

Effects of Financial Variables and Market Risk on Investment Returns

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Abstract

Previous studies have shown a positive correlation between the cross-section of average stock returns and financial variables. Some studies have documented that market risk does not seem to help explain the cross-section of average stock returns. Using data from Compustat, this study examines the relationship between stock returns and stock prices with financial variables considered relevant in predicting stock returns and market risk. The empirical results show that book value per share, free-cash flow, return on equity, dividends, and cash flow per share have a weak or no effect on stock returns and stock prices. Earnings from operations and its stability over time are the two more relevant factors affecting stock returns and prices.

I. Introduction

Miller and Modigliani (1961) argued that a firm's value is determined only by its basic earning power and its business risk. The firm's value depends on the income produced by its assets, not on how this income is split between dividends and retained earnings. Alternatively, Gordon (1963) and Lintner (1962) argued that a firm's value maximizes by setting a high dividend payout ratio (Bird-in-the-Hand Theory). When dividends are increased or initiated, prices tend to go up, and when dividends are cut or omitted, prices fall. Studies by Stattman (1980), Rosenberg, Reid, and Lanstein (1985) find that average returns on U.S. stocks are positively related to the ratio of the firm's book value to market value of common equity. In their study, Chan, Louis, Hamao, and Lakonishok (1991) showed that book-to-market value of equity also has a strong role in explaining the cross-section of average returns on the Japanese stock prices. Fama and French (1992) showed that market risk does not seem to help explain the cross-section of average stock returns. They conclude that whatever the underlying economic causes, two easily measureable variables (size and book-to-market equity) provided a simple and powerful characterization of the cross-section of average stock returns during the 1963-1990 period. In a later research, Pontia and Schall (1998) examined the ability of an aggregate book-to-market ratio to forecast market returns. They showed that an aggregate measure of the book-to-market ratio forecasts future market returns and the excess returns of small stocks over big stocks. In general, the Dow Jones Industrial Average (DJIA) book-to-market ratio is a stronger predictor of market returns than are previously examined variables such as interest rate spreads and dividend yields. Using data from the Japanese stock market, Garza-Gómez (2001) showed that the relationship between book value to market value of equity and risk was weak and found that two factors contributed to this result. First, market value correlated not only with risk but it also correlated with variables measuring liquidity and past performances. Second, book value of equity has a strong correlation with financial risk. Rahgozar (2008) showed that dividend and book value were relevant variables in predicting share values of Dow Jones Industrial Average firms (DJIA). Leong, Pagani, and Zaima (2009) found firms with the low price-to-earnings ratio (value stocks) and high price-to-earnings ratio (growth stocks) exhibit the highest returns. They showed that the book-to-market portfolio performances are not statistically different among various portfolios.

Using data from Compustat, this study examines the relationship between total stock returns as defined in Compustat and stock prices with several financial variables considered relevant in predicting total stock returns and prices. Total stock returns is defined as annualized rates of return reflecting price appreciation and reinvestment of monthly dividends and the compounding effect of dividends paid on reinvested dividends. Of course, for companies paying no dividends total investment returns are comprised only of stock price appreciations.

The remainder of this paper includes the following sections. Section II describes the data and methodology. Section III reports the empirical results. Conclusions and implications of the study appear in Section IV.

II. Data and Methodology

Data considered in this study is obtained from the Standard & Poor's Compustat. The sample includes all firms included in the S&P 500 Index. For statistical analysis, I have generated cross-sectional data for all variables appearing below by averaging data for each company and variables over the period 1992.1-2010.1. The average returns and financial variables considered under this study are all from the same periods. The mean and variance analysis employed test the stability of the total stock returns over time. In addition, correlation and regression analysis employed examine whether dividend is an important factor in estimating total investment returns. Furthermore, I have employed correlations and regressions analysis to test relationships between stock prices and financial variables considered relevant in predicting stock prices. The list of variables considered in this paper with their definitions appears below.

Variable definitions:

- 1YR = 1-Year Total Return (The Total Return concepts are annualized rates of return reflecting price appreciation plus reinvestment of monthly dividends and the compounding effect of dividends paid on reinvested dividends.)
- 3YR = 3-Year Total Return
- 5YR = 5-Year Total Return
- BVPS = Book Value Per Share
- CFPS = Cash Flow Per Share
- FCF = Free Cash Flow Per Share
- EPSO = Earnings Per Share From Operations
- EPS = Earnings Per Share Current 12- Month
- DPOT = Dividend Payout
- ESTA = Earnings Stability (Is based on Graham Dodd's definition, the sum of positive earnings for the last five years is assigned number 5, sum of the positive earnings for last four years assigned 4, ..., and for one year is assigned number one.)
- PE = Price to Earnings Ratio
- ROE = Return on Equity
- B = B, Beta Measure Market Risk
- P = Stock Price

III. Empirical Results

Table 1 contains means, standard deviations and coefficients of variation of stock returns of all firms in the S&P 500 over one, three, and five years. The numbers in the table support that high stock returns are associated with high risks. It shows that one-year return (1YR) is higher and more volatile than three and five-year returns. The average of one-year returns is equal to 20.87 percent with a standard deviation of 14.02 percent and a coefficient of variation of 0.67 percent. Whereas, the three and five-year returns are 14.74 and 14.11 with standard deviations of 8.53 and 7.94 percentages respectively.

Table 1
Means, Standard Deviations, and Coefficient of Variations of Total Stock
Returns of All Firms in the S&P 500 index, 1992.1 – 2010.1

	1YR	3YR	5YR
Mean	20.87	14.74	14.11
SD	14.02	8.53	7.94
CV	0.67	0.58	0.56
N	475	475	475

Note: Variables 1YR, 3YR, and 5YR, are one, three, and five-year total stock returns; SD is the standard deviation of returns and CV is the coefficient of variation. N is the number of companies having usable data out of the 500 S&P 500 index firms.

Table 2 includes correlations between one, three, and five years stock returns of all firms in the S&P 500 with financial variables and measure of market risk (B) appearing in the first row of table. The correlation numbers show that book-value per share (BVPS), dividend per share (DPS), earnings per share (EPS), earnings per share from operations (EPSO), earnings stability (ESTAB), and return on equity (ROE) all have a weak and negative relationship with the return variables. Whereas, cash flow per share (CFPS), free cash flow (FCF), price to earnings ratio (PE), and beta (B) all have small but positive correlation with stock returns. Among all variables in the table, PE (price-earnings ratio) is the only one that has a relatively higher positive correlation with one-year stock returns (0.44). It is interesting to note that while dividends are part of the total stock return calculations, they have a minor and negative correlation with total stock returns. This might imply that investors are less interested in dividend income than capital gains while investing in stocks.

Table 2
Correlations between Total Stock Returns and Listed
Financial Variables, 1992.1 – 2010.1

Returns	BVPS	CFPS	DPS	EPS	EPSO	ESTAB	FCF	PE	ROE	B
1YR	-0.05	0.03	-0.12	-0.32	-0.35	-0.48	0.05	0.44	-0.12	0.05
3YR	-0.04	0.08	-0.08	-0.12	-0.19	-0.12	0.03	0.13	-0.02	0.15
5YR	-0.04	0.10	-0.06	0.03	-0.11	-0.05	0.03	0.03	-0.02	0.05

Note: Variables 1YR, 3YR, and 5YR represent one, three, and five-year stock returns. BVPS is book value per share, CFPS is cash flow per share, DPS is dividend per share, EPS is earning per share, EPSO is earnings per share from operations, ESTAB is earnings stability, FCF is free cash flow per share, PE is price-earnings-ratio, ROE is return on equity, and B represents market risk.

To measure how the volatility of financial and market risk variables affect investment returns, Table 3 presents correlations between standard deviations of stock returns and standard deviations of listed variables. The numbers in Table 3 reveal that changes in earnings' stability (ESTAB) and price-earnings-ratio (PE) have the highest effect on the one-year stock returns. The variations of market risk measured by the standard deviation of beta (B) show no correlation with variations of one-year stock returns but it has a higher correlation with three and five-year returns. The variations of the remaining financial variables are weakly correlated with the variation of the total stock returns. The correlation numbers simply imply that investors prefer stability in earnings and lower volatility in price-earnings ratio and stock prices over other financial variables appearing in the table.

Table 3
Correlations between Standard Deviations of Total Stock Returns and Standard Deviations of Listed Variables, 1992.1 – 2010.1

SDV	BVPS	CFPS	DPS	EPS	EPSO	ESTAB	FCF	PE	ROE	B
1YR	-0.04	-0.00	-0.11	0.12	0.07	0.48	-0.04	0.42	0.11	0.00
3YR	-0.05	-0.02	-0.05	0.15	0.11	0.41	-0.05	0.26	0.11	0.43
5YR	-0.06	-0.03	-0.05	0.23	0.17	0.31	-0.06	0.15	0.14	0.28

Note: SDV is the standard deviation. Numbers in the table show the correlation between standard deviation of returns and standard deviations of listed financial variables.

To further investigate whether the variability of stock returns can be explained by the variations of the selected financial variables, regression analysis is employed. Table 4 includes the stepwise regression results.

Table 4
Stepwise Regressions Showing Relationship between Standard Deviation of Total Stock Returns and Standard Deviations of Financial Variables

Dep. Var.	C	BVPS	CFPS	DPS	EPS	EPSO	ESTAB	FCF	PE	B
Regression (1)										
SDYR1	25.39	-----	-----	-----	6.65	-3.29	27.04	-----	0.08	-----
	(9.11)	-----	-----	-----	(3.84)	(3.31)	(9.16)	-----	(6.19)	-----
	$R^2=0.30$		DW=1.67		N =436					
Regression (2)										
SDYR3	15.21	-----	-----	-----	1.75	-----	7.77	-----	0.02	0.31
	(14.11)	-----	-----	-----	(2.36)	-----	(6.83)	-----	(3.90)	(2.81)
	$R^2=0.36$		DW=2.05		N =414					
Regression (3)										
SDYR5	11.77	-----	-----	-----	2.19	-0.91	4.54	-----	-----	0.56
	(16.66)	-----	-----	-----	(4.46)	(3.06)	(5.94)	-----	-----	(5.98)
	$R^2=0.27$		DW=1.79		N =404					

Note: Variables SD1YR, SD3YR, and SD5YR represent standard deviations of one, three, and five-year total stock returns. BVPS is book value per share, CFPS is cash flow per share, DPS is dividend per share, EPS is earning per share, EPSO is earnings per share from operations, ESTAB is earnings stability, FCF is free cash flow per share, PE is price –earning-ratio, ROE is return on equity, and B represents market risk, t-statistics are in parentheses. R^2 is R-square and DW is the Durbin–Watson statistic. N is the number of companies included in the regressions.

Fama and French (1992) have shown that the book-to-market ratio of individual stocks has the ability to explain cross-sectional variations in stock returns of nonfinancial firms for the period of 1963-1990. The regression results in Table 4 show that cross-section variations of total stock returns and book-value per share (BVPS) have an insignificant relationship. However, results indicate the volatilities of earnings-per-share (EPS) and earnings stability (ESTAB) have a strong significant effect on the variation of stock returns (regressions #1, 2, and 3). Price-earnings ratio (PE) also has a significant and positive effect on the one-and three-year investment returns. Fama and French (1992) showed that market risk does not help to explain the cross-section of the average stock returns. Contrary to the Fama and French findings, the results in Table 4 show that variations in market risk (B) have a strong effect on the cross-section of average total of three-and five-year returns (regression 2 and 3) without having any effect on the short turn return. The weak relationship between dividend per share (DPS) and total stock returns shown above implies that dividend is a less important factor when calculating total stock returns.

The remaining portion of this study attempts to identify the most relevant financial variables that purely affect stock prices and not total returns.

Stock Price Analysis

It is of interest to many investors to identify which financial variables are more relevant to observe while making investment decisions. Table 5 Panel A, shows the relationship between stock prices and selected financial variables using correlation analysis. Panel B presents correlation between the standard deviation of stock prices and the standard deviation of the listed financial variables.

Table 5
Correlations between Stock Prices and Listed Variables
Over 1992.1 – 2010.1

Panel A: Correlations between Stock Prices and Listed Variables										
BVPS	CFP	DPS	EPS	EPSO	ESTAB	FCF	PE	ROE	B	
-0.00	-0.02	0.27	0.22	0.66	-0.01	-0.02	-0.00	-0.47	0.01	
Panel B: Correlations between Standard Deviations of Stock Prices and Listed Variables										
BVPS	CFP	DPS	EPS	EPSO	ESTAB	FCF	PE	ROE	B	
-0.00	0.02	0.14	0.85	0.88	0.07	0.2	0.01	0.67	0.06	

Note: Average stock prices of all companies included in the S&P 500 index and their standard deviations with financial variables and their standard deviations.

As is apparent from Table 5 (Panel A & B), earnings per share from operation (EPSO) and its volatility measured by standard deviation has the highest positive correlation with stock prices. The correlation between variations of earnings per share (EPS) and stock prices as shown in Panel B is high. The return on equity (ROE) has negative correlation with stock prices (Panel A) but volatility return on equity and stock prices are positively correlated. The remaining variables, including market risk volatility seem have small and negligible correlation with stock prices and its volatility.

It is interesting to note that the return on equity (ROE) has a negative effect on stock prices while correlation between variations of price and ROE are positive. One possible explanation for the negative correlation is that average equity returns for companies included in this study have been low without having a sustainable growth rate. Companies with high and stable returns on equities normally have higher earnings growth rates because a sustainable earnings growth rate is the return on equity times the retention rate. Earnings of firms with a high and stable return on equity are expected to grow at a higher rate than one with a lower return on equity (assuming dividend payout policies are same). Companies with the high and sustainable return on equity provide a higher growth in stock prices.

To further explore the relationship between stock prices and financial variables using regression analysis, Table 6 presents stepwise regression results. In regression (1), the dependent variable is stock prices and in regression (2), an endogenous variable is the standard deviation of stock prices. The test results in regression (1) show that dividend per share (DPS), earnings per share (EPS), and earnings stability (ESTAB) have a significant negative effect and earnings from operations have a positive effect on stock price level.

In regression (2), volatility of variables DPS, EPSO, ESTAB, and B have a positive and significant relationship with stock price variations. Among all financial variables appearing in the Table 6, free-cash flow, book value per share, cash flow per share, price- earnings per share, and return on equity show an insignificant relationship with stock prices. The effect of dividend per share on stock prices was changing from positive to negative. The earnings from operations, earnings stability, and earnings per share were the three most relevant variables having the strongest effect on stock prices and its volatility. This finding is in accordance with Miller and Modigliani (1961) that earnings are the most relevant factor in valuations of firm value and thus Stock price.

Table 6
Stepwise Regressions between Stock Price and Its Variations
and Listed Financial Variables

Dep. Var.	C	BVPS	CFPS	DPS	EPS	EPSO	ESTAB	FCF	PE	ROE	B
Regression (1)											
P	30.13	----	----	-29.99	-83.36	38.16	-6.57	----	----	----	----
	(4.71)	----	----	(3.30)	(19.88)	(31.79)	(4.30)	----	----	----	----
	R ² =0.70		DW=2.11		N =500						
Regression (2)											
SDP	----	----	----	4.26	----	4.81	9.86	----	----	----	0.35
	----	----	----	(2.43)	----	(39.29)	(12.60)	----	----	----	(1.93)
	R ² =0.74		DW=1.96		N =500						

Note: P is stock price, SDP is standard deviation of stock prices, BVPS is book value per share, CFPS is cash flow per share, DPS is dividend per share, EPS is earning per share, EPSO is earnings per share from operations, ESTAB is earnings stability, FCF is free cash flow per share, PE is price-earning-ratio, ROE is return on equity, and B represent market risk, t-statistics are in

parentheses. R^2 is R-square and DW is the Durbin–Watson statistics. N is the number of companies included in the regressions.

IV. Conclusion

This study examines financial variables and market risk that affect total stock returns and stock prices. The sample includes data for all companies in the Standard & Poor 500 Index. The mean and variance analysis reconfirms that short-term stock returns are more volatile and riskier than longer-term stock returns. The empirical results show that book value per share, free-cash flow, return on equity, and cash flow per share has a weak or no effect on the total aggregated S&P 500 Index companies' stock returns and stock prices. Moreover, regression results show that dividend per share has an insignificant and negative effect on the total stock returns. Such results go along with the Miller and Modigliani (1961) arguments that dividend payments are irrelevant to corporate values.

Rosenberg, Barr, Reid, and Lanstein (1985) documented positive relations between average return and book-to-market of equity for U.S. stocks. The empirical results of this study do not support a strong relationship between total stock returns and stock prices with book-value per share. Furthermore, regression results showed that market risk and its variations are important factors in explaining changes in total stock returns and stock prices. The findings are not in accordance with Fama and French (1992) that have shown market risk does not seem to help explain the cross-section of average stock returns during the 1963-1990 periods. Differences in such findings might be the result of different periods of study and/or sample selections.

Among all variables considered in this study, earnings per share and earnings stability showed the strongest and most significant effect on total investment return. This result implies that besides paying attention to company earnings, investors' also consider the stability of earnings while making investment decisions. Regarding stock prices, earnings per share from operations is the more relevant variable to consider while investing in stocks. Other financial variables have a weak and inconsistent effect on the price and price variations.

The question of what factor influence stock prices the most has been of interest to many investors and studies. It is very important, for example, to know whether dividend-paying firms' stock prices outperform non-dividend paying firms and whether factors such as earnings and its stability, cash flows, return on equity should be taken into consideration while making investment decisions. The major contribution of this study is to reinstate that the earnings and its stability are important variables to be considered while investing on stocks. Other variables like cash flows, dividends, return on equity, etc are one way or other derived from the earnings.

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