theorem follows from the capital structure irrelevance proposition which states that the method of raising capital, either via equity or debt, is irrelevant. Only the firm's ability to earn money and the riskiness of its activities can have an impact on the value of the company. MM states, "...given a firm's investment policy, the dividend payout policy it chooses to follow will affect neither the current price of its shares nor the total returns to shareholders" (pg. 414). This theorem is based off many assumptions that are criticized as not accurately reflecting

the real world. Specifically, to come to the dividend irrelevance theorem, MM assumed: Personal or corporate income taxes do not exist, there are no stock flotation or transaction costs, financial leverage does not affect the cost of capital, both managers and investors have access to the same information concerning the firm's future prospects, the firm's cost of equity is not affected in any way by the distribution of income between dividend and retained earnings, dividend policy has no impact on firm's capital budgeting, and investors are rational.

Since the publication of MM, several empirical studies have shown that dividend policy does not make any difference to the wealth of shareholders (Black & Scholes, 1974; Miller & Scholes, 1978; Bernstein, 1996). Black and Scholes' findings are based off a 3-factor model, which incorporated expected return of the portfolio, expected return of the market, and long term dividend yield. They found that the coefficient of the dividend yield variable was statistically insignificant from 1936-1966. These findings, however, are relatively dated and examine dividend yield, not growth which, for aforementioned reasons, encompasses a different universe than the one of interest for this study.

Many studies argue that dividends create a positive wealth impact, both before and after MM: Gordon (1959), Long (1978), and Gordon and Bradford (1979), argue that investors prefer returns in the form of dividends, possibly due to institutional constraints. Prior to the dividend irrelevance theorem, Gordon and Lintner's famous Bird-In-Hand theory postulated that investors prefer the certainty of dividend payments to the possibility of higher future capital gains. Furthermore, Ball et. al, which built off of Black and Scholes' model, analyzed data from Australian markets from 1960-1969 and failed to find conclusive evidence in support of the dividend irrelevance theory (1979). A larger pool of more current, empirical studies also reveal that dividends play an important role in creating shareholder wealth. Empirical studies such as DeAngelo (2006) looked at cash flow retention parameters to develop a relationship

between dividend policy and wealth increases. Dickens and Casey found contradictory evidence to the dividend irrelevance theorem in their multi-factor model when applied to the banking sector (2002). A detailed analysis of the dividend growth universe and the dividend growth parameter does not exist. Surveys also reveal that dividends play a role in affecting share prices. Baker and Powell (1999) surveyed 603 CFOs of US firms listed on the NYSE, and observed that 90 percent of respondents believed that dividend policy affects a firm's value and cost of capital. A couple of studies confirmed that changes in dividend policy, namely dividend initiation, had a significant impact on company value in response to the signal about future earnings contained within the dividend policy (Asquith & Mullins 1983; Richardson & Sefcik, 1986).

Finally, several studies argue that a negative wealth impact may result from costs associated with paying dividends. Addressed in the following section, the argument that has garnered the most traction is that dividend income faces a higher tax rate than capital gains (Lewellen et al., 1978; Blume et al., 1980).

The effects of dividend policy is hotly debated. One purpose of this study is to contribute to this debate for the universe of stocks that grow dividends over time by analyzing the significance of this dividend growth in fundamentals-adjusted shareholder returns.

2.2 Tax Arguments

High taxes on dividend income may have two potential consequences with regards to wealth and the dividend policy: 1. Stock prices fall as investors may seek other alternatives and 2. Management may opt for other capital allocation strategies that limit dividend payout. As Al-Malkawi et al. concisely summarized, there is often a differential in tax treatment between dividends and capital gains, and, because most

investors are interested in after-tax return, the influence of taxes might affect their demand for dividends. Taxes may also affect the supply of dividends when managers respond to this tax preference, in seeking to maximize shareholder wealth or firm value, by increasing the retention ratio of earnings (2010).

Research pioneered by Brennan (1970) to explore this question initially showed that, ceteris paribus, stocks with higher dividend yields sell at lower prices because of the disadvantage associated with higher taxes. His linear model regressed excess stock returns on dividend yield and market returns where the coefficient on the dividend yield variable can be interpreted as an implicit tax bracket and independent of the dividend yield. Follow-up research is not clear-cut. While Litzenberger and Ramaswamy (1979), Poterba and Summers (1984), Thomas (1998), and others corroborated Brennan's findings or some version of it, papers including Black and Scholes (1974) and Miller and Scholes (1982) challenged such conclusions. Keim (1985), which accounted for more variables including the January Effect and firm size, concluded, "At a minimum, the results suggest the observed relation between long-run dividend yields and stock returns may not be solely attributable to differences in marginal tax rates for dividends and capital gains" (p.487). A limitation to these studies are that they are all CAPM-based, which, though argued in the next section as a valid model to measure stock returns, is but one of many perspectives to address the problem. Furthermore, such studies only look at yield and vary only the time frame to analyze it, e.g. one month, one week, one year, etc., not the parameter itself. Results may differ when looking at a dividend growth universe.

Copeland Capital examined the relationship between the tax rate and returns of stocks classified by corporate dividend policies (2012). They created three hypothetical capitalization-weighted portfolios: dividend payers which included all publicly traded US companies which paid a dividend in the previous year, high yielders which contained the top 20% of yielders in each sector, and dividend growers which included

companies that grew their dividends for at least five years and had a $1B market capitalization. They examined from 1989-1993, when top income tax rates rose from 28% to nearly 40%, and from 2002-2003, when the top income tax rates fell from 35% to 15%. They found that for both periods, dividend strategies showed little correlation with tax rate changes as all three portfolios outperformed in the period of rising tax rates and performed relatively in-line during the period of decreasing tax rates.

Furthermore, tax rates did not prove to influence corporate behavior in terms of capital budgeting. A plot between dividend payout for the S&P 500 Index and top marginal income tax rates from 1960-2011 had an R^2 of 0.0009. Figure II, reproduced below with the permission of Copeland Capital, summarizes this relationship.

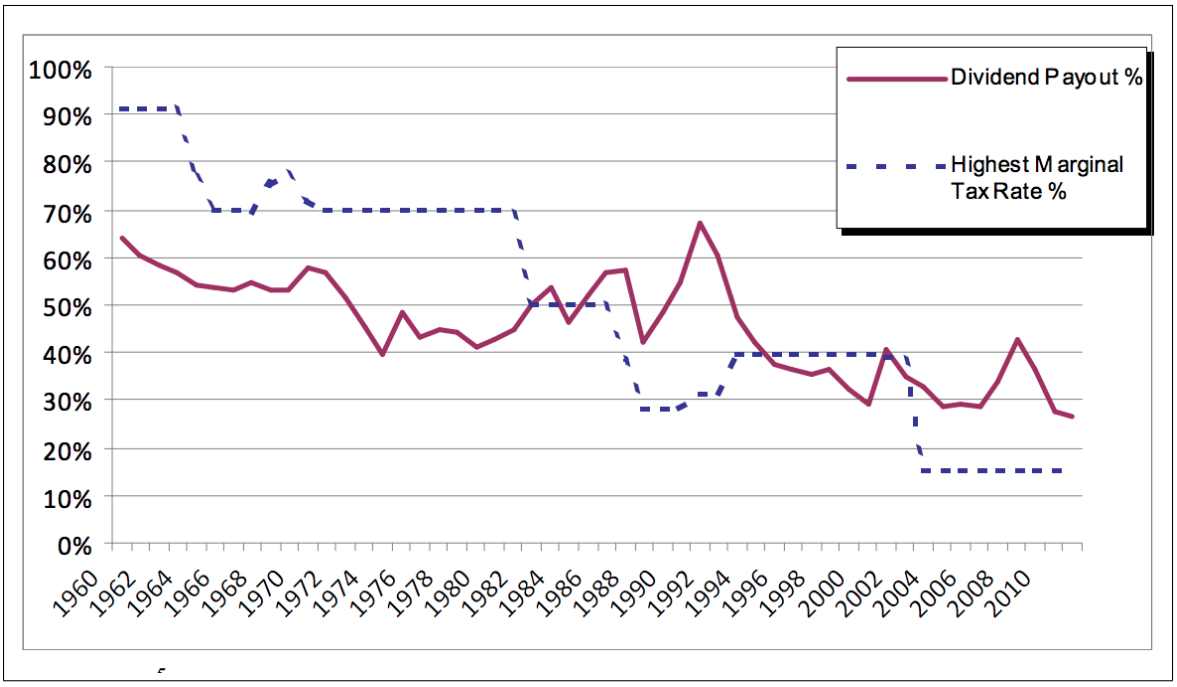

Figure II: With an R^2 of 0.0009, tax rates do not influence the capital budgeting behavior of companies (Copeland Capital, 2012).

Chapter 3

Methodology and Data

3.1 Methodology

3.1.1 CAPM

A valid framework is necessary to test and measure the importance of dividend growth in returns. For the purposes of this study, the Capital Asset Pricing Model (CAPM) of William Sharpe and John Lintner appears to be an appropriate starting point, as was the case for Black and Scholes (1974), Ball et. al (1979), Blume (1980), Keim (1985), Kalay and Michaely (2000) and many others who used a CAPM model or some form it. The basic CAPM model is defined in Equation 3.1:

$$E[R_i] = Rf + \beta_1(E[Rm] - Rf) \tag{3.1}$$

$\boldsymbol{E[R_i]}$ is the expected return of stock i

$\boldsymbol{Rf}$ is the risk-free rate of interest

$\boldsymbol{\beta_1}$ is the sensitivity of the expected excess asset returns relative to market returns

$\boldsymbol{E[Rm]}$ is the expected return of the market, generally the historical average

CAPM uses co-movement with the market as a whole to describe security returns. From an empirical perspective, this single-factor model has been criticized for its inaccuracy (Fama & French, 2004), though multi-factor models tend to be more robust. In this study, we use a multi-factor model to model asset prices:

$$E[R_i] = Rf + \beta_1(E[Rm] - Rf) + \beta_2 X_2 + \beta_3 X_3 + ... + \alpha \tag{3.2}$$

with chosen factors explained in the following section.

3.1.2 Model Parameter Selection

With criticisms of studies such as Gordon (1959), risk variation among firms drawn from different sectors may lead to omitted bias in and inflation of the coefficients of dividend variables, thus a variable to control for annual sector returns (as defined by the GICS) is necessary. More generally, to control for the state of the economy, especially with the 2008 financial crisis, an annual GDP variable is also used.

Furthermore, to deduce the significance of dividend growth itself and its implication for management, we also account for fundamentals. Consistent with the factors outlined in Section 1.1, sales, free cash flow, which is a generally good parameter for retained earnings, and ROIC parameters are used. These factors are also in-line with Hou, Xue, and Zhang's argument in "Digesting Anomalies: An Investment Approach," which looks through 80 factors to find the most significant parameters in determining returns. The paper concludes, "...an empirical q-factor model consisting of the market factor, a size factor, an investment factor, and a profitability factor outperforms the Fama-French and Carhart models in capturing many (but not all) of the significant anomalies" (2014). And because of the growing nature of dividends, the annual changes in free cash flow and sales will also be useful to account for in this model.

Finally, two forms of dividend growth are examined: annualized percentage growth in dividends and years of dividend growth. This leaves the following time-series model:

$$\begin{aligned} Return = \beta_1(E[Rm_t] - Rf_t) + \beta_2 S_{i,t} + \beta_3(\delta S_{i,t}) + \beta_4 FCF_{i,t} + \beta_5(\delta FCF_{i,t}) \\ + \beta_6 ROI_{i,t} + \beta_7 GDP_t + \beta_8 I_{i,t} + \beta_9 DGY_{i,t} + \beta_{10} DGP_{i,t} + \alpha \end{aligned} \tag{3.3}$$

$\boldsymbol{Return}$ is the stock's annual return in excess of the risk-free rate: $E[R_{i,t}] - Rf_t$

$\boldsymbol{S_{i,t}}$ is the annual fiscal year end revenue for company i in year t

$\boldsymbol{\delta S_{i,t}}$ is the annual change in revenue for company i between years t and t-1

$\boldsymbol{FCF_{i,t}}$ is the annual fiscal year end free cash flow for company i in year t

$\boldsymbol{\delta FCF_{i,t}}$ is the annual change in free cash flow for company i between years t and t-1

$\boldsymbol{ROI_{i,t}}$ is the return on invested capital for company i in year t

$\boldsymbol{GDP_t}$ is the annual US GDP in year t

$\boldsymbol{I_{i,t}}$ is the return of the industry for company i in year t

$\boldsymbol{DGY_{i,t}}$ is the number of years of dividend growth for company i in year t

$\boldsymbol{DGP_{i,t}}$ is the annual percent increase in dividend per share for company i in year t

3.2 Data

There are several sources that keep track of current dividend growth companies: the NASDAQ Dividends Achievers, S&P Dividend Aristocrats Index, and DRiP Investing Resource Center are perhaps three of the most well known. For the purposes of this study, which aims to look at the most recent decade and the universe of current dividend growers, these sources will suffice for obtaining a stock universe. Longer term analysis of companies that have once been but since fallen out of these lists is difficult as there does not currently exist a source or a cost- and time-efficient way to compile a universe of such companies. Simple algorithms that detect year after year dividend growth do not work on databases that track dividend history due to

the frequency of one-time special dividends that tend to exceed the value paid of a normal dividend and should be disregarded in classifying dividend growers.

We obtained most historical corporate financial data from the S&P Capital IQ's Compustat North American database, which contains fundamental and market data on publicly held companies. The database covers 99% of the world's total market capitalization with annual company data available back to 1950. The Bloomberg database was also utilized for price, free cash, dividend per share, and ROIC figures, which were either not adjusted for splits or otherwise not available in the Compustat database. We retrieved sector returns from S&P and risk-free rate and market return data from the Federal Reserve of St. Louis database.

Dividend Contenders are companies that have grown dividends for 10 or more years; currently there are 249 actively traded US dividend contenders. Though it may be worth taking a deeper look to see if the ten-year mark carries any other significance, for the purposes of this study, the dividend contenders universe seems appropriate to use for a pool of dividend growth stocks. In summary, we downloaded annual numbers obtained from sources listed above for parameters outlined in the model in Equation 3.3 for companies that had at least ten years of dividend growth, as defined by the DRiP investing resource database, and are trading on either the NYSE or NASDAQ exchanges and used for analysis in Stata version 13.1.

To correct for special dividends and stock splits, we created an algorithm to scan for anomalies in the dividend data as it was already known that each company has continually grown its dividend. Each anomaly was then examined and revised by crosschecking corporate 10Ks. We excluded a handful of corporate data from the analysis that were either unavailable from the two data sources or the annual filings. After data processing, we made one final screening of each data point to ensure data integrity. Table 3.1 shows the summary statistics of the data and Table 3.2 the correlation matrix.

Table 3.1: Summary Statistics

Variable	**Mean**	**Std. Dev.**	**N**
Risk-Free Rate (rf)	0.033	0.01	2330
Market Returns (rm)	0.094	0.177	2330
Risk Premium (rprem)	0.06	0.18	2330
Sales (sales)	10826.526	28483.523	2330
Annual Change in Sales (d_sales)	0.094	0.24	2330
Free Cash Flow (fcf)	956.208	5466.935	2330
Annual Change in Free Cash Flow (d_fcf)	-0.119	15.628	2330
Returns on Invested Capital (roic)	12.001	9.641	2320
GDP (gdp)	15.084	0.567	2330
Number of Years of Dividend Growth (dgy)	10.148	5.128	2330
Annual % Increase in Dividend (dgp)	0.145	0.198	2330
One Year Lagged dgy (l_dgy)	9.648	4.971	2097
One Year Lagged dgp (l_dgp)	0.148	0.205	2097
Price	39.951	37.315	2330

Table 3.2: Correlation Among Dividend Growth and Fundamental Parameters

Variables	dgy	dgp	sales	d_sales	fcf	d_fcf	roic	sector_ret
dgy	1.000							
dgp	-0.172	1.000						
sales	-0.035	0.060	1.000					
d_sales	-0.086	0.045	0.009	1.000				
fcf	-0.023	0.037	0.771	0.007	1.000			
d_fcf	-0.019	0.002	0.003	0.017	0.022	1.000		
roic	-0.083	0.169	0.113	0.071	0.173	0.039	1.000	
sector_ret	0.113	-0.044	0.030	-0.046	0.019	0.025	0.036	1.000

Chapter 4

Results

4.1 Dividend Growth Returns

We first conducted analysis to verify earlier cited empirical literature. The data show that in the past ten years, returns of the dividend contenders were an annualized 15.53%, which is in-line with the aforementioned empirical research that spanned from 1971-2013 (Ned Davis Research, 2013). This outpaced market returns of 9.375% by a non-trivial 6.15% (See Table 4.1 and Figure III).

Table 4.1: Dividend Growth Returns vs. Market Returns 2005-2014

Year	**DG Universe Returns**	**Market Returns**	**Difference**
2005	.1355476	.0483	.0872476
2006	.22277	.1561	.06667
2007	.1249537	.0548	.0701537
2008	-.1779711	-.3655	.1875289
2009	.3076154	.2594	.0482154
2010	.2506598	.1482	.1024598
2011	.0810675	.021	.0600675
2012	.1425973	.1589	-.0163027
2013	.3340467	.3215	.0125467
2014	.1320611	.1348	-.0027389
Total	**.1553243**	**.09375**	**.0615848**

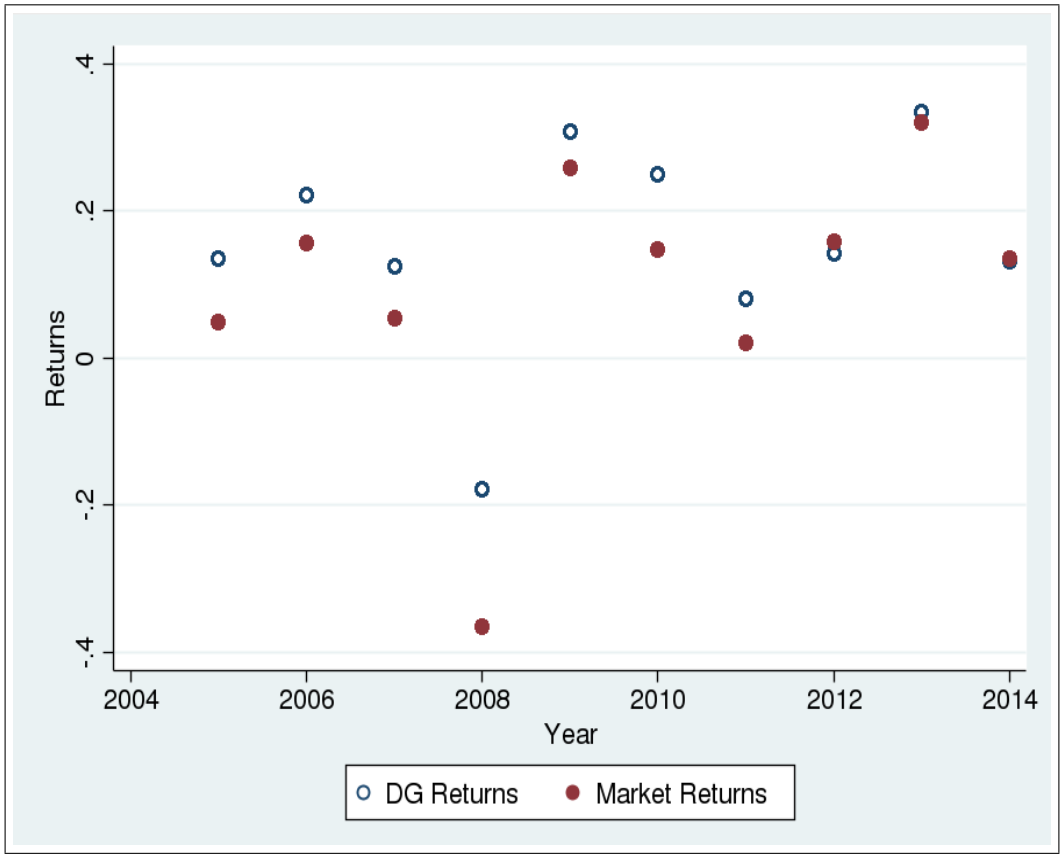

Figure III: Graphical form of returns of 10-year dividend contenders compared to those of the market.

4.2 General Statistical Significance

We ran OLS regressions to view the significance of dividend growth as an explanatory factor for outsized returns. The earlier produced correlation matrix (Table 3.2) gives a better idea of the relationship and correlation between dividend growth (dgp represents dividend growth annual percentage and dgy represents number of years of dividend growth) and the fundamental parameters.

Unsurprisingly, the correlations between the dividend growth parameters and the fundamental metrics are not trivial. Based on a one-factor model, dgp appears to be a significant explanatory metric for returns with a p-value of 0.0008 (see regression 1 of Table 4.2 and Figure IV).

Regression 2 of Table 4.2 accounts for fundamental and macro variables to isolate the effect of dividend growth alone on stock returns. Controlling for fundamental and macro variables, dgp remains a significant explanatory factor at an $\alpha = 0.05$ level with a p-value of 0.013 while dgy is insignificant with a p-value of 0.084. Interestingly, the coefficient for dgy is negative, a point further elaborated on in Section 5.

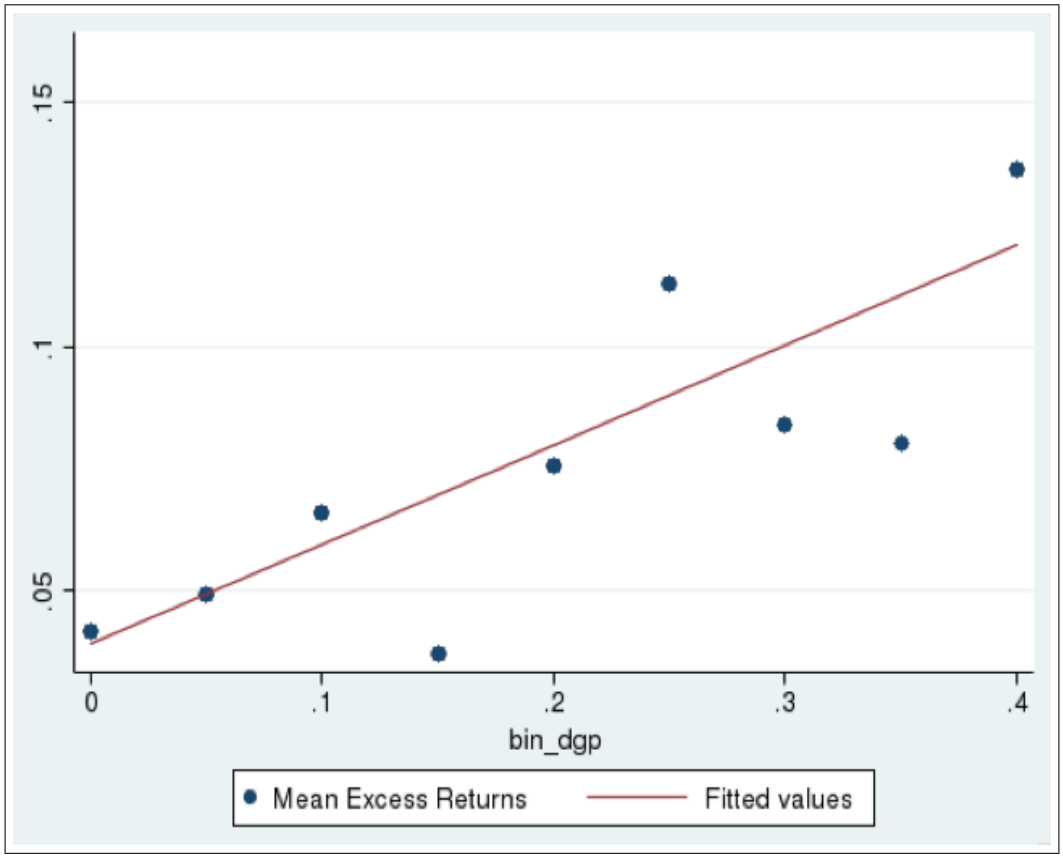

Figure IV: Correlation between annual dividend growth (DGP) and excess returns.

Table 4.2: Regressions of Dividend Growth Variables from 2005-2014

	(1) Return	(2) Return	(3) Return	(4) Return
dgp	0.111***	0.0896*		
	(3.36)	(2.48)		
rm	0.756***		0.753***	
	(25.26)		(24.86)	
dgy		-0.00195		
		(-1.73)		
sales		-0.000000205		-0.000000196
		(-0.70)		(-0.62)
d_sales		0.0870**		0.0765*
		(2.81)		(2.50)
sec_ret		0.382***		0.393***
		(7.77)		(7.95)
gdp		-0.0197		-0.0267*
		(-1.65)		(-2.02)
rprem		0.398***		0.387***
		(6.92)		(6.72)
fcf		-0.00000279		-0.00000287
		(-1.70)		(-1.69)
d_fcf		0.000311		0.000256
		(1.68)		(1.34)
roic		0.00217**		0.00238***
		(3.15)		(3.44)
l_dgp			0.0294	0.0141
			(0.82)	(0.35)
l_dgy				-0.00198
				(-1.62)
Constant	0.0680***	0.371*	0.0772***	0.485*
	(9.77)	(2.10)	(10.08)	(2.44)
Observations	2330	2320	2097	2087

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3 Dividend Growth as a Predictor

It is also useful to see the predictability of dividend growth in future returns. To do this, we regress the dividend growth parameters (dgy and dgp) for the prior year on current returns of the stock above the risk-free rate (see Equation 4.1). In other words, lagged dividend variables $dgy_{i,t-1}$ and $\text{dgp}_{i,t-1}$ serve as explanatory variables. We chose a lag of one year as dividends in the dividend contender universe tend to be grown on an annual basis.

$$\begin{aligned} Return = \beta_1(E[Rm_t] - Rf_t) + \beta_2 S_{i,t} + \beta_3(\delta S_{i,t}) + \beta_4 FCF_{i,t} + \beta_5(\delta FCF_{i,t}) \\ + \beta_6 ROI_{i,t} + \beta_7 GDP_t + \beta_8 I_{i,t} + \beta_9 DGY_{i,t-1} + \beta_{10} DGP_{i,t-1} + \alpha \end{aligned} \tag{4.1}$$

Regressions 3 and 4 of Table 4.2 show the regression outputs. Regression 3 shows that even in a one-factor model, l_dgp was insignificant in predicting returns. Subsequently, neither of the lagged dividend variables, l_dgp and l_dgy, is significant. Or in other words, dividend growth does not serve as a significant predictor for future (at least one year) earnings during this period.

4.4 Analysis Excluding Bull Market

A leading argument by funds that implement the dividend growth strategy is that companies in the dividend growth universe strongly outperform in non-bullish times. These include recessionary environments and environments of rising interest rates or expected rising interest rates (Wyatt Investment Research, 2014; Copeland Capital Management, 2013).

To analyze this claim using dividend contender data, we ran similar regressions done earlier again on years 2008-2013 (see Table 4.3), a period of expected rising

interest rates and all-time low US equity fund inflows. Figure V shows the negative domestic equity fund inflows during this period.

As seen in regression 2 of Table 4.3, which controls for all variables, dgy becomes significant in the negative direction and dgp remains significant in bearish years as it did when applied to the whole period 2005-2014. Regression 4 of Table 4.3 shows the same regression for the lagged dividend growth parameters.

We regress on only years 2009-2013 due to the lagged nature of the predictor variable. In this case, dgp as a predictor becomes a statistically significant variable with a p-value of 0.021 compared to when applied to the whole period (evidenced earlier in regression 4 of Table 4.2). Though elaborated further in Section 5, this may imply that investors flock to safer investments in bad times or rotate out of safe investments such as bonds into riskier ones in times of cautious growth and that dividend growth is a parameter considered by said investors in making such investment decisions.

Table 4.3: Regressions of Dividend Growth Variables from 2008-2013

	(1) return	(2) return	(3) return	(4) return
dgp	0.129**	0.106*		
	(2.90)	(2.37)		
rm	0.741***		0.916***	
	(23.93)		(12.73)	
dgy		-0.00247		
		(-1.85)		
sales		-0.000000318		6.17e-09
		(-0.86)		(0.01)
d_sales		0.0528		0.0911
		(1.20)		(1.42)
sec_ret		0.361***		0.517***
		(5.53)		(6.61)
gdp		-0.0144		-0.0183
		(-1.12)		(-1.16)
rprem		0.401***		0.369***
		(5.71)		(3.85)
fcf		-0.00000294		-0.00000487*
		(-1.58)		(-2.30)
d_fcf		0.000317		0.0000541
		(1.34)		(0.18)
roic		0.00211*		0.00305***
		(2.50)		(3.43)
l_dgp			0.281**	0.240*
			(3.08)	(2.30)
l_dgy				-0.00403*
				(-2.39)
Constant	0.0575***	0.299	-0.000667	0.321
	(6.94)	(1.57)	(-0.04)	(1.32)
Observations	1602	1602	1160	1160

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

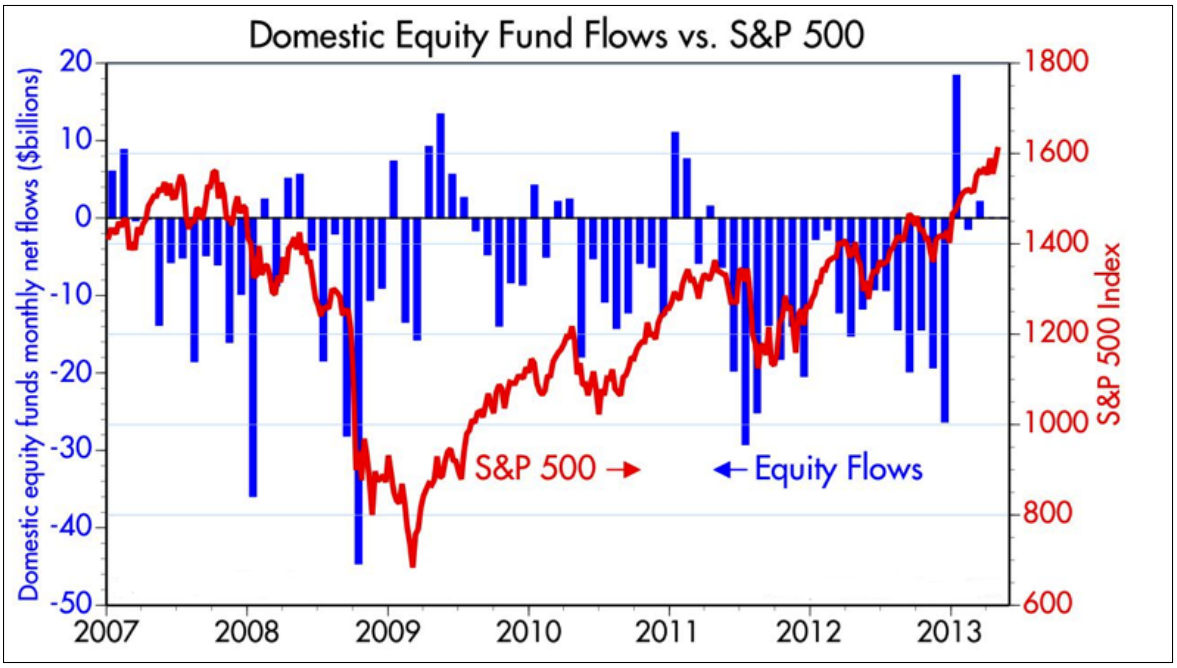

Figure V: Negative domestic equity fund inflows from 2007-2013 from Investment Company Institute (ICI, 2013).

Chapter 5

Discussion

5.1 General Statistical Significance

It is interesting, though expected, to see that in all regressions, the sector return and risk premium variables are highly significant. This implies that returns at large are strongly driven by market or sector-wide trends, which in turn may impact the company's fundamentals. Additionally, the ROIC variable is significant in all regressions and changes in sales and free cash in most.

From the results, dividend growth, as defined by annual percentage growth (dgp), is a significant factor in explaining excess returns. Furthermore, dividend growth as a predictor (i.e. last year's dividend growth's impact on this year's returns), also served as a statistically significant predictor in excess returns for bearish and rising rates environments. The implication of these findings is twofold.

(1) First, it appears that dividends do play a significant role in measuring returns. This study provides the initial framework for a new perspective with which to view the debate on the dividend irrelevance theorem: to examine the universe of dividend growers. Though the exact mechanism for which dividends and their growth (dgp) affect the returns of dividend growth stocks is not discussed in depth in this paper,

the statistically significant finding is a non-trivial result that may be worth looking deeper into for future works.

(2) Second, dividend growth is a metric that may be useful in picking market-beating stocks. One should note, however, that if utilizing a dividend growth strategy, the one must be fairly confident in the company's future dividend growth as only a universe of current dividend growers are examined in this study, i.e. there exists survivorship bias in the sampling data. In relation to the dividend irrelevance theory, dividend growth as a predictor may be revealing of future changes (improvements) to fundamental measurements, which thus affect the stock price. Thus, in less bullish periods, dividend policy may have an impact on stock prices.

5.2 Years of Dividend Growth Metric (DGY)

Though dividend growth as an annualized percentage proved to be quite significant, the cumulative number of years of dividend growth (dgy and l_dgy) did not. Somewhat surprisingly, the number of years of dividend growth appeared to have a slightly negative association with overall returns (see Figure VI).

Though intuitively it may appear that companies that have grown their dividends for a longer period of time may experience some competitive advantages and thus should enjoy higher returns, the results seem to indicate otherwise. Among other reasons, one explanation for why dgy and l_dgy were not significant may be that much of the competitive advantage implied through the number of years of dividend growth is already accounted for in the other fundamental metrics and the percentage growth of dividends variable. Furthermore, companies that have grown their dividends for a while tend to be quite established and experience less growth (see Figure VII), e.g. lower beta and steady return stocks, which may also explain the negative relationship. Finally, from an analytical standpoint, while dgy only increases year to

year, returns are highly variable which, despite controlling for many major factors, may also contribute to the insignificance of the variable.

An interesting observation is that companies may see higher excess returns in the beginning years of dividend initiation and growth. As seen in Figure VI, excess returns were quite high in the first six years of growth before declining in future years. This may imply a certain significance in the number of years which a company has grown its dividend or the activities done during this time. For example, a company may experience large growth spurts, allowing it to initiate and increase a dividend and yield substantial excess returns. This may allow the company to develop strong competitive advantages and a reputation as a dividend grower after a certain number of years. Thus the company continues to grow the dividend, even when growth decays and excess returns decline. It may be interesting to take a deeper look into this observation in future works.

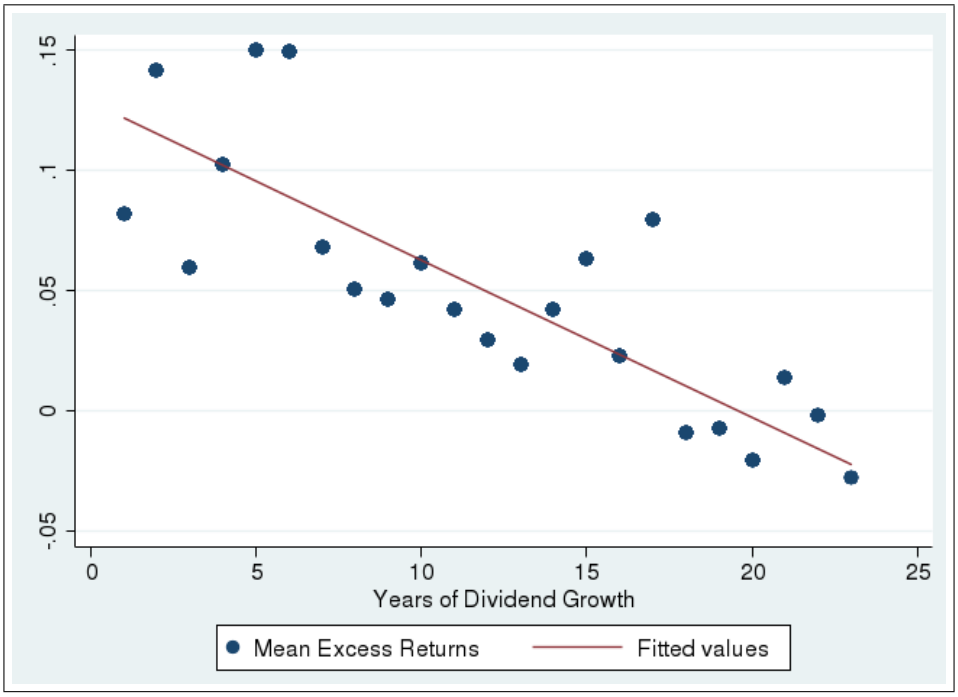

Figure VI: Negative Correlation: Years of Div Growth and Excess Returns. Companies that have grown their dividends over longer periods see less excess returns.

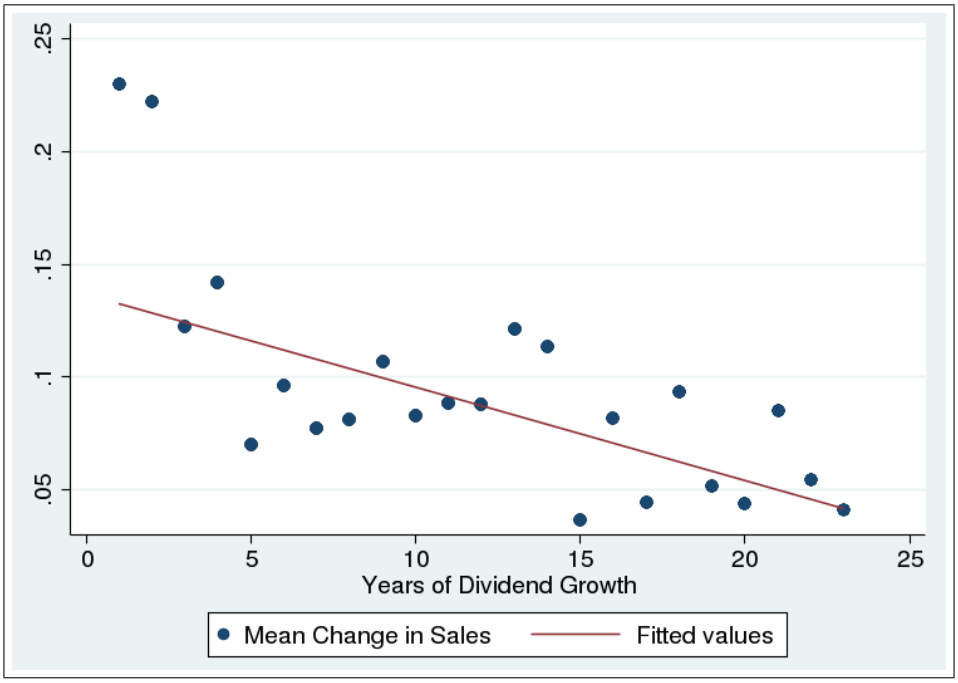

Figure VII: Negative Correlation: Sales Growth and Years of Div Growth. Companies that have grown their dividends over longer periods see less sales growth.

5.3 Dividend Growth in Bull and Bear Years

As seen in regression 4 of Table 4.3, dividend growth has some predictive power in bearish and rising rates environments with a p-value of 0.021. Though there may be many explanations for this, two reasonable possibilities are that: (1) In times of recession, investors seek to invest in firms that have a credible commitment to shareholders and that may experience future optimism. As mentioned in Section 1, a dividend growth philosophy quantitatively serves as a signal for both and allows the investor to minimize agency risk in the classic principal-agent problem. (2) In times of rising or expected to rise interest rates, macroeconomic conditions tend to be improving. However, given the uncertainty in the stock market associated with increased rates, investors flock to investment options such as dividend growth stocks that provide a greater safety net but are also exposed to the macro growth environment.

Copeland Capital echoes this line of thought and investigated this claim further in an April 2013 White Paper. Copeland claims that from June 2003 through June 2007, the federal funds rate jumped from 1.00% to 5.25%, and during this time, dividend growers outperformed high yielders by 320 basis points annualized. Copeland generalizes this example over three periods of rising rates; "... looking at more than 40 years worth of data for both long-term and short-term rates there were three major episodes of rising interest rates (from 1972 to 1982, 1994 to 1995, and 2003 to 2007), as well as several shorter term spikes ... over this longer frame of reference, we find that Dividend Growers, up 4.8% annualized, are the best-performing segment of the market" (see Figure VIII).

This explanation may also account for why l_dgp was not found to be significant when regressed across all years. Namely, in boom years, dividend growth stocks tend not to significantly outperform, as shown in Figure III, as investors develop a stronger risk appetite and look past the dividend growth universe. Thus the dividend growth

factor and the general business it connotes do not significantly account for excess returns.

This finding may not only have practical importance in the short-term from an investment strategy standpoint, especially given the Fed's projections (Federal Reserve, Mar 2015) and public anticipation of rising interest rates, but also academic in the context of the efficient market hypothesis.

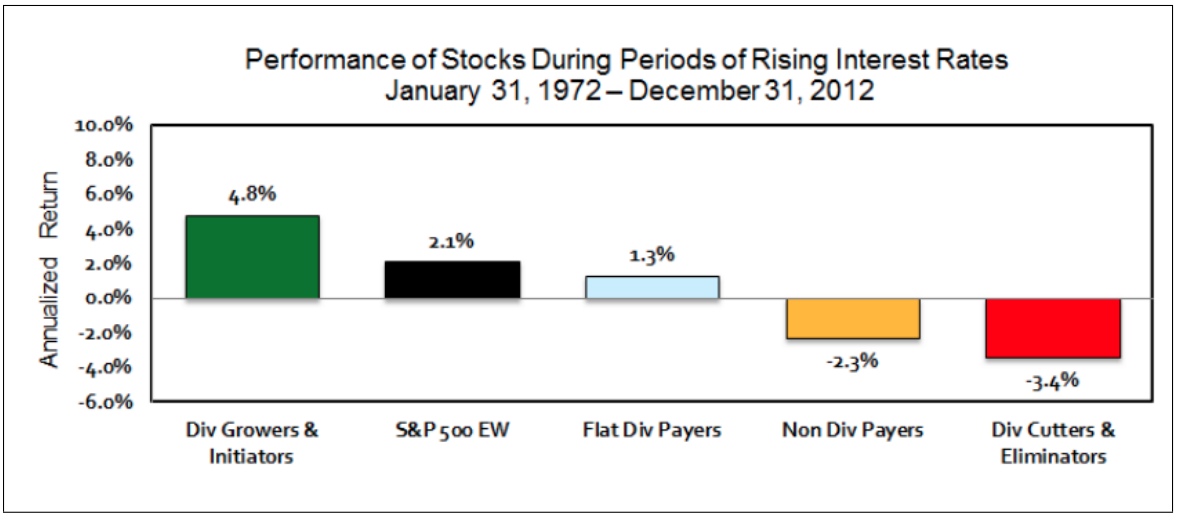

Figure VIII: Graph depicting the outperformance of dividend growth during times of rising federal funds rates. Reproduced with permission (Copeland Capital, 2013).

5.4 Efficient Market Hypothesis

The efficient market hypothesis is an investment theory that states it is impossible to generate long-term returns beyond that of the market because efficiency leads existing share prices to incorporate and reflect all relevant information (Fama, 1970). The semi-strong form hypothesis stipulates that stocks trade at their fair value given publicly available data, making it impossible for investors to either buy undervalued stocks or sell stocks for inflated prices using fundamental research. Thus, assuming a confident prediction of continued dividend growth, the rate at which a company grows its dividend may present some predictive power of market-beating returns depending on the macro environment. This strategy, if invoked by fund managers, has some traction in arguing against the semi-strong form of the efficient market hypothesis.

Chapter 6

Conclusions

We have compiled a comprehensive and accurate dividend contender (companies with 10+ years of dividend growth) data set which includes fundamental and macro data for the current dividend contender universe and has corrected for special dividends and stock splits. The data supported existing empirical and academic research on dividend growth returns. Furthermore, we found annualized dividend percentage growth to be significant both as a non-lagged variable for all years and as a predictor of future returns in non-bullish (as defined by fund inflows) years. In general, dividend growth in years has a slightly negative and insignificant relationship with returns. The statistical significance of dividend growth in explaining returns is a contribution to the dividend irrelevance theorem and the efficient market hypothesis debates. While these topics are not explored in depth in this paper, dividend growth as a predictor may be revealing of future improvements to fundamental measurements, which thus affect the stock price. Finally, future work may include doing similar analysis using a data set, albeit difficult to obtain, that includes dividend cutters to eliminate survivorship bias.

References

Al-Malkawi, Husam-Aldin N., Michael Rafferty, and Rekha Pillai (2010). Dividend Policy: A Review of Theories and Empirical Evidence, International Bulletin Business Administration 9, 171-200.

Asquith, Paul, and David W. Mullins, Jr. (1983). The Impact of Initiating Dividend Payments on Shareholders' Wealth, Journal of Business 56, 77-96.

Baker, H. Kent, and Gary E. Powell (1999). How Corporate Managers View Dividend Policy, Quarterly Journal of Business and Economics 38, 17-35.

Ball, Ray, Philip Brown, Frank J. Finn, and R. R. Officer (1979). Dividend and the Value of the Firm: Evidence from the Australian Equity Market, Australian Journal of Management 4, 13-26.

Black, Fischer, and Myron S. Scholes (1974). The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns, Journal of Financial Economics 1, 1-22.

Blume, Marshall E. (1980). Stock Returns and Dividend Yields: Some More Evidence, Review of Economics and Statistics 62, 567-577.

Bradford, David (1979). The Incidence and Allocation Effect of a Tax on Corporate Distributions, NBER Working Paper No. 349.

Brennan, Michael J. (1970). Taxes, Market Valuation and Corporate Financial Policy, National Tax Journal 23, 417-427

Campbell, John Y. and Robert Shiller (1988). The dividend-price ratio and expectations of future dividends and discount factors, Review of Financial Studies 1, 195228.

Copeland Capital (2012). Copeland White Paper I: The Surprising Impact of Draconian Tax Policy on Dividends. CCM White Paper. Obtained from: http://www.copelandcapital.com/pdf/Copeland_White_Paper_I_Dividends_and_Tax_Rates.pdf

Copeland Capital (2013). The Copeland Review: 2nd Quarter 2013. CCM White Paper. Obtained from: http://www.copelandcapital.com/pdf/Copeland_Review_2Q13.pdf

Copeland Capital (2014). The Copeland Review: 1st Quarter 2014. CCM White Paper. Obtained from: http://www.copelandcapital.com/pdf/Copeland_Review_1Q14.pdf

Copeland Capital (2014). The Copeland Review: 2nd Quarter 2014. CCM White Paper. Obtained from: http://www.copelandcapital.com/pdf/Copeland_Review_2Q14.pdf

DeAngelo, Harry, Linda DeAngelo, and Douglas J. Skinner (1996). Reversal of Fortune: Dividend Signaling and the Disappearance of Sustained Earnings Growth, Journal of Financial Economics 40, 341-371.

Ervin, Eric (2014). Elusive Prey: Isolating Corporate Fundamentals From Price. Reality Shares White Paper. Obtained from: http://www.realityshares.com/whitepapers

Fama, Eugene (1970). Efficient Capital Markets: A Review of Theory and Empirical Work, The Journal of Finance, 25(2), 383-417.

Fama, Eugene and Ken French (2004). The CAPM: Theory and Evidence, Journal of Economic Perspectives, 18(3), 25-46.

Federal Reserve (2015). Economic Projections of Federal Reserve Board Members and Bank Presidents, March 2015. Obtained from: http://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20150318.pdf

Fish, Dave (2014). The DRiP Investing Resource Center: Your Location For Dividend Reinvesting Information. Retrieved December 4, 2014, Obtained from: http://www.dripinvesting.org/tools/tools.asp

Goyal, A. and I. Welch (2004). A Comprehensive Look at the Empirical Performance of Equity Premium Prediction, Yale ICF Working Paper No. 04-11.

Ghosh, A., Constantinides, G.M. (2011). The Predictability of Returns with Regime Shifts in Consumption and Dividend Growth. Unpublished working paper, University of Chicago.

Greenblatt, Joel (2006). The Little Book That Beats the Market. Hoboken, NJ: John Wiley & Sons. ISBN 0-471-73306-7.

Graham, Benjamin (1959). The Intelligent Investor, A Book of Practical Counsel, 3rd ed. New York: Harper & Brothers Publishers.

Gordon, M (1962). The Investment, Financing, and Valuation of the Corporation. Irwin, Homewood, IL.

Gordon, Myron J. (1959). Dividends, Earnings, and Stock Prices, Review of Economics and Statistics 41, 99-105.

Hou, Kewei, Chen Xue, and Lu Zhang (2014). Digesting Anomalies: An Investment Approach. Ohio State University. Working Paper. Obtained from: http://www.rfs.oxfordjournals.org/content/early/2014/10/28/rfs.hhu068.full

Investment Company Institute. (2013). Domestic Equity Fund Flows. Obtained from: http://www.ici.org/research/stats/flows

Kalay, Avner, and Roni Michaely (2000). Dividends and Taxes: A Reexamination, Financial Management 29, 55-75.

Kapadia, Reshma (2014). In Dividend Funds, Growth Can Trump Yield. Barrons. Obtained from: http://online.barrons.com/articles/SB50001424052748704287804579036870989098380

Keim, Donald B. (1985). Dividend Yields and Stock Returns: Implications of Abnormal January Returns, Journal of Financial Economics 14, 473-489.

Klarman, Seth (1991). Margin of Safety: Risk-Averse Value Investing Strategies for the Thoughtful Investor, Harper Collins, New York.

Lewellen, Wilbur G., Kenneth L. Stanley, Ronald C. Lease, and Gary G. Schlarbaum (1978). Some Direct Evidence on the Dividend Clientele Phenomenon, Journal of Finance 33, 1385-1399.

Litzenberger, Robert H., and Krishna Ramaswamy (1979). The Effect of Personal Taxes and Dividends on Capital Asset Prices, Journal of Financial Economics 7, 163-195.

Long, J. B. (1978). The market valuation of cash dividends: A case to consider. Journal of Financial Economics, 6, 235-264.

Mauzy, Stephen (2014). How Will Interest Rates Impact Dividend Stocks? Wyatt Investment Research. Obtained from: http://www.wyattresearch.com/article/rising-interest-rates-impact-dividend-stocks/

Miller, Merton H., and Franco Modigliani (1961). Dividend Policy, Growth, and the Valuation of Shares, Journal of Business 34, 411-433.

Miller, Merton H., and Myron S. Scholes (1978). Dividends and Taxes, Journal of Financial Economics 6, 333-264.

Miller, Merton H., and Myron S. Scholes (1982). Dividend and Taxes: Some Empirical Evidence, Journal of Political Economy 90, 1118-1141.

NASDAQ US Dividend Achievers Select Index (DVG) (2014). Retrieved December 4, 2014, from https://www.indexes.nasdaqomx.com/Index/Overview/DVG

Ned Davis Research (2012). Select research provided to Oppenheimer Funds. Boston, MA. Obtained from: https://www.oppenheimerfunds.com/investors/doc/Rising_Dividends_Fund_Brochure.pdf ?dig_asset_metrics=done

Ned Davis Research (2013). Select research provided to Copeland Capital. Boston, MA. Obtained from: http://www.copelandcapital.com/whydivgrowth-longtermoutperformance.htm

Poterba, James M., and Lawrence H. Summers (1984). New Evidence That Taxes Affect the Valuation of Dividends, Journal of Finance 39, 1397-1415.

Richardson, Gordon, Stephan E. Sefcik, and Rex Thompson (1986). A Test of Dividend Irrelevance Using Volume Reactions to a Change in Dividend Policy, Journal of Financial Economics 17, 313-333.

S&P 500 Dividend Aristocrats (2014). Retrieved December 4, 2014, from http://us.spindices.com/indices/strategy/sp-500-dividend-aristocrats