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# **THE PREDICTIVE ABILITY OF FINANCIAL RATIOS ON STOCK RETURNS**

A study of the S&P Global 100 during  
2000 – 2020  
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## **Abstract**

This study examines the predictive ability of ten financial ratios on annual stock returns at a one-year horizon. Ratios and stock returns are observed for the S&P Global 100 Index over the time period 2000 to 2020. The index is chosen for its representativeness stemming from the size and multinationality of its constituents. Regression analysis is used to find the predictiveness of the ratios.

The study shows that dividends, dividend yield, market capitalization, total revenues, earnings per share and free cash flow margin are significant predictors of annual stock return at a five percent significance level. Investors and managers are, therefore, recommended to focus on these factors. Further studies of how the factors interplay along with studies of other correlation types, are also proposed.

***Key words:*** *Financial ratios, stock return, predictability, regression*

# Table of content

- 1. Introduction..... 4
  - 1.1. Problem description..... 4
  - 1.2. Prior research and the contribution of the study..... 5
  - 1.3. Research questions ..... 7
  - 1.4. Restrictions ..... 7
- 2. Theoretical framework..... 8
  - 2.1. Ratio analysis..... 8
  - 2.2. Efficient markets..... 9
  - 2.3. Fisher’s separation theorem..... 9
  - 2.4. Gauss-Markov theorem ..... 10
- 3. Methodology ..... 10
  - 3.1. Data..... 10
    - 3.1.1. Summary statistics..... 11
    - 3.1.2. Ratios..... 11
    - 3.1.3. Sources ..... 13
  - 3.2. Regression analysis..... 14
    - 3.2.1. The univariate linear model..... 14
    - 3.2.2. Assumptions ..... 14
  - 3.3. Hypothesis testing..... 15
  - 3.4. Strengths and weaknesses of the methodology ..... 15
    - 3.4.1. Bias..... 16
- 4. Result and analysis..... 16
  - 4.1. Possible reasons for the predictability ..... 19
  - 4.2. Concordance with prior research ..... 20
  - 4.3. Comments on the result ..... 21
- 5. Conclusion ..... 22

5.1. Applications for managers and investors.....	22
5.2. Applications to other data.....	22
5.3. Further research .....	23
5.4. Final summary .....	24
Reference list.....	25
Appendix .....	27

# 1. Introduction

In the mid- 1980s, scientists started to believe that there may be a way to accurately predict future returns, which had previously been considered impossible. Since then, many economists have researched this topic to find a correlation between stock returns and different types of financial ratios. This have led to the development of ratio analysis which is one of the tools investors use when making decisions. According to Cochrane (1999), this development started when the basic assumptions which had previously ruled the financial perspective were suddenly challenged. Prior to this, Cochrane (1999) states that economists based their view of the investment world on three widely accepted beliefs. The first of these beliefs was that the capital asset pricing model (CAPM) was a fairly accurate measure of risk. The theory was that only assets with a high beta value could generate a high return. The second assumption was that returns could not be predicted. Stock returns were considered to be close to unpredictable according to the random walk theory whereas bond returns were considered to be entirely unpredictable according to the expectation model. Further, foreign exchange bets were also impossible to predict, and the stock market volatility was thought to be close to constant. Finally, economists believed that managers were unable to outperform risk-corrected indices and passive portfolios. Any outperformance by an actively managed fund was thought to be the result of chance and did not indicate similar future occurrence. However, in the mid- 1980s, these assumptions were challenged. New findings proved both the existence of assets which exhibit return that cannot be explained by its beta-value as well as the existence of return predictability. The findings also proved that, unlike people had previously believed, the stock market volatility was not constant but rather varied over time. These new insights to the world of investments opened up the doors to the field of ratio analysis. Today, ratio analysis is one of many important tools for investors. The basic principle being that certain ratios and other key financial information can, to a degree, predict the future return of an asset.

## 1.1. Problem description

The prediction of stock returns has been a fascination to many economists in the past and continues to interest researchers to this day. The topic is being discussed in several papers by researchers all over the world. Understanding the mechanisms that drive stock return is of great importance to investors because it helps them to choose more profitable investments and

increase their profits. It is also helpful to corporate managers since part of their goal is to create investor value. The purpose of this study is to provide insight into this subject so that investors will know what to look for and can make well informed and profitable decisions. It is also meant to provide guidelines for managers so that they can prioritize the areas which are most beneficial for the return. Of course, corporate managers also have other goals but since stock return is one of the main objectives, it is important for them to have a good understanding of this subject. This increases their chances of producing high returns.

## **1.2. Prior research and the contribution of the study**

Similar studies have been conducted several times in the past and this study builds on the methods and findings of this prior research. For instance, Campbell and Yogo (2006), discuss the different methods and models used when analyzing the effects of financial ratios on future returns. They discuss the accuracy of these models and their relevance in determining the predictability of stock returns. They also analyze the predictive ability of dividend yield. This ratio is one of the most commonly discussed ratios within this topic. Campbell and Yogo (2006), like Lewellen (2004) and Cochrane (1999), conclude that there exists a predictability of stock returns for this ratio. The power and reliability of this predictability, however, remains a topic for discussion. Other ratios which commonly occur in the academic literature are price-to-earnings and book-to-market. Basu (1977) found that portfolios with a low price-to-earnings ratio tended to perform better than portfolios with a high price-to-earnings ratio. He noticed that this tendency was true also for risk-adjusted portfolios which indicate a correlation between the ratio and stock performance and thus may be relevant when predicting future stock return. This was partially confirmed by Lawrenz & Zorn (2017), who showed that the predictive ability of price-to-earnings depend upon whether the ratio is consistent or opposing to other indices by running a cross-sectional analysis. They found that only price-to-earnings ratios which were consistent between the indices, exhibited a significant correlation with future stock returns. A number of studies, such as Fama & French (1993), Fama & French (1995) and Pontiff (1998), also indicate the existence of a correlation between book-to-market ratio and the profitability of market returns. Pontiff argued that this ratio was a better predictor of market returns than interest rate spreads and dividend yield when studying the indices DJIA and S&P. He attributed this predictive ability to the use of book value in cash flow forecasting.

Pontiffs statement that book-to-market ratio has a higher impact on stock returns than dividend yields is inconsistent with the findings of Lewellen (2004) and Campbell & Yogo (2006) who both concluded that dividend yield has the highest explanatory power of the observed ratios. The predictive ability of dividend yield has been widely discussed by several other researchers who have had different opinions regarding the subject. Fama & French (1988) and Maio & Santa-Clara (2015) agree that it is a significant ratio when predicting returns. Cochrane, however, have presented a more skeptical view. Fama & French found that, in the New York Stock Exchange, dividend yield could be considered significant over longer time horizons of two years or more. Monthly and quarterly returns, however, could not be predicted using this ratio. Cochrane has criticized the predictive ability of the same ratio but concluded in 2008 that such predictability does exist, though it cannot be achieved solely based on dividend yield. He further suggests a model based on multiple financial ratios.

The prior research presented above provide an important foundation for this study mainly regarding methodology and areas of focus. Most of the methodology used in this study can be attributed to its use in previous research. This results in a widely accepted approach which allows for valid comparisons between the findings of this study and earlier findings. When reading papers on the topic of stock return predictability, the main predicting variables analyzed appear to be dividend yield, book-to-market ratio, and price-to-earnings ratio. This is why dividend yield as well as total dividends are both included in this study. In the interest of contributing new knowledge, the other ratios studied in this report are less common in the academic literature. While most of the earlier research has focused on dividend yield, book-to-market ratio and price-to-earnings ratio, this study analysis ten different ratios and values, many of which has not been included in most of the previous studies. They are also observed over a one-year horizon rather than the monthly basis observed by a majority of other researchers. By observing less common ratios over a longer time horizon, the hope is to find new useful ratios which can be used to indicate long-term profitability. A recent data sample also creates additional value since the majority of similar studies have focused on time periods before the turn of the millennium.

### **1.3. Research questions**

This report examines the correlation between financial ratios and stock return for the S&P Global 100 Index during the time period 2000-2020. The study is conducted through a quantitative analysis of historical economic performance of the companies included in the index. The main focus of this research is the predictive ability of these financial ratios on future stock returns. This predictive ability is observed over a one-year time horizon. The goal of the study is to answer how financial ratios can be used as predictors of annual stock return and what this means to investors and managers.

### **1.4. Restrictions**

There are several limitations and restrictions to this study. The study focuses on annual stock returns in the context of long-term investments. The reason for this is that most serious investors tend to invest over a relatively long time period since that is usually how they can earn the highest profit. Therefore, it is believed that a focus on long-term investments is of higher relevance to investors. The study is restricted to observing the annual stock return on a one-year horizon. This time horizon is chosen because annual observations provide a better basis for further studies, over longer horizons, compared to the monthly observations which are common in other literature. The reason that a one-year horizon is chosen instead of a longer one is to minimize the bias which is more evident in long run regressions. It is important to first identify which variables are important, with as small bias as possible, before studying the long-term effects of these variables.

The ratios which are examined are limited to dividends, dividend yield, market capitalization, revenues, earnings per share, free cash flow, free cash flow margin, debt-to-equity, book value per share and total enterprise value. These ratios are chosen due to their common occurrence as well as their lack of occurrence in prior studies, respectively. They have also been chosen because of what they indicate about the company.

The study analyzes the data between the year 2000 and the year 2020. This time period is chosen because the world economy, due to globalization and digitalization as well as the rapid technological development, is constantly changing. Therefore, a recent sample is important since a lot of the prior research has focused on earlier time periods. There occurs a financial



crisis during this period which may influence the result, but the significance of a recent sample is thought to outweigh this risk.

Finally, the study is limited in its observation of companies. The study is restricted to the companies included in the S&P Global 100 Index. This index tracks the financial performance of the 100 most traded global stocks on the S&P stock market. The choice of this index is based on the fact that most prior research focuses on the U.S. stock market. The index has also been chosen for its influence on the world economy, since it includes large multinational companies traded on the second largest stock market of one of the most powerful economies in the world.

## **2. Theoretical framework**

The theoretical framework of this report is constructed by prior literature written on similar subjects. This literature lay the foundation for both the methodology as well as the analysis of the empirical data reported in this paper. Complementary information presented in this section has also been gathered from Investopedia.

### **2.1. Ratio analysis**

Recent literature suggests that future returns can be predicted using certain financial ratios. These ratios have different abilities to predict stock returns with different levels of confidence as well as different explanatory power. Ratios with a stronger explanatory power accounts for a higher percentage of the variation in returns. Cochrane (1999) writes about these findings and the causes and limitations connected to them. Cochrane state that daily, weekly, and monthly return are basically unpredictable although long-term returns can be partially predicted using variables such as dividend yield or term premium. This predictability is expected to grow over longer horizons. The reasoning behind this is that the predictability accumulates over time.

Analysis of the predictive ability of price-based ratios have showed a negative correlation between stock price and stock return. This results in positive correlation between stock return and financial ratios where the price factor is in the denominator and a negative correlation with ratios where the price factor is in the nominator (Cochrane 1992). This is also thought to explain

the long time rises which are subsequently followed by a decline in the stock market. This phenomenon is driven by the psychological aspect of anticipation. When a stock perform well, investors are more willing to buy which drives up the price. Since the price is negatively correlated to stock return, the increase in price leads to a decrease in returns resulting in a decline of the stock market. Investors than become less willing to pay such a high price for the stocks and the price declines leading to increasing returns once again.

## **2.2. Efficient markets**

The psychological aspects which drive stock return are dependent upon the dispersion of knowledge. When people have access to different kinds of information or when there is a delay between an event the time it becomes public knowledge, it effects the market differently. A simplistic model often used by economists is the efficient market. Malkiel (2003) describes the efficient market as a market where prices of securities perfectly reflect all available information. The theory of efficient markets assumes symmetric information where all parties possess the same knowledge about relevant events and developments. According to this model, new information is incorporated into prices without any delay due to a rapid dissemination of knowledge. This is the basic meaning of efficiency in the market.

## **2.3. Fisher's separation theorem**

In 1930, Irving Fisher developed the theory known as Fisher's separation theorem. In this theorem, Fisher states that, in an efficient market, managers should only focus on maximizing profits regardless of the goals and preferences of the shareholders (Investopedia 2021). The main assumption is that managers and investors have different consumption objectives. Neither party is capable of assessing and obtaining the objectives of the other party. The managers can't be expected to know or consider the preferences of each individual shareholder and the shareholders usually don't have enough insight into the business to make optimal decisions. Fisher's solution to this problem is for managers to maximize profits and company value, the theory being that even though it may contradict shareholder utility preferences, their long-term utility will still be maximized by this approach. The conclusion of Fisher's separation theorem is a result of the lending and borrowing opportunities on the efficient market. By utilizing these

opportunities, investors can make trades according to their individual marginal rate of substitution to achieve their personal preferences and reach optimal allocation. In order to maximize the utility of each investor's optimal allocation, the investors' resources need to be maximized. The increased budget allows the investors to achieve a higher indifference curve and therefore, a higher utility. This is what Fisher postulates by stating that maximal utility is achieved by maximizing company profit.

## **2.4. Gauss-Markov theorem**

The Gauss-Markov theorem states five assumption under which, the ordinary least squares regression has the smallest variance of the unbiased regression models. These five assumptions are linearity, random selection, non-collinearity, exogeneity and homoscedasticity. The condition of linearity states that all the parameters used in the regression have to be linear. The condition of random selection means that the observations must be randomly sampled from the population without any conscious selection of data points. Non-collinearity refers to the condition that the regressors are not perfectly correlated, in which case, the OLS model may not be the optimal one. Exogeneity refers to the condition that the regressors are not correlated to the error term and the condition of homoscedasticity states that the error of variance must be constant. Assuming that all the conditions described are met, the ordinary least squares regression model is the appropriate model to use since it gives an unbiased regression and under these assumptions result in the lowest variance. If these conditions are not completely fulfilled, the appropriateness of the model is determined by how well the data concur with the assumptions. If they do not coincide closely enough, another regression model should be considered.

## **3. Methodology**

### **3.1. Data**

The research is conducted as a quantitative study, analyzing the performance of the S&P Global 100 Index for the time frame 2000-2020. The ratios are compiled for each of the constituents of the index. To obtain the overall ratio the aggregate ratios are divided by the corresponding

index level. Following the example of researchers such as Cochrane (1999), Campbell & Yogo (2006) and many others, they are then transformed into logarithmic values before a regression analysis is conducted.

The S&P Global 100 Index is an index covering the financial performance of 100 multinational blue-chip companies which have a significant impact on the economy worldwide (S&P Dow Jones Indices 2022). This index is chosen due to its importance to the world economy. The idea is that, since the companies included in the index are so influential, any findings regarding this index may not only apply to the specific companies studied but may also hint at a more general conclusion.

### **3.1.1. Summary statistics**

The sample includes 20 data points for each of the independent variables which are compared to 20 corresponding data points for the dependent variable. Each set of data points exhibit different ranges, mean values and standard deviations. They are, however, all assumed to follow a normal probability distribution.

### **3.1.2. Ratios**

In this report, ten ratios have been chosen for observation. These are dividends, dividend yield, market capitalization, revenues, free cash flow, free cash flow margin, earnings per share, debt to equity, book value per share and total enterprise value.

Dividend yield has been chosen as an independent variable due to its common occurrence in the academic literature. Most researchers, (Fama & French 1988; Lewellen 2004; Campbell & Yogo 2006; Cochrane 2008) agree that this ratio is significant to the prediction of future stock return which makes it an interesting variable to study further. It also makes for an interesting comparison when studying total dividends. Since total dividends are closely related to dividend yield, it is thought to be of importance to this study. The amount of the dividend payouts is determined by the board of directors and knowledge concerning the effects of these payouts on future stock return can provide guidelines regarding dividend policies. In order to make a valid

comparison between dividends and dividend yield, an independent analysis of dividend yield must be conducted within the methodology of this study. This is another reason for including dividend yield in the analysis.

A similar ratio to dividend yield is earnings per share. This ratio describes a company's profitability by expressing the net profit as a percentage of the number of outstanding shares. By including this ratio in the study, conclusions may be drawn regarding the correlation between company profit and stockholder profit. The analysis also includes book value per share which is a ratio used by investors when evaluating stock prices. It provides an indication as to whether the stock is undervalued. The ratio expresses the common equity as a percentage of the total number of stocks outstanding (Investopedia 2021). The analysis of this ratio aims to study the share value relative to the generated stock return.

Market capitalization is also an interesting variable to observe. It can be described as the total market value of a company's outstanding shares. It is given by the total amount of outstanding shares multiplied by the share price. This value represents the company's worth and is used as an indication of its size. The market capitalization also describes the company type. Companies can be divided into large-cap, mid-cap, and small-cap companies. A large-cap company has a market capitalization above 10 billion dollars and tends to be established and successful companies which generates a steady revenue and exhibits slow growth and small volatility in prices. Smaller companies have a greater potential for growth but exhibits a higher volatility as well as larger risks due to their less stable nature (Investopedia 2021). Market capitalization has been chosen because of the wide information which can be derived from this value.

Another indicator of the company worth is the total enterprise value. Unlike the market capitalization, this value also accounts for the company debt. Many argue that this makes it a more accurate indicator of the true value of a company (Investopedia 2021). Therefore, this too is included in the study. The hope is that it may also provide evidence of the importance of debt for the stock return. Further evidence of the significance of debt is given by the analysis of the debt-to-equity ratio. This ratio describes the company's ability to cover its debts by expressing the percentage of debt relative to the company's equity (Investopedia 2021). By analyzing the predictive ability of the debt-to-equity ratio, the hope is to provide insight into the significance

of general leverage. This is something which has been proven important in many other fields and it would therefore be useful to also know its impact on stock returns when weighing the benefits of debt against the disadvantages. According to Fisher's separation theorem, the main goal of a company should always be to maximize its net present value regardless of the required leverage. This is related to maximizing revenues and free cash flows. On a one-year horizon this is the only aspect to consider. Over a longer time period the discount rate becomes important. While revenues only measure the gross profit derived from sales, the free cash flow measure the net amount of cash which has been transacted into the company account (Investopedia 2021). Since this is such an important factor of the NPV, it is considered an interesting study object. Further insight into this topic can be obtained by studying the free cash flow margin. This ratio is defined as the free cash flow divided by the revenues. By analyzing this ratio, conclusions can be drawn regarding the importance of the percentage of company profit which is reinvested back into the company. This is interesting since a larger net profit should increase the return at the same time as investing in the company can make it more profitable.

### **3.1.3. Sources**

The data is mainly collected from the database S&P Capital IQ which provides financial data and analytical models covering quantitative and qualitative information about 99 percent of the world's market cap. This database is widely used by investors as well as researchers or economy students and professors. It was founded in 1998 and has grown into one of the world's largest providers of economical information. Therefore, it is considered a reliable source which can provide relevant data for this study.

The theory and background are largely based on papers written by other researchers. The authors of these papers are mostly professors of highly accredited universities and institutes with decades of experience behind them. The papers include both old and recent studies to show the development of the field. In addition to being written by accomplished authors with great knowledge of the area, the papers also have high citations which further strengthens their credibility.

## **3.2. Regression analysis**

### **3.2.1. The univariate linear model**

Following the example of prior researchers such as Fama & French (1988), Lewellen (2004), Campbell & Yogo (2006), and Cochrane (2008), the predictive ability is computed using the univariate linear regression model. This model describes a relationship on the form:  $r(t) = \alpha + \beta x(t-1) + \varepsilon(t)$ . For the purpose of this study, the term  $r(t)$  represents the annual stock return at year  $t$  and the term  $x(t-1)$  represents the annual ratio the year prior to the observed stock return. The annual stock return is the dependent variable whereas the financial ratios are individually used as independent variables.

In order to be consistent with the methodology of prior studies, the natural logarithmic values of the independent variables are used in the model rather than the actual values. The reasoning behind this is that it will make the data better suited for linear approximation. It stabilizes the variance of the time series and avoid the positive skewness associated with using the raw data.

The explanatory power of this model is given by R-squared which is defined as  $SSR/SST$  and can take on values ranging from zero to one. This is used as a measurement of how important each variable is to the stock performance. By comparing the explanatory power over different time horizons, a conclusion can also be made regarding the time it takes for the ratios to affect the stock return.

### **3.2.2. Assumptions**

One of the most basic assumptions of this study is that any correlation between a financial ratio and the stock return can be described as a linear function. This may not necessarily be the case. However, for the purpose of this study, the correlation is assumed to be linear. Further studies might explore other types of functions which may be a better fit. Another assumption is that the dividend yield is stationary. This is due to the evidence presented by prior researchers which argues that the mean dividend yield is reverting in the long-term. This assumption allows for the use of Ordinary Least Squares Regression (OLS).

### **3.3. Hypothesis testing**

To determine whether there is a significant correlation between the ratios and the stock return, the null hypothesis sets the beta-value to equal zero and the alternative hypothesis set the beta-value not equal to zero.

$$\mathbf{H_0: \beta = 0}$$

$$\mathbf{H_a: \beta \neq 0}$$

To test this hypothesis an F-test is done using the formula  $F = MSR/MSE$ . The p-value approach is then used to determine whether or not the null hypothesis can be rejected at a 5 percent significance level which it can if the p-value is lower than 0,05. If the null hypothesis can be rejected, it can be concluded, with 95 percent confidence, that the observed ratio has a significant impact on the stock return over the observed time horizon.

### **3.4. Strengths and weaknesses of the methodology**

In consistency with prior studies, this paper focusses on linear predictability of stock return using OLS regression. There are several benefits to this approach. Linear regression provides a simpler description of the predictive ability compared to other non-linear types of regression models. The assumption of linearity is also important for the use of the OLS regression model according to the Gauss-Markov theorem. However, this assumption disregards predictability exhibiting a non-linear correlation. As a result, the study run the risk of omitting important information. The OLS regression model has the advantage of providing unbiased coefficients. The downside of this model, however, is that it is sensitive to outliers which risk affecting the result by underestimating the slope. This model requires a large sample to provide a reliable result. Regarding the validity of the model, this is guaranteed by the fulfillment of the Gauss-Markov assumptions. Given a large sample and assuming that the Gauss-Markov theorem holds, this is considered the most appropriate model for the analysis. However, for future studies where the independent variables are studied together using a multivariate regression model, other models may be better suited for this purpose.



### 3.4.1. Bias

There exists a bias due to the use of index levels when computing the ratios. This bias stem from the fact that index levels are strongly tied to the stock return. Pontiff, J., & Schall, L. D. (1998) state that this bias causes an apparent relation between the variables and the future return. This bias is larger in small samples which is why this report studies a one-year horizon to include as many data points as possible in the sample. This is meant to minimize the bias but it is still important to keep this bias in mind when reading the results since the predictive ability of the variables have a tendency to be exaggerated.

## 4. Result and analysis

*Table 1: An overview of the R squared, adjusted R squared and the p-value as well as the intercept and coefficient for an OLS simple linear regression. The values are presented for the regression of ten ratios corresponding to the annual stock return the following year. The stock return is expressed as a percentage and all data, not ratios or per share, is in millions. All data has been gathered from Capital IQ. All values are converted at the current spot*

	<i>R-squared</i>	<i>Adjusted R-squared</i>	<i>p-value</i>	<i>Intercept</i>	<i>Coefficient</i>
<b>Dividends</b>	0,293259	0,253995	0,01366	-0,11288	0,354463
<b>Dividend yield</b>	0,198397	0,153864	0,049051	2,22613	0,340431
<b>Market capitalization</b>	0,212924	0,169198	0,040564	-1,90583	0,462826
<b>Total revenues</b>	0,247026	0,205194	0,025783	-1,25142	0,372536
<b>Earnings per share</b>	0,24971	0,208027	0,024867	0,517012	0,160185
<b>Free cash flow margin</b>	0,264532	0,223673	0,020334	1,447959	0,298498

<b>Free cash flow</b>	0,106452	0,05681	0,160337	-0,0783	0,114678
<b>Debt to equity ratio</b>	0,183644	0,138291	0,059402	0,383304	0,159656
<b>Book value per share</b>	0,189772	0,144759	0,05487	0,175397	0,187519
<b>Total enterprise value</b>	0,182168	0,136733	0,060547	-2,09375	0,493263

As shown in the table above, six of the chosen ratios can be concluded as valid predictors of annual stock return at a five percent significance level. These are the total dividends paid over the past year, the dividend yield over the past year, the current market capitalization, the total revenue over the past year, the earnings per share and the free cash flow margin. According to the collected data, total dividends provide a better estimator of annual stock return than the dividend yield. Another interesting observation is that only the free cash flow margin shows a significant correlation with the return. The actual free cash flow over the past year does not provide enough evidence of predictive ability at the chosen significance level. Neither does the debt-to-equity ratio, the book value per share nor the total enterprise value. This means that the null hypothesis can not be rejected for these ratios and therefore no conclusion about their predictive ability can be drawn based on the empirical evidence in this study. For the ratios whose p-values are less than 0,05, the null hypothesis can be rejected, and the alternative hypothesis is therefore accepted. This means that there exists a significant predictive ability of the one-year stock return for these ratios.

Of the observed ratios, the total dividends paid over the past year has the highest explanatory power. The regression using this as the independent variable shows an R squared value of 0,293259 which means that just under 30 percent of the variation in the annual stock return the following year can be explained by variations in dividends. This is followed by the free cash flow margin with an explanatory power of just over 26 percent and earnings per share and total revenues which both has an explanatory power just below 25 percent. Of the variables showing a significant predictive ability, the two with the lowest explanatory power are market

capitalization and dividend yield which explain just above and just below 20 percent of stock return variance respectively. Of all the variables observed, the free cash flow showed by far the least explanatory power as well as the weakest significance. This is interesting considering that the free cash flow margin was shown to have the second highest significance of the chosen variables.

All the coefficients are positive which indicates a positive correlation between the annual stock return and each of the ratios one year earlier. Each coefficient has a value below one, meaning that an increase in either ratio results in a smaller increase in next years annual stock return. Of the variables showing a significant correlation, the one with the largest coefficient is market capitalization which has a coefficient of 0,46286. This is followed by total revenues, total dividends, dividend yield, free cash flow margin and earnings per share respectively.

*Table 2: Presents the correlation between the different independent variables. High correlation is defined as higher than +7- 0,5 while medium is defined as values between +/- 0,3 and +/- 0,5 and low correlation is defined as lower than +/- 0,3.*

	Market cap	Enterprise value	Book per share	Free cash flow	Dividend yield	FCF margin	Total revenue	Total dividend	EPS	Debt to equity
Market cap	1									
Enterprise value	High	1								
Book per share	High	High	1							
Free Cash flow	High	High	High	1						
Dividend yield	Low (-)	Low (-)	Low	High	1					
FCF margin	High	High	High	High	Low	1				
Total revenue	High	High	High	High	Low (-)	High	1			
Total dividend	High	High	High	High	Medium	High	High	1		
EPS	High	High	High	High	Medium	High	High	High	1	
Debt to equity	Medium	Medium	Low	Medium	Low	Low	Low	Medium	Medium	1

Most of the variables presented in table 2 show a strong positive correlation which can account for part of the explanatory power shown by the regression analysis. This, however, presents a problem since it is difficult to determine whether the explanatory power is truly due to the existence of a predictability or if it can be derived from correlation with another significant variable. It also means that extending the model to include multiple variables may, in many cases, not contribute to the explanatory power of the model. If two variables were to be studied together, it is recommended to choose two significant variables with relatively high explanatory power and a low correlation. An example would, for instance, be a model combining dividend yield and free cash flow margin.

#### **4.1. Possible reasons for the predictability**

Total revenues and free cash flow margin were both found to be significant predictors of stock return. This can be attributed to the statement of Jansen (2021), which postulates that the generation of money is the main driving force behind stock returns. It is also consistent with Fisher's separation theory since the positive correlation between these variables and stock return show that increasing company profit also increase investor returns. The free cash flow was not determined as a significant predictor which indicates that the company costs may not be of major importance for the returns. A theory is that any evidence of correlation between free cash flow and stock returns can be derived from the revenue component of the variable. This is supported by the high correlation between the two variables. Since the free cash flow could not be proven significant while total revenues could, one can conclude that reducing costs does not necessarily lead to higher returns. However, due to the predictive ability of the free cash flow margin, there is evidence to support the theory that a lower cost-to-revenues ratio tend to lead to increased returns. Increasing expenditures can be profitable if the money is used for activities which increase efficiency and profitability, but the findings of this paper suggest that this is only the case when the revenues increase at a higher rate. Similarly, lowering expenditures is only effective for stock profitability if they are decreased by more than the revenues. This demonstrates the tradeoff between the benefits of reinvestment and the loss of profit due to increased expenditures.

Market capitalization and enterprise value are similar in what they represent for the company. Total enterprise value is often considered to be a better indicator than market capitalization since it includes debt and thus contain more information about the company. Yet, in this study, the market capitalization has a higher significance when predicting future stock return. This, along with the fact that the debt-to-equity ratio was not significant at the chosen significance level, leads to the conclusion that the inclusion of debt result in a weaker predictor. The explanatory power of the debt-to-equity ratio is assumed to stem from the equity component along with medium correlation with certain significant variables.

## **4.2. Concordance with prior research**

In accordance with the findings of Fama & French (1988), Lewellen (2004), Campbell & Yogo (2006), Maio & Santa-Clara (2015) and several other researchers, dividend yield was found to be a significant factor when predicting stock returns. However, unlike Fama & French (1988), this correlation was found significant over a one-year horizon. This is not necessarily contradictory to their findings but rather adds further evidence of the predictive ability of this ratio. The free cash flow, however, showed weak correlation to returns and could not be concluded as a significant predictor. This is inconsistent with the findings of Jansen (2021) who argued that a company's ability to generate cash was the most important factor determining stock performance. On the other hand, total revenues were found to explain almost 25 percent of the variance in annual stock return which is consistent with this conclusion. The free cash flow margin was also found significant and exhibited the second highest explanatory power of the observed variables.

For many of the variables studied in this paper, there is a shortage of prior research. It is therefore difficult to compare the findings of this report, in regard to these variables, to earlier findings. The results of the analysis of those variables which have been widely researched, however, seems to be relatively consistent with the findings of other papers. While the findings may not be completely the same, they complement each other by providing further evidence. Some factors which have previously lacked sufficient support to draw valid conclusion, have been confirmed as significant in this study whereas some of the factors which do not gain enough support from the empirical data in this report, can be confirmed by other studies. It should also be stated that not all of the previous studies have analyzed the same indices or time

horizons. Some deviations in the results may occur due to differences in method and sample selection.

### **4.3. Comments on the result**

This report is based on limited empirical data regarding the annual stock return of the S&P Global 100 index and financial information about the constituents of this index. The findings of this study refer to the specific data which they are based on and does not necessarily have to apply to other sample groups.

The fact that some variables cannot be determined as significant predictors of future annual stock returns over a one-year horizon means that the empirical data does not provide enough support to make such a conclusion given a 95 percent confidence interval. This does not mean that such an ability does not exist, but the data does not provide enough evidence. These variables need further studying to be able to draw a conclusion. A larger sample size is then recommended. It is also important to keep in mind that this study focuses solely on linear correlation. It is completely possible that another model can be better suited for predicting stock return using these ratios. This can also be true for the ratios which were found to be significant. Though there exist a linear correlation between these ratios and future stock return, there may exist a non-linear correlation which can explain a larger share of the return variance. It is also important to remember the possible bias stemming from the correlation between stock return and index level.

Due to the limitations of this study, the findings should solely be used as guidelines regarding the ratios exhibiting a predictive ability of annual stock return on a one-year horizon which can be described by a linear relation. It is not meant to be used in any other context since it cannot provide enough evidence to draw conclusions outside of this particular area of focus.

## **5. Conclusion**

### **5.1. Applications for managers and investors**

One of the main goals of this study is to provide guidelines for managers and investors based on the objective to maximize stock return. It has been argued that costs, on their own, are not of great importance. What matters is how they relate to the revenues. The profit does not affect returns, but rather the percentage of the profit that stems from increased revenues. Corporate managers should, therefore, focus on this tradeoff and try to maximize this percentage. Investors should, in turn, invest in companies which have a high free cash flow margin.

Another conclusion is that debt does not significantly impact stock returns. With maximizing stock return as the only objective, managers do not need to take leverage into consideration. The main concern should be to maximize their profit using whatever level of leverage needed, in accordance with the Fisher separation theorem. Of course, there are other aspects to consider when choosing leverage, but these aspects are not analyzed within the scope of this paper. Investors should also focus on other factors which carry more weight when choosing their investments.

Due to the relatively high explanatory power of total dividends, this is the factor that investors are recommended to focus on the most. Combined with the other factors which were determined to be significant, the hope is that this will lead to good investments which generate high returns.

### **5.2. Applications to other data**

While the findings of this study are only guaranteed to apply to the chosen data sample, there are indicators that there may exist similarities within other samples as well. The index studied is the S&P Global 100 index, which includes 100 large, multinational companies widely traded on the S&P stock market. This index was specifically chosen for its impact on other indices. Due to the size and multinationality of its constituents, the S&P Global 100 is a highly influential index which reflect large shares of the market as well as covers the economic structures of several countries. Being the second biggest stock market in the United States, it is

also representative of one of the most powerful economies in the world. This means that traits exhibited in this index influence the entire world economy. It is therefore likely that the findings from analyzing this index, can also be applied in a more general context.

The findings, presented in this paper, are also restricted to the time period 2000 to 2020. It is therefore possible that changes in economical structures and other underlying factors may cause an inconsistency when comparing these findings to other time periods. The basic mechanisms explaining the correlations, however, remain the same regardless of the time period observed. Thus, while the results may vary slightly, they should not deviate too much when changing the time restrictions.

In conclusion, the findings of this paper should also be applicable to other sample groups and can, therefore, work as an indicator of the general factors driving stock return.

### **5.3. Further research**

For further studies exploring this subject, it may be interesting to examine how the independent variables work together when using a multivariate regression model. Hopefully, when combining the variables, which were determined as significant in this report, a model with a higher explanatory power can be constructed. This paper can be thought of as a starting point for such a study by presenting a number of significant factors which can be included in such a model. It is then recommended that the variables included in the model exhibit low or medium correlation, in order to maximize the value of using multiple variables. Another elaboration of the findings of this study could be to explore how the predictive ability of these factors vary over different time horizons. The theory presented by Cochrane (1999) suggests that this predictability should accumulate over time. It would be interesting to test this assumption and to examine the nature of these changes. Finally, one could research other types of correlations than the linear model used in this study. It is possible that a non-linear regression model may provide a better fit when studying how variations in annual stock return can be explained by variations in different financial ratios. If a more appropriate model can be found it would give further insight and provide a more useful tool for investors.



## **5.4. Final summary**

In conclusion, dividends, dividend yield, market capitalization, total revenues, earnings per share and free cash flow margin were concluded to have a significant predictive ability for annual stock return. Dividend yield was found to have the highest explanatory power and account for almost 30 percent of the return variance. This was followed by the free cash flow margin. From this it's been argued that stock return is determined by the ratio between profits and total revenues. This led to the theory that the tradeoff between benefits of reinvesting in the company and the losses from high expenditures should always result in the revenues increasing at a higher rate or decreasing at a lower rate than the costs. The fact that market capitalization was found to be significant when the total enterprise value was not, along with the fact that the debt-to-equity ratio did not show enough evidence of a correlation, led to the conclusion that leverage is mainly irrelevant to the return.

Due to the conclusions drawn, investors are recommended to focus mainly on dividends and free cash flow margin when choosing investments. These findings are relatively consistent with earlier findings but also add new information to the understanding of stock return predictability by suggesting new ratios which may be useful. The results should be applicable for a general population as well as the observed sample due to the high influence of the chosen index along with the underlying factors which affect the result. Some deviation, however, is to be expected.

Further research proposed are the study of non-linear correlation as well as the use of a multivariate regression model which build on the variables found significant in this report. It is also proposed that a study could be conducted regarding different time horizons to examen the phenomenon of accumulated predictability.

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# Appendix

*Table A: Presents an overview of the variable definitions. It also shows comments regarding the methodology used when handling these variables.*

<b>Ratio / Value</b>	<b>Definition</b>	<b>Comment</b>
<b>Stock return</b>	Annual percentual change in index level.	
<b>Index level</b>	Value of an index compared to a fixed point in time.	Observed at the end of the calendar year.
<b>Total dividends</b>	Total annual payouts to shareholders.	Sum over the past calendar year.
<b>Dividend yield</b>	Total dividends divided by share price.	Share price at the end of the calendar year.
<b>Earnings per share</b>	Total earnings divided by the number of shares.	Sum of earnings over the past calendar year. Shares at the end of the year.
<b>Book value per share</b>	Common equity divided by the number of shares.	Equity and shares at the end of the calendar year.
<b>Market capitalization</b>	Stock price multiplied by the number of shares.	Price and number of shares at the end of the calendar year.
<b>Total revenues</b>	Earnings before paying costs.	Total earnings over the past calendar year-
<b>Free cash flow</b>	Earnings after paying costs.	Earnings and costs over the past calendar year.
<b>Free cash flow margin</b>	Free cash flow divided by revenues.	Free cash flow and revenues over the past calendar year.
<b>Debt to equity</b>	Debt divided by equity.	Debt and equity at the end of the calendar year.
<b>Total enterprise value</b>	Market value of equity added to the market value of the debt.	Debt and equity at the end of the calendar year.

All ratios and values in table A, apart from stock return and index level, are observed on a corporate level. The aggregate ratios are divided by the index level at the end of the calendar year in order to obtain the value for the entire index. Finally, the values are converted into natural logarithms. The return for years 2001 to 2020 is chosen as the dependent variable and the logarithmic values and ratios for years 2000 to 2019 are each chosen as individual independent variables. A simple linear regression is then run for each of the values and ratios.