From Saving to Investing: An Examination of Risk in Companies with Direct Stock Purchase Plans that Pay Dividends

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Abstract

Low interest rates force savers to become investors if they want higher returns. Whereas average savings rates paid by commercial banks in the United States have averaged near zero, dividend rates paid on stock can approach five percent annually. Direct stock purchase plans offer an inexpensive way for savers to become investors and earn higher returns from dividends. This study examined the extent to which savers would have to except higher risk for higher dividends. Using three different measures of risk, this study finds evidence to suggest that investors do not have to accept higher risk to earn higher dividends.

Introduction

Savers wanting to build wealth have little choice but to become investors. While prudent investors are likely to build wealth, savers are likely to watch as inflation shrinks their wealth. For example, with national average savings rates, including those for time deposits, at a small fraction of recent rates of inflation, bank deposits cannot do much for people building wealth but serve as a leaky holding tank that erodes purchasing power through inflation cracks. On the other hand, many stocks available for direct purchase can be acquired for little or no fees and commissions, and pay dividends with yields well in excess of rates paid on savings. In addition, many dividend yields exceed recent rates of inflation, and many of these same companies have a long history both paying dividends and raising them as each year passes. However, unlike savings accounts whose redemption values do not fluctuate, stock prices do fluctuate, and

therefore may add a substantial element of risk to those seeking higher returns in the form of dividends.

This study examines dividend yields in companies with direct stock purchase plans by searching for relationships between dividend yield and risk. Risk is measured in three different ways. The first way risk is measured is by a beta coefficient giving an indication of the volatility of stock returns in relation to a broad market index. The second way is a measure of the volatility in earnings and dividends. The third way risk is measured is by the overall volatility of stock prices. In addition, a discussion of sale commissions and fees will also be introduced as a cost of liquefying direct stock purchase plan purchases. These three measures of risk are used to explain dividend yields using both parametric and nonparametric methods. Parametric methods include correlation and regression analysis. The nonparametric method used is the Kruskal-Wallis test of medians.

The results contain no evidence that higher dividend yields are associated with higher beta coefficients, higher volatility in earnings and dividends, or higher volatility of stock prices. However, the results contain substantial evidence that higher dividend yields are associated with lower betas. These results are potentially good news for savers who would like higher returns on their savings but are concerned about risk.

The paper proceeds with a review of the literature, descriptions of the methodology and data, a presentation of the results, and ends with some concluding remarks.

Literature

Direct stock purchase plans have been previously studied by academic researchers. Baker, Khan, and Mukherjee (2002) look into why companies offer such plans. DeGennaro (2003) compares characteristics of firms using plans to those firms not using the plans. Jain (2006) looks for price spikes on the trading days of companies with direct stock purchase plans whose plans call for trades once or twice per month. Newman and Johnson (2012) examine price spikes and troughs in companies with plans calling for trades every week on a particular day. However, no study has been found that examines dividend yield and the investment risk of the stock.

Research supports the use of size, beta, credit rating, and volatility in earnings and dividends as measures of investment risk. Ozenbas and Portes (2011) find that size measured by market capitalization is a risk factor by providing evidence that smaller firms have more volatile streams of earnings and sales. Ciftci and Cready (2011) also find that size measured by market capitalization is a risk factor by finding evidence that the positive association between the volatility of future earnings and research and development expense decrease with the size of the company. Fama and French (1995) say that with rational pricing, size as measured by market capitalization, must proxy for sensitivity to common risk factors in returns. Downs and Ingram (2000) use size measured by market capitalization and beta as measures of risk in a study relating risk to return and find that in certain subsamples, both size and beta are significant measures of risk. Hand, Holthausen, and Leftwich (1992) find that equity values fall when credit ratings fall. Ederington and Goh (1998) find that credit rating downgrades are associated with negative equity returns and also find that analysts revise earnings forecasts downward after a downgrade. They further find that this results from the downgrade rather than other information. Howatt, Zuber, Gandar, and Lamb (2009) study the risk of the firm's earnings variability through their dividend policy and provide evidence that an increase in dividends is associated with increases in earnings per share, and that a significant increase in earnings per share variance, considered to be a measure of risk, exists after all dividend changes except for dividend omissions. Jiang and Lee

(2009) find a positive risk-return relation by measuring expected returns and conditional variance using firm earnings and dividends.

Methodology

The methodology attempts to identify relationships between direct stock purchase plan dividend yields and company investment risk. Dividend yield is the most recent quarterly cash dividend divided by the most recent price of the company's stock converted to an annual basis. Risk measures identified in the literature section for large, publicly traded companies include the volatility of the stock price relative to other stocks, the stability of company earnings and dividends, and the overall volatility of stock price in a recent year. The relationships examined are shown in the following general and theoretical functional relationship:

$$\text{Yield} = f(\text{Risk})$$

This relationship is assumed to be linear. The examination of this relationship is done with both parametric and nonparametric statistical techniques. The parametric statistical techniques used in this study are correlation, analysis of variance, and linear regression. These parametric techniques are reliable if the variable distributions are close to normal and have nearly equal variances. The nonparametric technique compares two populations and is employed as a test for the robustness of the parametric results because with the nonparametric technique normal variable distributions are not necessary and results are less sensitive to unequal variances.

The correlation technique produces Pearson Correlation coefficients that measure the strength and direction of the linear relationships between two numerical variables. The analysis produces Pearson Correlation coefficients between dividend yield and numerical risk measures, and also between numerical risk measures. The null hypothesis is that no Pearson Correlation coefficient is significantly different from zero, and the alternative hypothesis is that at least one coefficient is significantly different from zero. Thus the null and alternative hypotheses to test the correlations are:

H_0 = All correlation coefficients are zero
H_A = All correlation coefficients are not zero.

The analysis of variance technique compares means to look for differences in the mean dividend yield for the categorical risk measures. Categorical risk measures are present in the stability of company earnings and dividends variable, and the overall volatility of stock price variable. Therefore the analysis of variance technique will look for differences in mean dividend yields between stability of company earnings and dividends categories, and also between overall volatility of stock price categories. The null and alternative hypotheses to test for dividend yield mean differences within the categories of each risk variable are:

H_0 = All means are zero
H_A = All means are not zero.

A Levene's test for equal variances will be performed within the analysis of variance technique.

Linear regression technique uses ordinary least squares regression to explore the relationship between dividend yields and each numerical risk measure separately. Each risk measure is put in separately to avoid having more than one variable in the regression measuring the same thing. Therefore the regression technique will look for the relationship between dividend yield and numerical risk measure through the use of an estimated regression coefficient on the risk variable. The general model is:

$$Yield_{ij} = \beta_0 + \beta_1 Risk_i + \epsilon_i$$

Where $Yield_{ij}$ represents a j^{th} stock dividend yield, and $Risk_i$, is a numerical measure of the risk for each i^{th} company. Risk variables will be the volatility of the stock price relative to other stocks, and the stability of company earnings and dividends categorical variable coded as a numerical variable. Each i^{th} company has a stochastic error term, ϵ_i. Thus the null and alternative hypotheses to test the linear regression coefficients of the numerical risk measure variables are:

$$H_0 = \beta_1 \text{ is zero}$$
$$H_A = \beta_1 \text{ is not zero.}$$

The regression coefficient, β_1, shows the relationship between the risk measure and the dividend yield. Although intercept terms, β_0, are part of the analysis, their interpretation may be irrelevant because in order to interpret an intercept, it is necessary to envision a situation in which a company with no risk would be able to pay a dividend. In theory, a company with no risk that pays dividends does not exist. A Cook's test for outliers will be performed within the ordinary least squares regression technique.

The comparison between two populations uses the Kruskal-Wallis test. This nonparametric test compares the dividend yield medians between the categories within the stability of company earnings and dividends risk variable, and the overall volatility of stock price risk variable. Therefore the Kruskal-Wallis test looks for differences in dividend yield medians between the stability of company earnings and dividends variable categories, and also between overall volatility of stock price variable categories. The null and alternative hypotheses to test for dividend yield median differences within the categories of each risk variable are:

$$H_0 = \text{All medians are zero}$$
$$H_A = \text{All medians are not zero.}$$

The next section provides the sources of the data, describes the variables, and gives more precise variable definitions.

Data

The companies selected are from all direct stock purchase plans administered by Shareowner Services, a division of Wells Fargo Bank, N.A. Shareowner Services had 75 plans as of September 2013, although 15 were eliminated from this study because they either did not pay dividends (7), did not have a stock report (2), or had incomplete information in their stock report (6). Dividend yields and risk measures for the sixty remaining companies are from stock reports found in Standard and Poor's Net Advantage. Dividend yield is labeled YIELD and is the

annual rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports on an annual basis. Risk measures are labeled BETA, QUALITY, and VOLATILITY. BETA is the stock beta computed by Standard & Poor's Compustat Services using 60 month-end prices for calculations that include sharp stock price changes and dividends, and use the Standard & Poor's 500 stock price index as a proxy for the market. QUALITY is a categorical measure of stability in earnings and dividends calculated by proprietary arithmetic models owned by Standard & Poor's that assign letter rankings for stocks in this study of A+ to the lowest risk stocks through B- to the highest risk stocks. QUALITY# is the QUALITY variable that has been coded for a numerical analysis as follows: A+ = 1; A = 2; A- = 3; B+ = 4; B = 5; and B- = 6. VOLATILITY is a risk measure that rates the volatility of the stock's price over the past year using a proprietary arithmetic model and reported in stock reports from Standard & Poor's Net Advantage, and can be either low or average for stocks in this study.

Descriptive statistics on all numerical variables are shown in Table 1. All three variables appear to have nearly normal distributions. Standard deviations are a fraction of the means. Medians are close to the means. Minimum and maximums do not reflect extreme outliers. Finally, Skewness and Kurtosis statistics do not suggest extreme deviations from normal distributions. However, as a precautionary measure the Cook's test was performed to identify any potential outlier problems in the regressions and are reported in the section subtitled Results.

Table 1: Descriptive Statistics

	Mean	Standard Deviation	Median	Minumum	Maximum	Skewness	Kurtosis
YIELD	3.03	1.24	2.92	0.67	5.47	0.07	-0.75
BETA	1.06	0.62	0.98	0.17	2.91	1.07	0.94
QUALITY#	3.87	1.35	4.00	1.00	6.00	-0.48	-0.55

Data are from stock reports found in Standard and Poor's Net Advantage for stocks with direct stock purchase plans administered by Shareowner Services, a division of Wells Fargo Bank, N.A. Shareowner Services had 75 plans as of September 2013, although 15 were eliminated from this study because they either did not pay dividends (7), did not have a stock report (2), or had incomplete information in their stock report (6). YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports. BETA is the stock beta computed by Standard & Poor's Compustat Services using 60 month-end prices for calculations that include sharp stock price changes and dividends, and use the Standard & Poor's 500 stock price index as a proxy for the market. QUALITY# is a measure of stability in earnings and dividends calculated by proprietary arithmetic models owned by Standard & Poor's that assign letter rankings for stocks in this study of A+ to the lowest risk stocks through B- to the highest risk stocks, and have been coded for the numerical analysis as follows: A+ = 1; A = 2; A- = 3; B+ = 4; B = 5; and B- = 6.

Results

The results are from obtaining Pearson coefficients of correlation, the analysis of variance technique, Kruskal-Wallis tests, and ordinary least squares regressions. Each set of results is shown in a table and discussed.

Pearson coefficients of correlation appear in Table 2 for the two numerical variables. The cash dividend yield, YIELD, and the beta, BETA, are the only significant correlations. The cash

dividend yield is higher when beta is lower, although with a correlation of only -0.46, the relationship is general, and maybe not always apparent.

Table 2: Pearson Correlations

	YIELD	BETA
BETA	-0.46 (0.00)	
QUALITY#	0.02 (0.85)	0.21 (0.11)

YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports. BETA is the stock beta computed by Standard & Poor's Compustat Services using 60 month-end prices for calculations that include sharp stock price changes and dividends, and use the Standard & Poor's 500 stock price index as a proxy for the market. QUALITY# is a measure of stability in earnings and dividends calculated by proprietary arithmetic models owned by Standard & Poor's that assign letter rankings for stocks in this study of A+ to the lowest risk stocks through B- to the highest risk stocks, and have been coded for the numerical analysis as follows: A+ = 1; A = 2; A- = 3; B+ = 4; B = 5; and B- = 6.

The results of the analysis of variance technique examining the cash dividend yield mean across the subcategories of the stability in earnings and dividends variable, QUALITY, appears in Table 3a. The F-test fails to reject the equality of the means across all the QUALITY levels, A+ through B-. In addition, Levene's Test fails to reject the equality of variances across all QUALITY levels.

Table 3a: Analysis of Variance using the QUALITY factor

QUALITY level	Number	YIELD Mean	Standard Deviation
A+	3	2.49	0.54
A	10	3.15	1.44
A-	5	2.77	0.85
B+	21	3.21	1.16
B	16	2.84	1.26
B-	5	3.19	1.92
F-Test = 0.33 with 0.891 p-value			
Levene's Test = 1.26 with 0.30 p-value			

QUALITY is a measure of stability in earnings and dividends calculated by proprietary arithmetic models and found in Standard & Poor's Net Advantage stock reports that assign letter rankings for stocks in this study of A+ to the lowest risk stocks through B- to the highest risk stocks. YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports.

The results of the analysis of variance technique examining the cash dividend yield mean across the subcategories of the volatility in stock price variable, VOLATILITY, appears in Table 3b. Again, the F-test fails to reject the equality of the means across the two VOLATILITY

levels, average and low. In addition, Levene's Test fails to reject the equality of variances across the two VOLATILITY levels.

Table 3b: Analysis of Variance using the VOLATILITY factor

VOLATILITY level	Number	YIELD Mean	Standard Deviation
Average	29	2.91	1.40
Low	31	3.13	1.08
F-Test = 0.48 with 0.49 p-value			
Levene's Test = 1.83 with 0.18 p-value			

VOLATILITY is a risk measure that rates the volatility of the stock's price over the past year using a proprietary arithmetic model and reported in stock reports from Standard & Poor's Net Advantage, and can be either low or average for stocks in this study. YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports.

The results of the Kruskal-Wallis nonparametric test examining the cash dividend yield median across the subcategories of the stability in earnings and dividends variable, QUALITY, appears in Table 4a. The Kruskal-Wallis test statistic fails to reject the equality of the medians across all the QUALITY levels, A+ through B-. Table 4a provides evidence that median dividend yields are not different by risk level using Standard & Poor's ranking for stability in earnings and dividends as a measure for risk.

Table 4a: Kruskal-Wallis Test using the QUALITY factor

QUALITY level	Number	YIELD Median	Average Rank	Z
A+	3	2.45	22.3	-0.83
A	10	3.41	32.0	0.31
A-	5	2.80	26.8	-0.49
B+	21	2.90	32.6	0.69
B	16	3.02	28.8	-0.46
B-	5	3.89	32.6	0.28
Kruskal-Wallis Test = 1.5 with 0.91 p-value				

QUALITY is a measure of stability in earnings and dividends calculated by proprietary arithmetic models and found in Standard & Poor's Net Advantage stock reports that assign letter rankings for stocks in this study of A+ to the lowest risk stocks through B- to the highest risk stocks. YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports. Average rank is the average rank of the YIELD variable within each QUALITY level using a ranking of from lowest to highest for all 60 observations. Z is the difference in each QUALITY level rank compared to the mean rank for all observations.

The results of the Kruskal-Wallis nonparametric test examining the cash dividend yield median across the subcategories of the subcategories of the volatility in stock price variable, VOLATILITY, appears in Table 4b. Again, the Kruskal-Wallis test statistic fails to reject the equality of the medians across the two VOLATILITY levels, average and low.

Table 4b: Kruskal-Wallis Test using the VOLATILITY factor

VOLATILITY level	Number	YIELD Median	Average Rank	Z
Average	29	2.73	28.8	-0.72
Low	31	3.10	32.1	+0.72
Kruskal-Wallis Test = 0.53 with 0.47 p-value				

YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's stock report. Average rank is the average rank of the YIELD variable within each VOLATILITY level using a ranking of from lowest to highest for all 60 observations. Z is the difference in each VOLATILITY level rank compared to the mean rank for all observations. VOLATILITY is a risk measure that rates the volatility of the stock's price over the past year using a proprietary arithmetic model and reported in stock reports from Standard & Poor's Net Advantage, and can be either low or average for stocks in this study.

The result of the ordinary least squares regression to explain the cash dividend yield, YIELD, using stock betas, BETA, appears in Table 5a. Stock betas are negatively related to cash dividend yields. However, only about 21 percent of the variation in cash dividend yields is explained with the stock betas. In addition, the highest Cook value computed does not exceed 0.80, so outliers are unlikely to be causing a distortion in the coefficient on BETA.

Table 5a: Regression output explaining YIELD with BETA

YIELD = 3.98 – 0.91 BETA (0.00)
R-squared 20.7%
N = 60
Highest Cook = 0.54

YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports. BETA is the stock beta computed by Standard & Poor's Compustat Services using 60 month-end prices for calculations that include sharp stock price changes and dividends, and use the Standard & Poor's 500 stock price index as a proxy for the market.

The result of the ordinary least squares regression to explain the cash dividend yield, YIELD, using the stability of earnings and dividends categorical variable converted to a numerical variable, QUALITY#, appears in Table 5b. The stability of earnings and dividend categories are negatively related to cash dividend yields, but not in a significant way. In addition, the highest Cook value computed does not exceed 0.80, so outliers are unlikely to be causing a distortion in the coefficient on QUALITY#.

Table 5b: Regression output explaining YIELD with QUALITY#

YIELD = 2.94 – 0.22 QUALITY# (0.85)
R-squared 0.1%
N = 60
Highest Cook = 0.11

YIELD is the rate of return expressed as a percentage that is paid on a stock in the form of cash dividends found in Standard & Poor's Net Advantage stock reports. QUALITY# is a measure of stability in earnings and dividends calculated by proprietary arithmetic models owned by Standard & Poor's that assign letter rankings for stocks in this study of A+ to the lowest risk stocks through B- to the highest risk stocks, and have been coded for the numerical analysis as follows: A+ = 1; A = 2; A- = 3; B+ = 4; B = 5; and B- = 6.

The next and final section of the paper provides some conclusions that may be drawn from the results.

Conclusion

Although the jump from saving to investing does entail considerably more risk, this study provides evidence that once savers start investing, more risk is not necessary to obtain a higher return in the form of a cash dividend yield. Using three measures of risk, no evidence was found that more risk must be accepted to obtain a higher cash dividend yield. The risk measures of beta, stability in earnings and dividends, and the volatility in stock price, were each compared to cash dividend yields using several parametric techniques, and a nonparametric technique. The only relationship found was rather surprising. Higher betas were found to be significantly related to lower cash dividend yields.

The negative relationship between betas and cash dividend yields actually provides some evidence that higher returns can be obtained by assuming lower risk. This conclusion should be viewed with caution. Betas only explain about a fifth of the variation in cash dividend yield, which leaves much variation yet to be explained, and provides avenues for further research. In addition, other risk measures, providing more precise measures of risk using continuous variables such as the standard deviation of stock returns, could provide better insight than the categorical variable measuring volatility in this study, which had only two categories, average and low.

Nonetheless, savers have some good news. If they are willing to make the jump to stock investing, more risk is not necessarily required to obtain a higher stock dividend yield. The appendix provides five examples of stocks from this study that can be purchased with low fees through direct stock purchase plans, have yields from three to over five percent, have very stable earnings and dividends, and whose stock price volatility are very low. Given that yields are much higher than the near zero returns on savings accounts, savers may want to consider becoming stock investors to obtain higher returns with minimal risk.

Appendix

Sample of stocks available through direct purchase plans with high yields, low betas, stable earnings and dividends, and low stock price volatility.

Company	Yield	Beta	Stability	Volatility
Entergy Corporation	5.2	0.5	A	Low
AGL Resources Inc.	4.1	0.5	A	Low
Piedmont Natural Gas Company, Inc.	3.8	0.3	A	Low
General Mills, Inc.	3.1	0.2	A	Low
Kellogg Company	3.0	0.5	A+	Low

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