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**"Fundamental analysis and its predictive power in forecasting stock returns:
evidence from Dow Jones Industrial Average (DJIA)"**

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Abstract:

This thesis aims to assess whether historical financial information can be used to predict future share returns by means of fundamental analysis of the Dow Jones Industrial Index.

The aim of this paper will be achieved through analysis of data for the 8-year period from 2009 to 2016 for all 30 companies listed on the Dow Jones Industrial Average (DJIA) which include both non-financial and financial entities. The analysis utilizes seven indicators which aim to provide information regarding multiple areas of a company's operations i.e profitability ratios: return on assets (ROA) and return on equity (ROE); liquidity ratios (Current Ratio); Leverage Ratio (Debt to Equity) and Market-based ratios earnings per share (EPS), dividend per share (DPS), price to book ratio (P/B), price-earnings ratio (P/E).

The results from our model indicate that fundamental analysis is weak as the regression results designate insignificant relationship between most of the explanatory variables and the stock returns.

Keywords: Stock Market, Market Indices, Fundamental Analysis, Financial Ratios.

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1.0 Introduction:

The stock market has been around for centuries, in fact, the first idea of the stock market dates back to the 1400s in Amsterdam, Netherlands, where merchants would buy goods speculating that the price would eventually rise, enabling them to generate profits. Almost 400 years later the first stock exchange was founded. In 1896 Charles Dow and Edward Jones saw the need to create what is today known as the Dow Jones Industrial Average (DJIA) index, representing 12 companies which were listed on the New York Stock Exchange, all operating in the industrial sector, as at the time manufacturing companies were of a great importance for the U.S Economy. Later on in the 'roaring' 20s it was upgraded to 30 companies. Today the 30 blue-chip companies with large capitalization represent almost every important sector of the economy except utilities and transportation (Shoven et. al, 2000). Although often labeled as one of the most flawed indexes due to its price-weighting method, DJIA is of great importance to the overall economy, enabling for the flow of funds from investors and granting them access to companies which operate in multiple sectors. Furthermore today, most mutual funds and economists use it as a benchmark when it comes to performance-reporting.

Specifically with the recent developments in the economy the stock market has been booming, the latest liquidity injections have enabled many to bet in the stock market and since the crash in March 2020 the DJIA has recovered in less than a year. Nonetheless it is important to mention that investing in the stock market exposes one to a great risk if done without any previous knowledge or having no understanding of it. Poor investment decisions often lead to great financial losses as we have seen many times in the past, and many new investors often fail to consider the factors involved in stock price movements and returns. Generally speaking, decision making should not be done without incorporating any fundamental and technical analysis, especially in the constantly shifting stock market. Both analyses go hand in hand, although technical analysis is often second to fundamental, and it is mainly used by investors who do not possess the ability to produce their own expectations based on fundamental analysis (Menkhoff,1997). Fundamentals are excellent in guiding investors to discover potential for growth and prospect in the long-run and find greatly undervalued companies in the short run. However the main concept of both is the same "buy the securities when the stock prices of the specific securities are undervalued and sell when overvalued" (Muhammad and Ali, 2018, p.84).

1.1 Aim of the thesis:

This thesis aims to examine the predictive power of the fundamental analysis in regards to forecasting stock returns for the 8-year period of 2009 to 2016 of the 30 large capital blue chip companies, which are listed on the Dow Jones Industrial Average and answer the following questions:

- Can EPS, DPS, P/E & P/B ratios help forecast stock returns?
- Can ROA and ROE help forecast stock returns?
- Can Debt to Equity help ratio forecast stock returns?
- Can Current Ratio (CR) help forecast stock returns?

1.2 Structure of the thesis:

This thesis contains 6 chapters. The first chapter is Introduction. It discusses the stock market, briefly introduces DJIA, mentions types of analyses performed in decision making. The second section of this thesis presents the Introduction to Market Indices and The History of DJIA, it's weighing methodology and performance relative to other indices, furthermore we compare The Efficient Market Hypothesis (EMH) and Behavioral Finance. The third chapter of this thesis presents various findings in past and current literature related to fundamental analysis and its application in predicting stock returns using data drawn from different Stock Exchanges around the world such as Japan, Indonesia, Pakistan, Iran and many more. The fourth section explains the methodology (descriptive statistics, tests the regression assumptions and multiple regression based on secondary data), through which we draw inferences. The fifth section presents the findings through the use of graphs, figures and tables. The last section concludes the thesis and presents recommendations to future research.

2 Market Indices, DJIA, Efficient Market Hypothesis and Behavioral Finance

2.1 The Dow Jones Industrial Average

We often hear reporters, macroeconomists and financial analysts quoting The Dow Jones Industrial Average when addressing the economic situation, this is due to the fact that The Dow is often considered to be a barometer of the overall movement on the market. Nevertheless, certain academic fellows label the Dow as a flawed index relative to the other 'better-constructed' indices. The latter led us to question, do investors make a mistake by following the performance of the Dow Jones Industrial Average?

Before we look into this, we believe that we owe to our reader a brief introduction to market indices, the history of the Dow Jones Industrial Average, its weighing method as well as its performance and flaws relative to other popular indices.

2.2 Introduction to Market Indices and the history of the DJIA:

A market index is often defined as a broad portfolio representative of a certain segment of the market, therefore often considered a performance metric. Per (Pierre -Cyrille Hautcoeur, 2006) indices are of great importance in assessing long-term regularities that aid in understanding the evolution of the economy. Today, some of the most well-known indices include the S&P 500, The Nasdaq Composite Index and The Dow Jones Industrial Average. Although their weigh-in methodologies differentiate, they are all based around a weighted-average calculation. Depending on the weighing method the calculation of the value of an index can be: price based, market capitalization based, revenue based etc, (where weighing is defined as adjusting the individual impact of the components).

The story of the Dow Jones Industrial Average begins in late 1800s when Charles Dow and Edward Jones started publishing a daily market summary in a newspaper, they eventually saw the need to compose an index, representing 12 companies (9 railroad companies, one steamship company and a communications company) which were listed on the New York Stock Exchange, all operating in the industrial sector, as at the it was of great importance for the U.S Economy. Twenty years later in 1916, the Dow counted 20 companies and just 12 years later, it expanded to 30 companies. However, up until 1928, the average was calculated as the sum of all stock prices divided by the

number of companies listed excluding any market capitalization, dividends or stock splits thus the founders saw the need to implement a more accurate method, and they did so through the divisor, a metric adjusted after each stock split or a component substitution, hence ensuring that DJIA's validity as a benchmark not being compromised (Shoven and Clemens 2000).

2.3 DJIA's construction method vs. S&P 500 (price vs. value based)

One of the aforementioned types of index-weigh-ins is the price-weighted method. The Dow Jones Industrial Average follows that methodology. In fact if we were to estimate the value of the Dow Jones Industrial Average we would need to incorporate the following formula:

$$DJIA_t = \frac{\sum_{i=1}^n P_{i,t}}{d}, \text{ where}$$

$DJIA_t$ - is the value of the Dow Jones Industrial Average at time t (present time), d is the divisor which is equal to 0.15188516925198 (as of June 3rd, 2021), indicating that \$1 change in price of any stock will result in a 6.5839 ($1 / 0.15188516925198$) points increase in the value of the DJIA, while $P_{i,t}$ is the price of a stock i at present time t .

Therefore if we were to add the stock prices of all the components on the DJIA as of 16.08.2021 and divide them by the divisor shown above, DJIA would be valued at 35,515.38 points. Assuming this, it would mean that as of the moment of writing this thesis UnitedHealth Group Inc. a component of DJIA enjoys the highest weight of 7.7% compared to Microsoft with a weight of 5.4% although Microsoft has approximately 5 times the market capitalization of UHG, thus one of the three flaws of DJIA is that the importance of each stock is not based on the market capitalization (considered a size metric) but rather its price.

On the other hand a value weighted index such as the S&P 500 would use the following formula to estimate the value:

$$\text{Weighting S\&P 500} = \frac{\sum_{i=1}^n P_{i,t} \cdot M_{i,t}}{\sum_{i=1}^n M_{i,t}} \text{ where,}$$

Market Capitalization i stands for the market value (calculated by multiplying the price of a common share outstanding by the total number of shares outstanding) of a specific company, divided by the *Total Market Capitalization of the Index*.

Therefore if we were to use the Dow Jones Industrial Average components for the sake of comparison and weigh them according to the value weighted method, Microsoft would rank second due to a market capitalization of 2.2 trillion (as of 16.08.2021), while UnitedHealth Group Inc. would rank 7th.

2.4 Performance of the Dow Jones Industrial Average vs. S&P 500

In order to assess whether the price-weighting method of DJIA produces significantly different results from the market-capitalization method of S&P 500, (Shoven and Clemes 2000, p.12), studied both indices from the period of 1928 until 2000 and concluded that: “the difference between price and value weights may be theoretically important, in actual fact the price weighting has not caused the DJIA to differ significantly from what it would have been with the superior system of market capitalization weights”. Another study performed in 2021 by (J. Lin et. al 2021, p.5) found that: “the price weighting and the selection of the index constituents do not have a significant impact on the long-term performance of large-capitalization stocks in the U.S. For example, the arithmetic average price return of the DJIA from 1929-2019 amounts to 6.97% per year, whereas the corresponding average returns are 6.78% for a value-weighted index of the constituents of the DJIA and 6.68% for a value-weighted index of the largest 30 firms publicly traded on U.S. stock exchanges”.

2.5 Composition - Misleading or Appropriate?

DJIA's second flaw is that the 30 companies which comprise the index are not representative of the stock market. According to (Shoven and Clemes 2000) the companies included in the index as of 1999 accounted for only 27.39% of the value of all domestically listed companies, which led them to question: “Would price indexes with different compositions have performed significantly differently from the DJIA over the long run?” (Shoven and Clemens, 2000, p.12). To answer this question they composed an index consisting of the 30 largest publicly traded companies in the United States hereafter named as ‘BIG 30’ (valued by market capitalization), and evaluated their

performance for the period of 1928-1998. Their findings showed that: “The correlation between the BIG 30 and the DJIA equals 0.9487” (Shoven and Clemens, 2000, p.13), hence concluding that: “Value-weighted indexes perform very similarly even over very long time periods. Ergo, concentrating on a flawed index like the DJIA would not have been seriously misleading over long time periods” (Shoven and Clemens, 2000, p.13).

2.6 Market Indices, Dividends and Missed Returns:

Last but not least, the third yet ‘mutual’ flaw of the Dow Jones Industrial Average Index and the other indices is the exclusion of stock dividends, which according to researchers results in missing out on considerably better performance year over year. Likewise, missing out on dividend inclusion would mean missing out on a proper presentation of market returns as investors earn returns not only on stock price appreciation but on dividends as well. Given that stock prices decrease after an ex-dividend date (i.e stock prices go up due to demand when dividends are declared, therefore buyers who are in to capitalize on the dividends will sell the stock once dividends are paid out, therefore prices will adjust back to previous levels), for an index like the Dow which has more than 100 ex-dividend dates it results in significantly lower stock market returns (Shoven and Clemens, 2000). To put things into perspective, Shoven and Clemens considered a scenario where dividends are included in the calculation of value-weighted DJIA index, and conclude that: “Adding dividends increases the value of the index after 70 years by a factor of more than 25. Including dividends mitigates the effects of the Great Depression. A new all-time high is reached in January 1945 instead of November 1954 if dividends are included.” To further prove the findings of Shoven and Clemens, we look at another study which replicates the Dow Jones Industrial Average adjusted for dividends for the period between 1929-2019, their findings indicate that: “the replicated index outperforms the official DJIA in 60 of the 91 years covering our sample period” (J. Lin et. al 2021,p.18), noting that: “the replicated index exhibits a higher overall value as the missed stock dividends and right issues bias the value of the official DJIA downwards” (J. Lin et. al 2021,p.17).

From the latter, it can be concluded that indices which are often labeled as ‘superior’ due to their weighing method and construction in the long-run perform similarly as the often labeled ‘flawed’ Dow Jones Industrial Average. However, if indices were to incorporate cash dividends in the

calculation of their value it would allow for a far better representation of the market returns, therefore enabling investors to base their portfolio decisions to a more accurate market performance.

2.7 Efficient Market Hypothesis:

Popularized by Eugene Fama in the 1960s, the efficient market hypothesis states that prices of securities already reflect all publicly available information. Hence it can be concluded that outperforming the market would be pure luck, as nor by the use of technical analysis (studying past stock prices in order to predict the future prices), neither by fundamental analysis - “a process in which an investor studies accounting information, such as financial signals which in return provide data related to the performance of a company” (Tanevski 2021), investors would be able to achieve returns greater than in a portfolio comprised of randomly selected stocks (Burton, 2003).

Additionally, when researching, studies that were performed in the early 60s we concluded that most of them were based on the random walk model (for example see: Horne and Parker 1967). A random walk model means that the information arrives in a completely random manner. Any change in the prices of stocks are independent of each other, therefore past stock trends cannot be capitalized to predict any future movements, meaning that stock prices of tomorrow reflect the available information of tomorrow, and are not in any way related to the stock prices of today Burton (2003). The Efficient Market Hypothesis arrives at the same conclusion due to the fact that stock prices trade at their fair value all the time and arbitrage opportunities are almost non-existent.

Opposite of the topic to traditional finance which studies the Efficient Market Hypothesis is the study of Behavioral Finance which digs deep into investors' decisions and seeks patterns. In fact according to Kapoor and Prosad (2017) Behavioral finance is tied to the psychology of investors and its role in decision making thus since humans are beings with emotions their judgement can be clouded leading to irrational decisions. As a study Behavioral Finance started to blossom in the late 90s, when the so-called ‘cracks’ (read disruptive anomalies such as the crash of 1987 a period when the Dow Jones plummeted 20% in a single day) in the Efficient Market Hypothesis started to appear. In his paper, Shiller (2003) explains the crash of ‘87 through the ‘feedback model’. According to him “the talk attracts attention to “new era” theories and “popular models” that justify

the price increases. This process in turn increases investor demand and generates another round of price increases. If the feedback is not interrupted, it may produce after many rounds a speculative “bubble,” in which high expectations for further price increases support very high current prices. The high prices are ultimately not sustainable, since they are high only because of expectations of further price increases, and so the bubble eventually bursts, and prices come falling down. The feedback that propelled the bubble carries the seeds of its own destruction, and so the end of the bubble may be unrelated to news stories about fundamentals. (Shiller, 2003, p.91)”. Although Burton (2003, p.73) does not neglect the possibility that certain psychological and behavioral factors were influencing the crash of 1987, he states that: “yields on long-term Treasury bonds increased from about 9 percent to almost 10.5 percent in the two months prior to mid-October. Moreover, a number of events may rationally have increased risk perceptions during the first two weeks of October. Early in the month, Congress threatened to impose a “merger tax” that would have made merger activity prohibitively expensive and could well have ended the merger boom. The risk that merger activity might be curtailed increased risks throughout the stock market by weakening the discipline over corporate management that potential takeovers provide. Also, in early October 1987, then Secretary of the Treasury James Baker had threatened to encourage a further fall in the exchange value of the dollar, increasing risks for foreign investors and frightening domestic investors as well. While it is impossible to correlate each day’s movement in stock prices to specific news events, it is not unreasonable to ascribe the sharp decline in mid-October to the cumulative effect of a number of unfavorable “fundamental” events”, concluding that share prices can change drastically due to rational responses to small changes in interest rates. Therefore, it would be illogical to neglect the significance of external factors and base everything off irrational behavior that shows the reasons for the significant decline in the values of stocks. Furthermore, besides the crash of 1987, another famous market anomaly among behavioural finance researchers is the so-called ‘calendar effect’, and it is defined as the different stock market behaviour tied to the calendar whether that is a day, week or a month of the year. Such is the “January effect” - where prices of stocks rise in January, therefore providing investors with an opportunity to earn good returns. However as Burton (2003) states, it is not long before the market anomaly was discovered and exploited that it was no longer profitable.

Burton further goes on to discuss another phenomenon often mentioned by behaviorists and that is the so-called ‘internet bubble’ of the 1990s. Although he agrees that temporarily, asset prices

were incorrectly reflected and capital was inefficiently allocated, acknowledging such inefficiencies is the short-term cost for a flexible market which generally allocates capital in an effective and productive manner. Concluding that bubbles are nothing but the exception rather than the rule.

To further study this we looked into a research which analyzed 115 mutual funds from the period of 1955-1964 concluding the following: “The evidence on mutual fund performance discussed above indicates not only that these 115 mutual funds were on average not able to predict security prices well enough to outperform a buy-the-market-and-hold policy, but also that there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance” (Jensen, 1968, p.415). However, according to Shiller (2003, p.83) “Academic finance has evolved a long way from the days when the EMT was widely considered to be proven beyond doubt.”. On the other hand, Burton states that statistics from the period between 1990-2000s lead to a conclusion that 75% of the actively managed funds failed to beat the S&P 500, and funds which overperformed in a certain period have underperformed in the next one (such is the case with funds during the 70s who underperformed the S&P 500 in the 80s). Per Burton, the long-term data is even worse, as only 5 of 355 funds managed to outperform the market by 2% per year. Concluding that portfolio managers that do 'beat the market' can be counted on one hand as the records indicated that stock market predictability is non-existent and so are the exploitable opportunities for excess returns. As he states: “whatever patterns or irrationalities in the pricing of individual stocks that have been discovered in a search of historical experience are unlikely to persist and will not provide investors with a method to obtain extraordinary returns. If any \$100 bills are lying around the stock exchanges of the world, they will not be there for long.” (Burton, 2003, p.80).

This begs the questions, if stock prices really follow a random walk model, and if securities reflect all publicly available information, are investors such as Buffett and Munger defying the Efficient Market hypothesis or are they simply lucky, as the hypothesis states?

2.8 Behavioral Finance: ‘The beginning to an end?’

Behavioral finance stands on the shoulders of the “Prospect Theory” developed by (Kahneman and Tversky 1979), which states that investor’s decision making is affected by some psychological

factors, resulting in deviation from rationality. In addition to developing the “Prospect Theory” Tversky and Kahneman were among the first if not the first to introduce some heuristic biases, which in essence are straightforward rules of thumb that people have developed based on past experiences also known as ‘cognitive tools’ that help us in decision making. According to (Causi, p.18, 2017), “the human mind is in fact subject to biological and physiological limits, that force it thus to simplify the surrounding reality through an approximation of the information obtained or the use of heuristics and cognitive filters” . (Veni and Kandregula, 2020) further conclude that biases are shown to affect decision-making, particularly decisions tied to money and investing. Among the most know heuristic biases are:

- **Availability bias**, which tends to augment the volatility of the stock market. Namely investors with availability bias are known to react to the latest news or trend. In part, availability bias can be explained through the GameStop stock case of January, 2021 when a social media group created a buzz that drove the Game Stop stock from \$17 to approximately \$470 in less than one month. Thus it can be said that investors with availability bias tend to be inclined in investing in securities which are often recalled or mentioned frequently.
- **Representative bias** occurs when investors purchase securities which have risen in value recently, thus they tend to not consider the long-term return as they are short-sighted by the present returns, buying with expectation that the current returns will continue. Ascertaining that people tend to think in terms of past events rushing to conclusions with no precise information.
- **Anchoring and adjustment bias** indicates that investors tend to base their decisions on initial or recent information which they've obtained, therefore attaching (anchoring) themselves to a reference information and adjusting it subsequently until a desired value is obtained, which may turn out to have no logical relevance to the decision at hand. An example of this is when investors typically hold investments which have lost in value since they've anchored a security based on their initial price and or adjustments estimates rather than the fundamental value, waiting for it to rise back .
- **Framing Bias** investors are more oriented towards the manner in which the information is delivered rather than the content of it. In terms of investing, when investors are presented only with the gains of a certain asset class and almost no information on the losses or risk,

they tend to ignore the risks and make the investment and vice versa, when investors are presented with the risks only, they're likely to stay away from investing.

The aforementioned biases were introduced by (Tversky and Kahneman, 1974, 1981) in their papers "Judgment Under Uncertainty: Heuristics and Biases" and "The Framing of Decisions and the Psychology of Choice" respectively. Another notable publication and contribution to the development of Behavioral Finance is the paper by De Bondt and Thaler 1985 named "Does the Stockmarket Overreact". Namely in their research De Bondt and Thaler, studied extreme-case winners and losers by constructing portfolios of the best performing stocks during the past three years starting in 1933, and also forming portfolios of the 'worst performing' stocks in the same fashion. What they concluded was that 'loser' portfolios outperformed the 'winners' portfolios. Namely, "Over the last half-century, loser portfolios of 35 stocks outperform the market by, on average, 19.6%, thirty-six months after portfolio formation. Winner portfolios, on the other hand, earn about 5.0% less than the market, so that the difference in cumulative average residual between the extreme portfolios, equals 24.6% (t-statistic: 2.20)", concluding that: "in violation of Bayes' rule, most people "overreact" to unexpected and dramatic news events. (De Bondt and Thaler, p.799, p.804, 1985). (Ruppert. D 2004) which discusses the paper of De Bondt and Thaler views on the overreaction is that winners' performance is poor relative to losers since winners are too overpriced and must correct, while losers are too cheap and eventually increase significantly. Concluding that none of these corrections or mispricing should've occurred in the world of Efficient Market Hypothesis where securities reflect all publicly available information.

2.9 Homo economicus vs. Homo Sapiens

With the end of the seventies came various market anomalies that gave rise to behavioral finance as soon as investors started seeking justifications for market bubbles, over and under reactions to trends, earnings and non-news among the many, which the academic finance, specifically Efficient Market Hypothesis lacked justifying as per the academic finance fellows see: [Harry Markowitz "Modern Portfolio Theory (1956)"; Merton Miller and Franco Modigliani "Investors are Rational (1961)" and Eugene Fama "Efficient Market Hypothesis (1970)"] investors are rational, markets are efficient and returns are a function of risk solely. On the other hand Behavioral finance argues that by failing to accept the market anomalies and solely following the academic finance, investors would not be able to earn sufficient returns. Thus, understanding the other side of the coin is highly important.

In defense to the Efficient Market Hypothesis researchers propose the following three 'commandments':

- Investors are completely rational; thus, prices of securities will reflect their true value.
- If investors were not rational for some reason, the trading of irrational investors is said to be random and would be cancelled out, suggesting that market prices will still equal their true value.
- Even if a 'herd' of irrational investors decides to trade in a similar fashion, rational arbitrageurs will anul their influence on market prices.

In regards to the first commandment, Ruppert D. (2004), suggests that even though rational investing implies that prices are a random walk, it does not necessarily imply that random walk is due to rational investing, it could simply be that it is caused by irrational investors, thus random walks should not therefore not be interpreted in favor of the Efficient Market Hypothesis. Furthermore, the author suggests that irrationality is highly present among retail and institutional investors. Namely, investors fail to look at final levels of wealth, rather they form decisions based on the way a problem is formulated, in a sense that people who have strong aversion to losses are likely to make a decision if a question is framed in a way that it contains the word 'loss', per (Ruppert D., p.438, 2004) "the emotional impact of a loss is twice as strong as an equal-sized gain". Suggesting that 'loss aversion' a term coined by Kahneman and Tversky (1979) is highly

present in the market. Given the complexity of human nature, behavioral finance helps justify investors' investment decisions. Emotion, cognitive limitation, social influence and other psychological factors are among the few which lead to irrational decision making. Furthermore, by placing too much importance on recent news and discarding historical data investors tend to deviate from rationality therefore creating an abundance of 'noise traders' which further follow each other and thus it can be said that trading between investors is correlated (Ruppert D. 2004). The case is similar with institutional investors as well. Per (Ruppert D., p.438, 2004) "Managers also have their own types of irrationalities not found among small investors such as buying portfolios excessively close to a benchmark, buying the same stocks as other fund managers so as not to look bad, and window dressing i.e., adding stocks to the portfolio that have been performing well recently so that these stocks can be listed in the fund's report.". Hence suggesting that managers might be 'noise traders' too.

In regards to the third commandment of the EMH. In order for one to 'grab' an arbitrage opportunity there must be a 'close substitute' for the asset whose price level is incorrectly driven by 'noise traders'. The fallacy of the third commandment is that investors react to non-news such when companies are added to the S&P 500 Index, it is observed that the prices of their stocks rise in value, yet there is no fundamental justification for doing so, (Ruppert D., p.438, 2004) suggest that "the problem is that investors irrationally view the S&P 500 as the market index, rather than just an approximation to the market index, so many index funds must replicate the S&P 500 exactly. So, when a stock is added to the S&P 500, many index funds are forced to buy that stock, which creates new demand and drives up the price.". The author provides an example of such nature. Namely, the shares of America Online rose 18% when it was included in the S&P 500. If the stock price of AOL were overvalued at the time of inclusion, an investor (read arbitrageur) would short AOL, however given the existing possibility that the company's shares price may rise due to overall developments to all internet providers despite being overpriced, an arbitrageur could have simply hedged short sale AOL by purchasing shares of an identical company to AOL which would have not been recently added to the S&P 500 and overvalued. Per (Ruppert D. 2004) the problem in this lies in the fact that no other companies were comparable to AOL and in cases if there was one, it would take a very long time for the improper pricing of AOL to be corrected.

2.10 Patience: Homo sapi-economicus

Previously we questioned whether investors such as Buffett and Munger are defying the Efficient Market hypothesis or are they simply lucky, as the hypothesis states?

Now that we have analyzed the other side of the coin (read Behavioral Finance), we believe that The Efficient Market Hypothesis is half true, that markets are indeed efficient yet not always, at least not in cases of speculative bubbles and anomalies such as the Internet bubble of the 1990s, The January Effect and many more where they lack the power to provide explanations for such anomalies, however we also now know that investors are greatly influenced by emotions and are keen to the use of heuristics, which as we know following such trends and heuristic biases tends to cloud their judgement, leading to short-sightedness.

So, in essence Efficient Market Hypothesis and Behavioral Finance although they are the two sides of the coin, at the end they complete the coin, where Efficient Market Hypothesis fails to justify, Behavioral Finance will do, and vice versa, thence both should be applied in conjunction with each other in order to best understand human behavior and markets. In other words, understanding both academic and behavioral finance will likely set a ground for good performance.

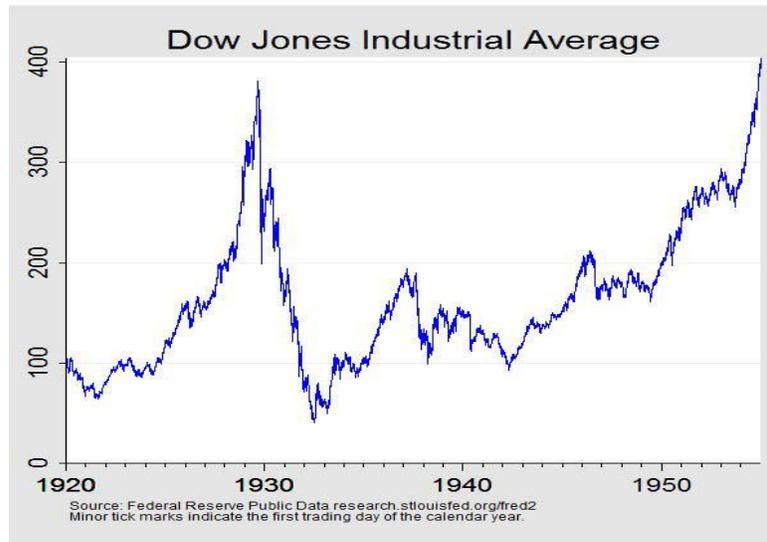
Therefore, we do believe that super investors as Buffett and Munger, are simply applying the best of both worlds when making decisions, not allowing for emotions to get the best of them, while remaining patient.

3.0 Literature review:

We previously discussed market indices, namely their construction methodologies, performance, their flaws but briefly on their history, thence in the following section we provide a detailed look into the history of stock market indices with their inauguration throughout the years in becoming the modern stock market indices we know today, Furthermore, we show findings of other researchers on financial ratios and stock returns and derive to our hypotheses based on the findings in literature.

The first official issuance of stocks to the public was in the early 1600s by the Dutch East India Company (Petram 2011), therefore instituting the first form of corporate establishment to have ever raised fixed capital. During this time, the British became increasingly aware of the evolution of the neighboring Netherlands and therefore sought to emulate their neighbors, and London cafes quickly became the hub of stock trading, eventually establishing what is today known as the London Stock Exchange in 1802. Similarly, in the mid 1800s the situation abroad was improving as well, with the U.S Railroads securities changing hands (from local and private investors) to a corporate market and Americans learning a great deal from the British, they became the leader of financial markets (Baskin, 1988). Hence, this fast-paced development, gave birth to the first stock exchanges and later in 1896 yielded in the creation of one among the many market indices known as the Dow Jones Industrial Average (DJIA).

In comparison to the countries on the old continent, the United States suffered no war on its own territory, economic development was increasing, unemployment decreased significantly and individuals were having the option to bear the cost of things they generally wouldn't. Thus, came what we today know as 'the roaring twenties', a time of extraordinary financial success. During the twenties, mass-delivered vehicles became common in the United States. In addition to this, theaters began to thrive and the aviation industry started to flourish. This great development led to an abundance of cash both for the individual investor and corporations and presented many opportunities which led to a boom in the stock market (see Graph 1) and gave rise to the financial press, which further contributed to the development of many market indices. Among the press which published data on indices and stocks that gained traction in the roaring twenties were Herald Tribune, The Analyst, The New York Times and Standard Statistic Company.



Graph 1: This graph depicts the period during the 1920s when the stock market was booming

The research of (Pierre -Cyrille Hautcoeur, 2006), provides a great insight into the early history of the financial press and market indices. According to him, “Herald Tribune mentioned indices not only in its heavy Sunday edition, but even in its daily editions, with a table giving an index of 70 industrial stocks, one of 30 railroads and one of 30 bonds, with sub-indices by industries. For each index, values for the previous week (max, min), the last day and one year ago were given, and, in another table, maximum, minimum and last values for each of the last five years. Some editions (Sundays and Mondays in 1929) published graphs of these data, and confronted other economic indicators, such as production indices, price indices, stock market volumes of transactions, broker’s loans, interest rates or monetary aggregates. Such a quantity of information is quite remarkable, especially for a journal which did not specialize in financial information (it published 5 pages of stock exchange quotations, including bonds and the “curb” market, but almost no analysis)” (Pierre -Cyrille Hautcoeur, p.3, 2006). Moreover, publications such as *The Analyst*, the weekly financial supplement of the *New York Times*, contained even more information about indexes and even graphically depicted their weekly values. As for the Standard Statistics Company (known as Standard & Poors Index), it mostly targeted finance experts and provided them with data on three daily indices and a weekly index representing 392 shares. Furthermore, it presented the most accurate data on market changes, through the incorporation of the market capitalization methodology and in addition removing any technical errors, hence making it the most useful

performance metric for portfolio managers now and then (Pierre -Cyrille Hautcoeur, 2006). Contrary to the United States, in Europe the most developed financial newspaper (The Financial Times), did not publish any data on market indices during the interwar period (11 November 1918 to 1 September 1939), even though it often reported on the stock market. According to (Pierre -Cyrille Hautcoeur, p.4, 2006) “The journal also gave a lot of attention to foreign markets (mostly New York, Paris and Berlin, but also Vienna, Amsterdam, Milan, Montreal), publishing substantial samples of security prices (60 for Paris for example), but mentioning no index”. Moreover, “L'économiste français, the business reference weekly, inspired by The Economist, published in its financial section detailed information on monetary policy, exchange rates, and financial information, but when presenting stock exchanges (either Paris or, more briefly, London, New-York, Canada, the Netherlands, Switzerland, Brussels) kept mentioning commented lists of quotations without any use of indices, synthetical tables or graphs, as late as 1938” (Pierre -Cyrille Hautcoeur, p.6, 2006). There are multiple reasons for lack of indices in the media during the interwar period. According to Pierre, among the many is the number of shareholders, which United States noted a significant increase in (and Europe lack thereof) through the successful introduction of preferred stock by Pennsylvania Railroad in 1871, given the nature of the instruments itself (a fixed income security), it allowed for a greater marketability among uneducated investors (Baskin, 1988).

Secondly, in France, the conversion from railroad stocks to quasi-bonds by the French government gave rise to risk averse investors. Likewise, Pierre suggests that the structure of the financial system, rapid development of investment trusts in the United States, as well as the various analysis techniques which were not common on the old continent (such as the Dow Theory and Technical Analysis) could serve as a justification for the lack of mention of indices in Europe and France specifically.

Today, there are many stock exchanges and indices around the world that contribute to firms raising capital and act as a channel of funds between lenders and savers (Melicher and Norton 2017). In fact, in 2017 the total market capitalization of the capital market peaked at \$79.23 trillion. (World Bank, 2017). Literature also suggests that there is a significant relation between market indices and Economic growth as measured in GDP. Namely, a study done by (Tekin and Yener 2019) who analysed multiple economies on different continents such as the United States, Europe, BRICS and Turkey for the period 1998 - 2017, determined causal relationship between stock

markets and economic growth. Additionally, (Hasan 2018) observed and concluded that the stock market has a significant impact on economic growth in Bangladesh, while (Ogbeide and Akanji, 2018) who examined the economic growth of Brazil, Russia, India, China and South Africa, ascertained that development of stock market significantly impacts the real GDP and thus economic growth of BRICS.

Nonetheless not all economies have equally developed and efficient stock markets. Depending on the how much information is reflected in prices the markets can be classified into three categories (Melicher and Norton 2017, p.356):

- strong-form efficient market: “A market in which prices reflect all knowledge, including past and current publicly known and private information”
- semi-strong form efficient market: where “all public information, both past and current, is reflected in asset prices.”
- weak form efficient market: where “prices reflect all past market information, such as past prices, price trends, and trading volume”

As defined previously the efficient market hypothesis states that prices adjust rapidly after important news appear, only in such cases a market is deemed efficient. The factors (news) that often cause stock prices to change are either of external or internal nature. External factors are considered ones such as new government policies, rate of inflation, economic and political conditions, while internal factors are ones such as companies fundamentals (the financial ratios used in this thesis, financial statements of a company etc.). Consequently, comes the importance of in-depth analysis. As mentioned in the previous section of this thesis, one of the methods which investors use to make decisions is fundamental analysis. Fundamental Analysis is a process in which an investor studies accounting information, such as financial signals which in return provide data related to the performance of a company. (Angahar and Malizu, 2015) found a positive association between accounting information and stock returns. However the importance to how well would the business perform (improve its stock returns) depends on how well the indicators will be evaluated and interpreted.

The first application of Fundamental Analysis in terms of predicting stock returns however was not until 1936 when Graham and Dodd analyzed the fundamentals of share valuation such as:

assets, liabilities, expenses, earnings and management expertise (Graham and Dodd, 1936). Today, many researchers have studied the financial signals and drawn inferences, among which is the 'pioneer work' of (Ou and Penman, 1989) who discovered that fundamentals are not always reflected in prices concluding that through fundamental analysis investors can achieve abnormal returns as well as predict future earnings. Contrary to this, Abarbanell and Bushee (1996) found that the approach of Ou and Penman (1989) withholds a significant number of explanatory variables, stating that some do not have any soundness as to why they are good signals in predicting future earnings, however they do not offer any appropriate financial signals. Moreover, (Reinganum, 1988) researched 222 companies that doubled their returns in a calendar year, finding that all share 9 common characteristics, among which is a high P/E ratio. To further inspect the predictive power of financial ratios, (Muhammad and Ali 2018) used five fundamental signals and through multiple statistical models concluded that some of the variables have significant and positive relationship with stock returns in Pakistan. Contrary to this, (Iqbal et. al 2018) performed F-SCORE fundamental analysis drawing evidence from non-financial firms on the Pakistani Stock Exchange concluding a positive yet insignificant relationship between signals and stock returns.

Dwiyanto and Hatta (2012) investigated the effects of companies' fundamental factors using evidence from the Indonesian Stock Exchange for the period of 2002 - 2006 concluding that Earnings Per Share (EPS) has a positive and significant effect on stock prices on the Indonesian market. Likewise, (Ebrahimi and Chadegani, 2011) studied the companies listed on the Iranian stock market and found a direct relationship between Earnings Per Share (EPS) and stock returns, as well as a direct and significant relationship between current period dividend per share (DPS) and stock returns. Additionally, (Twaijry, 2006), who tested the relationship between dividends and earnings and the behaviour of stock returns concluded that changes in dividend per share are the most powerful indicator in explaining stock returns and relative to the profits, company dividends affect prices of shares 15 times as much. Moreover, (Aono and Iwaisako, 2010) conclude that (P/E) ratio exerts quite stronger influence when predicting stock return on the U.S market relative to the Japanese stock market.

Fama and French (1992) concluded that book-to-market ratio is among the indicators with predictive ability when it comes to assessing stock returns. Additionally, (Donnelly, 2014, p.26) who researched the relationship between book-to-market ratio, earnings expectations and valuation

of stocks states the following: “BTM ratio has an ability to predict earnings disappointments, at least in the sense that value stocks will have more earnings disappointments and that these disappointments are larger on average than those of growth stocks. They also show that the BTM ratio predicts how the market reacts to an earnings disappointment”, therefore concluding the association between Book-to-Market Ratio and returns.

However, not all findings show a significant and positive relationship between the financial signals and stock returns. Namely, Current Ratio (CR) and Return on Assets (ROA) have insignificant effect on the stock prices in Indonesia. (Dwiyanto and Hatta 2012). Likewise (Muhammad and Ali 2018) found negative relationship between Current Ratio (CR) and stock returns in Pakistan, additionally, (Dwiyanto and Hatta 2012) also found that Debt to Equity (D/E) ratio, has a negative relationship with stock prices in Indonesia. Lastly, according to the findings of (Ahsan, 2012), Return on Equity has a significant impact on estimating future stock returns.

The differences in findings by researchers across the world lead us to establish the following hypotheses:

Hypothesis 1: There is a significant relationship between profitability ratios (ROA and ROE) and stock returns

Hypothesis 2: There is a significant relationship between liquidity measured in (Current Ratio) and leverage ratio (Debt to Equity) and stock returns

Hypothesis 3: There is significant relationship between market-based ratios (EPS, P/E, BTM and DPS) and stock returns

4.0 Methodology:

This thesis aims at exploring the predictive power of fundamental analysis in stock returns. The secondary data used in the thesis is drawn from the 30 companies listed on DJIA for the period of 2009 - 2016. However, since the DOW revises its components from time to time to, we continue to work and analyze the companies listed in 2009. Moreover, data from their financial statements will be extracted and analyzed via the eight fundamental signals which were discussed in the previous section. The goal of the signals is to evaluate the four main operational aspects of a company: profitability, liquidity, solvency and market performance. The latter will be achieved by calculating all of the ratios listed below as well as by performing a descriptive statistical analysis (central tendency) and correlational analysis (correlation and multiple regression) of the data using SPSS software.

As mentioned previously “Fundamental Analysis is a process in which an investor studies accounting information, such as financial signals which in return provide data related to the performance of a company” (Tanevski, 2021). Given this, a possibility exists that a fundamental analyst considers signals which may slightly differentiate. Therefore, we hereby list and define the ratios which will be used in this thesis. As stated in the book by (Reimer, 2009, p.75, p.289, p.338, p.388, p.389),

Current Ratio: “is a liquidity ratio that measures a firm’s ability to meet its short-term obligations”

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Return on Assets: “is a ratio that measures how well a company is using its assets to generate income. It is defined as net income divided by average total assets”

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

Debt to Equity: “compares the amount of a firm’s liabilities to the amount of its equity, an indication of solvency”

$$\text{Debt to Equity} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

Earnings Per Share: “is a commonly used measure of a firm performance, defined as net income - preferred dividends divided by the weighted average number of common shares outstanding”

$$\text{Earnings Per Share} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Weighted Average Number of Common Shares Outstanding}}$$

Return on Equity: “measures the amount of income earned with each dollar of common shareholders’ investment in the firm. To calculate ROE, take net income minus preferred dividends divided by average common shareholders’ equity”

$$\text{Return on Equity} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Common Shareholders' Equity}}$$

Price-Earnings (P/E) ratio: “is the market price of a share of stock divided by that stock’s earnings per share”

$$\text{Price-Earnings} = \frac{\text{Market Price per Share}}{\text{Earnings Per Share}}$$

Book to Market Ratio (BTM): represents a comparison of a company’s book value to its market value, calculated as the net value of assets divided by the company’s market capitalization.

$$\text{Book to Market} = \frac{\text{Book Value} - \text{Preferred Dividends}}{\text{Market Capitalization}}$$

Dividend per share (DPS): is calculated by dividing the total amount of declared dividends by the number of shares outstanding, which in return shows the income per share for the shareholders.

$$\text{Dividend per share} = \frac{\text{Total Dividends}}{\text{Number of Shares Outstanding}}$$

Econometric Model

Basic regression equation:

$Y = \beta_0 + \beta_1 X_1 + \varepsilon$, which can be rewritten as follows:

$$SR = \beta_0 + \beta_1 * CR + \beta_2 * ROA + \beta_3 * ROE + \beta_4 * DPS + \beta_5 * BTM + \beta_6 * EPS + \beta_7 * P/E + \beta_8 * D/E + \varepsilon$$

$$SR = \frac{\beta_1 - \beta_0 + \beta_1 \beta_2 \beta_3 \beta_4 \beta_5 \beta_6 \beta_7 \beta_8}{\beta_0} \times 100\%$$

Where:

SR - stock return, the dependent variable in this model defined as the percentage change due to increase/decrease in stock value (Ending Period Stock Price - Beginning Period Stock Price + Dividends) divided by the Beginning Period Stock Price

β_0 - (intercept), the stock return when all given variables are equal to 0 - which in this model would have no practical/economic meaning, as a company cannot have no turnover, assets or any equity on their books.

β_1 - (b1 or beta 1), the change in the independent variable, for a unit change in the variable ε - 'standard error', other factors omitted and therefore not explained by the regression equation

CR - current ratio

ROE - return on equity

BTM - book to market

P/E - price to earnings

P0 - Initial Stock Price

ROA - return on assets

DPS - dividend per share

EPS - earnings per share

D/E - debt to equity

P1 - Ending Stock Price

5.0 Research Results

5.1 Components of Dow Jones Industrial Average

Table 1. Components of The Dow Jones Industrial Average

ID	Ticker Symbol	Company Name	Ticker Symbol	Company Name	
1	MMM	3M	16	MCD	McDonalds
2	AA	Alcoa Inc.	17	MRCK	Merck & Co., Inc. and Subsidiaries
3	T	AT&T	18	MSFT	Microsoft Corporation
4	BA	The Boeing Company	19	PFE	Pfizer Inc.
5	CAT	Caterpillar Inc.	20	PG	The Procter & Gamble Company
6	CVX	Chevron Corp.	21	UTC	United Technologies Corporation
7	CSCO	Cisco Systems, Inc.	22	VZ	Verizon Communications Inc.
8	KO	The Coca Cola Company	23	WMT	Wal Mart Stores Inc.
9	JNJ	Johnson & Johnson	24	DIS	The Walt Disney Company
10	IBM	International Business Machines	25	TRV	The Travelers Companies, Inc.
11	INTC	Intel Corporation	26	GE	General Electric Company
12	HD	The Home Depot, Inc. & Subsidiaries	27	KFT	The Kraft Foods Inc.
13	HPQ	Hewlett-Packard Company & Subsidiaries	28	BAC	Bank of America
14	XOM	ExxonMobil	29	AXP	American Express
15	DD	E. I. du Pont de Nemours & Company	30	JPM	JP Morgan Chase & Co.

3M (MMM)

3M is an American multinational corporation based in Minnesota, founded in 1902. Formerly known as Minnesota Mining and Manufacturing Company, the company is currently under the leadership of CEO Mike Roman. The first public listing occurred in 1946 on the New York Stock Exchange, while on 9th of August, 1976, 3M was added to the Dow Jones Industrial Index. The corporation operates in multiple industries such as automotive, health care, safety, transportation, electronics etc. The company's operations range across 70 countries and multiple geographical regions such as Europe, Middle East, Africa, Asia North and South America.

Alcoa Inc. (AA)

Alcoa Inc. is an American corporation and one of the largest producers of aluminium in the world. It is based in Pennsylvania, and was founded in 1888 by Charles Martin Hall. Alcoa Inc. went public on July 31, 1925 and in 1959 became a component of the Dow and remained so for 54 years. The company is currently led by CEO Roy Harvey. Alcoa's operations are established in many countries such as North and South America, Norway, Brasil, Spain, Iceland, Australia, Saudi Arabia, etc.

AT&T (T)

AT&T is the world's largest telecommunications and the largest mobile phone service provided in the United States. It was founded by Alexander Graham Bell, Thomas Watson, Gardiner Hubard and Thomas Sanders in 1875. The company IPO'd in 1984, and it was a component of the DJIA for 99 years. The company's operations span across Asia, Australia, Europe, Middle East and The Americas, and is currently led by John Stankey who assumed the role of Chief Executive Officer.

Boeing (BA)

The Boeing Company is the world's largest multinational producer of commercial and defense jetliners corporation headquartered in Illinois operating in the aerospace industry. The company was founded by Willian E. Boeing in 1916, and became listed on the NYSE in 1962, while in 1987 it joined the Dow Jones Industrial Average Index. Boeing is currently led by Dave Calhoun who assumed the role of CEO in 2020. The company currently operates in more than 65 countries which include China, Australia, Japan, Russia, India, Israel, Asia and many more.

Caterpillar (CAT)

Caterpillar is the world's leading manufacturer of mining and construction equipment, operating in the farm and heavy construction machinery sector. The company was founded in 1925, headquartered in Illinois, and began trading on the NYSE in 1929 and in 1991 it was added to the Dow Jones Industrial Average. In 2017, Jim Umpleby assumed the company's CEO position and has been leading the company since then. Caterpillar currently operates in many European countries, The Middle East, Africa, Asia Pacific and The Americas.

Chevron Corporation (CVX)

Chevron Corporation was founded in 1876 and is the successor of Pacific Coast Company and The Standard Oil Company. Headquartered in California, it was publicly listed in 1920 on the New York Stock Exchange, and became part of the Dow in 2008. The company's current Chief Executive Officer is Mike Wirth. Chevron operates in the oil and natural gas industry with subsidiaries across the world with offices in The Middle East, Russia, Europe, South America and North America.

Cisco Systems (CSCO)

Cisco is an American multinational technology conglomerate corporation headquartered in California. Their main operations involve developing, manufacturing and selling hardware, software, among other technology services and products. The company was founded in 1984 by Sandy Lerner, and first went public in 1990, while in 2009 it became part of the Dow Jones Industrial Average. Cisco Systems is currently led by Chuck Robbins who assumed the role of Chief Executive Officer in 2015. The company's operations span across 75 countries which include Canada, Germany, France, Spain, Israel, Algeria, North Macedonia and many more.

The Coca-Cola Company (KO)

The Coca-Cola Company is an American multinational beverage corporation headquartered in Atlanta, Georgia. The company was founded by Assa Griggs Candler in 1885 and went public by 1919. In 1987 it became a component of the Dow Jones Industrial Average Index. Coca-Cola currently has its operations established in Europe, Africa, Asia, Middle East, Australia, South and North America and it is currently led by James Quincey who assumed the role of Chief Executive Officer back in 2017.

Johnson and Johnson (JNJ)

Johnson and Johnson is an American multinational pharmaceutical corporation which produces and manufactures medical devices, pharmaceuticals, and consumer packaged goods. Founded in 1886 by Robert, James and Edward Johnson, since 1944 it is listed on the New York Stock Exchange and became part of the DJIA in 1997. Johnson and Johnson is headquartered in New Jersey and is currently led by CEO Alex Gorsky. The company operates in Europe, Asia, Middle East, Pacific and The Americas.

International Business Machines (IBM)

International Business Machines is an American multinational technology corporation based in New York. The company was founded in 1911 by Charles Flint, and was listed on the NYSE in the same year. The company became part of the Dow Jones Industrial Average in 1976. IBM manufactures hardware and software, and as of 2016 they also offer cloud computing, artificial intelligence, commerce, data and analytics. The company is currently run by CEO Arvind Krishna and serves customers in 177 countries around the world.

Intel Corporation (INTC)

Intel Corporation is an American multinational technology company and world's largest chip manufacturer most known for 'x86' processors, founded in 1968 by Gordon Moore and Robert Noyce, with headquarters in California. Intel went public in 1971 on NYSE and since 1999 has been a component of the Dow Jones Industrial Average Index. The company is currently led by Patrick Gelsinger who assumed the role of Chief Executive Officer in 2021. Intel Corporation operates worldwide and has offices in Australia, Canada, Argentina, Austria, Canada, China, Finland, India, Israel etc.

The Home Depot (HD)

The Home Depot operates in the home improvement retailer industry in the United States and is the largest supplier of tools, home improvement products and services in the United States. Founded in 1978 by Bernard Marcus, Arthur Blank, Ron Brill, and Pat Farrah, currently headquartered in Georgia with more than 2300 offices in Canada, Mexico and the United States. Home Depot went public in 1981 on the New York Stock Exchange and since 1999 has been a component of the Dow. As of 2014, Craig Menear is the acting Chief Executive Officer.

Hewlett-Packard (HPQ)

Hewlett-Packard commonly known as HP, is an American multinational information technology company founded and headquartered in California in 1939. The company offered their first shares to the public in 1957 by becoming listed on the NYSE, and was a component of the DJIA from 1997 - 2013. Hewlett-Packard has its operations in more than 170 countries across Africa, Europe, Pacific, Asia and The Americas. As of 2019, HP, is led by Enrique Lopes who assumed the role of Chief Executive Officer

Exxon Mobil (XOM)

Exxon Mobil is an American multinational gas and oil corporation. The company was founded in 1999 by the merger of Exxon and Mobil and is the successor to Standard Oil Company which went public in 1920, while just eight years later in 1928 it was added to the DJIA. Exxon Mobil currently operates in Asia-Pacific, The Americas, Europe and The Middle East. The company's current Chief Executive Officer is Darren Woods.

E.I. Du Pont de Nemours & Company (DD)

E.I. Du Pont De Nemours and Company (post merger known as The DowDupont Company) was an American conglomerate founded in 1802 and incorporated in 1915 in Delaware. The company is mostly known for developing teflon, a product used on non-stick pans, additionally, the company is a leader in agricultural, nutrition products and many polymers, E.I. Du Pont De Nemours and Company joined the Dow Jones Industrial Average in 1935 and remained a component of the index until 2017. The company's operations spanned across Canada, Europe, The Middle East, Asia, South and North America. As of 2015 the Chairman and CEO of DuPont is Edward Breen.

McDonald's (MCD)

McDonald's is an American fast food franchise founded in 1940 in California by the McDonald brothers. The company operates more than 39,000 stores in 119 markets world wide. The company's corporate initial public offering occurred in 1965 which allowed McDonalds to be listed on the New York Stock Exchange, and since 1985 has been among the 30 blue chip companies on the DJIA. As of 2019, the franchise is led by Chris Kempczinski who assumed the role of Chief Executive Officer.

Merck and Co. Inc. and Subsidiaries (MRK)

Merck & Co. is a pharmaceutical company headquartered in New Jersey, and founded by the Merck family in 1668 and later set up an affiliate company in New York. The company is known for developing the first smallpox vaccine. Merck & Co was added to the DJIA in 1979. Today, Merck and Co. operates in Mexico, South America, Russia, India, China, South Africa etc. As of 2021 Robert Davis is the acting Chief Executive Officer of Merck and Co.

Microsoft Corporation (MSFT)

Microsoft Corporation is an American multinational technology corporation which develops computer software, electronics and offers other IT services. Microsoft Corporation was founded in 1975 in New Mexico by Bill Gates and Paul Allen. The company has been publicly listed on the New York Stock Exchange since 1986 and has been a component of the DJIA since 1999. The technology giant is led by Satya Nadella who assumed the role of Chief Executive Officer in 2014, and has been leading Microsoft's operations ever since. As of 2021 the company operates in more than 150 countries worldwide.

Pfizer Inc. (PFE)

Pfizer Inc. is an American multinational pharmaceutical and biotechnology established in 1849 by Charles Pfizer and Charles Erhart. Headquartered in New York, Pfizer has been publicly listed on the New York Stock Exchange since 1942 and was added to the Dow Jones Industrial Average Index in 2004. Pfizer's operations are led by Alber Bourla who assumed the role of chairman and CEO as of 2019. As of 2015 Pfizer's products are present in more than 55 countries globally.

Procter and Gamble (PG)

The Procter & Gamble Company is an American multinational consumer goods founded by William Procter and James Gamble in 1837, with headquarters in Ohio. The company issued their first shares to the public in 1890 and thus became listed on the New York Stock Exchange, and since 1932 has been a component of the DJIA. Procter and Gamble is a global company with operations in approximately 70 countries. As of 2015 David S. Taylor is the Chairman, President and CEO of Procter & Gamble.

United Technologies Corporation (UTX)

United Technologies Corporation was a multinational conglomerate with headquarters in Connecticut, and as of 2020 is part of Raytheon Technologies. United Technologies was incorporated in Delaware in 1934 and listed on the New York Stock Exchange, and since 1939 has been a component of the DJIA. United Technologies Corporation provided high-technology systems and services to the building and aerospace industries. Since its merger with Raytheon Technologies UTX has become a wholly owned subsidiary led by Gary Reyes who was a Chief Executive Officer of UTX from 2016 to 2020, and is now the CEO of Raytheon Technologies. The company supplies more than 10 countries worldwide which includes Germany, Israel, Taiwan, Kuwait, Japan etc.

Verizon Communications (VZ)

Verizon Communications is an American multinational telecommunications company founded in 1983, headquartered in New York. The company began trading on the New York Stock Exchange in 2000, and since 2004 has been a component of the DJIA. Verizon Communications's office locations span across the world in many Brasil, USA, Philippines, Czech Republic, Ireland, The Middle East and many more. As of 2018 Verizon is led by Hans Vestberg who assumed the role of Chief Executive Officer.

Walmart Inc. (WMT)

Walmart Inc. was founded in and headquartered in Arkansas in 1962 by the Walton family. Walmart is the world's largest retailer, rushing value-priced groceries to lower-income families through a hyperchain of stores across the United States and internationally. The markets where the company operates are Africa, North America, South and Central America. The company began trading on the New York Stock Exchange in 1970, and since 1997 has been a component of the DJIA. As of 2014 Doug McMillon leads the market chain as a Chief Executive Officer.

The Walt Disney (DIS)

Walt Disney Company operates in multiple nations as a mass media and entertainment conglomerate with headquarters in California. The Company was founded by Walt Disney and Roy Disney in 1923 in California. The Walt Disney Company began trading in 1957 on the New York Stock Exchange and since 1991 has been part of the 30 blue chip companies listed on the DJIA. The company is most famous for its Disney Park which can be found in the US, France and Japan. As of 2020 the company's CEO is Bob Chapek who previously operated as a chairman of Disney Parks.

The Travelers Companies (TRV)

The Travelers Companies is an American insurance company and the second largest writer of commercial property in the US. The Company was founded by James Batterson in 1853 in Minnesota with headquarters in New York. Travelers Companies began trading in 2002 on the New York Stock Exchange and has been a component of DJIA since 2009. Travelers operate in more than 150 countries which include the United States, Canada, the United Kingdom and Ireland. The Chairman and Chief Executive Officer of the company is Alan Schnitzer who assumed the role in 2015.

General Electric (GE)

General Electric is an American multinational conglomerate founded in New York in 1892 and headquartered in Massachusetts, operating in the machinery industry. The company was listed on the NYSE in 1896 and became one of the first 12 companies to be added to the Dow Jones Industrial Average Index where it remained for 122 years. General Electric's operations span across 130 countries on multiple continents which includes Africa, The Americas, Asia, Middle East, Europe and Australia. As of 2018 Lawrence Culp Jr. assumed the role of Chief Executive Officer and has been leading the company ever since.

Kraft Foods Inc. (KRFT)

Kraft Foods Group, a subsidiary of Mondelez Incorporated, (post-merger known as Kraft Heinz) is among the largest food and beverage companies in North America and internationally. The company was founded in 1923 in Illinois by James L. Kraft, headquartered in Illinois. In 2001 the company issued their first shares once it became listed on the Nasdaq Stock Exchange and became a component of the Dow Jones Industrial Average in 2008 and remained there until 2012. The company merged with Heinz in 2015 creating "The Kraft-Heinz" Company, which today operates in more than 40 countries. The Chief Executive Officer of Kraft Foods was John T. Cahill assumed the role in 2012 and led the company until its merger after becoming vice chairman in 2015.

Bank of America (BAC)

Bank of America Corporation is an American multinational investment bank financial service provider founded in 1998 when NationsBank of Charlotte acquired BankAmerica. Bank of America is headquartered in North Carolina. The company was listed on the New York Stock Exchange in 1973 as BankAmerica until its acquisition later when it changed the name to Bank of America. From 2008 to 2013 Bank of America was a member of the Dow Jones Industrial Average. Today, the company operates in more than 40 countries with branches in Canada, Europe, Middle East, Africa, The Americas, Asia and Australia.

American Express (AXP)

The American Express Company is a multinational financial services corporation headquartered in New York, founded in 1850. The company went public in 1958 and joined the Dow Jones Industrial Average by 1982. The company is widely known for its credit card business and operates in more than 30 countries. As of 2018 Stephen Squeri assumed the role of Chief Executive Officer.

J.P. Morgan Chase & Co. (JPM)

J.P. Morgan Chase & Co. is an American multinational investment bank and financial services company founded in 2000 as a merger between J.P. Morgan & Co. and Chase National Bank, however the company's oldest predecessor can be traced back to 1799 known as Bank of Manhattan Company. J.P. Morgan issued its first shares in 1942 and joined the Dow Jones Industrial Average in 1991. Today J.P. Morgan Chase & Co. operates in more than 60 markets and since 2005 is led by Jamie Dimon who assumed the role of Chief Executive Officer.

5.2 Descriptive statistics

The descriptive analysis of the dependent and the explanatory variables is presented in Table 2

Explanatory variables:

Table 2. Descriptive Statistics

		SR	CR	ROA	ROE	DE	EPS	PE	BTM	DPS
N	Valid	240	240	240	240	240	240	240	240	240
	Missing	0	0	0	0	0	0	0	0	0
Mean		,1511	1,3400	,0716	,2441	3,4417	3,9230	14,6872	,4751	1,6306
Median		,1250	1,2800	,0700	,1900	1,5800	3,4100	15,2900	,3400	1,6550
Std. Deviation		,25736	,76413	,05284	,28515	7,50102	3,19200	84,01150	,60112	1,06741
Range		1,98	3,49	,35	2,83	116,69	21,47	1472,23	7,20	5,50
Minimum		-,69	,00	-,11	-,41	-15,07	-6,41	-808,78	-,15	,00
Maximum		1,29	3,49	,24	2,42	101,62	15,06	663,45	7,05	5,50
Percentiles	25	,0100	,9225	,0300	,1100	,9725	1,6450	12,0025	,2325	,8050
	50	,1250	1,2800	,0700	,1900	1,5800	3,4100	15,2900	,3400	1,6550
	75	,2600	1,8100	,1000	,2700	3,8900	5,4725	20,2425	,5675	2,1975

As evident from Table 2, the average short term liquidity is 1,34, however it is important to note that the due to the inclusion of financial entities in our sample minimum current ratio of 0 is present, ergo it can greatly influence the average and is not by any means a true representation of the liquidity of financial institutions as their statement of financial position is not prepared in a traditional manner and it does not constitute a typical working capital, therefore we have decided to include the median which is not affected by extreme values and it provides a more transparent measure of the short-term liquidity. The results indicate that the median current ratio is 1,28, or 0.28 above the minimum acceptable current ratio of 1. On the other hand, Cisco Systems enjoys a favorable short-term liquidity with a current ratio of 3,49, and hence it can be said that it has solid operations since elevated liquidity is an indicator of such. Last but not least, the standard deviation of 0.76 indicates that 68% of the observed current ratios are clustered between 0.58 and 2,1 (one standard deviation away from the mean). Regarding profitability, on average, companies were able to generate 7.6% return, on assets and 24.41% on equity, respectively. With the most efficient utilization of assets being 24%, yet ranging to -11%. ROE on the other hand has even higher variation with values ranging from -41% to 242%, thus it should be noted that as in the case of current ratio, the median return on equity would be a more reliable indicator. As for the level of indebtedness, from Table 2, it is evident that only 25% of our observations had a debt to equity ratio lower than or equal to 0.975, however, in light of the data published in the yearly reports it must be noted that many companies were in a continuous share repurchase program which

considerably decreased their equity or brought about a negative stockholder's equity (see McDonald's Annual Report 2016), which may interpret the unfavorable indebtedness present in many of our observations.

In the case of the market based explanatory variables, extremely high range in values is noted in P/E ratio as evident per the maximum and minimum values (i.e. lowest and highest values in the dataset) of -808.78 and 663.45 respectively, with an average P/E multiple of 14.68 and a high standard deviation of 84.01 which suggests that 68% of the companies had a PE multiple in the range of -69.33 and 98.69, consequently it is best that investors use P/E multiples in conjunction with other metrics when justifying the financial health of companies. Contrarily, Book to Market does not exhibit such a high deviation from its mean of 0.475 which implies that on average companies are trading below their value, with only 1 out 30 companies trading at 7 times its book value. As for the earnings per share and dividend per share, in both cases substantial range of values was noted, -6.41 to 15,06 and 0 to 5.50 for earnings per share and dividend per share respectively, where the average dividend per share was \$1,36 while the average earnings per share was \$3.92, however we must consider that earnings per share can be manipulated by share buybacks which was ongoing many companies during the period of 2009-2016, and ergo potentially inflated.

5.3 Correlation matrix

Table 3. Pearson's Correlation

		SR	CR	ROA	ROE	DE	EPS	PE	BTM	DPS
SR	Pearson Correlation	1	-.005	.027	.003	-.019	-.048	-.204**	-.160*	-.085
	Sig. (2-tailed)		.935	.674	.968	.772	.463	.001	.013	.187
CR	Pearson Correlation	-.005	1	.459**	.074	-.206**	-.134*	-.024	-.333**	.012
	Sig. (2-tailed)	.935		.000	.251	.001	.039	.711	.000	.855
ROA	Pearson Correlation	.027	.459**	1	.383**	-.202**	.422**	.035	-.365**	.289**
	Sig. (2-tailed)	.674	.000		.000	.002	.000	.585	.000	.000
ROE	Pearson Correlation	.003	.074	.383**	1	.390**	.411**	.023	-.317**	.389**
	Sig. (2-tailed)	.968	.251	.000		.000	.000	.726	.000	.000
DE	Pearson Correlation	-.019	-.206**	-.202**	.390**	1	.105	.009	.047	.143*
	Sig. (2-tailed)	.772	.001	.002	.000		.106	.889	.464	.027
EPS	Pearson Correlation	-.048	-.134*	.422**	.411**	.105	1	.018	-.210**	.662**
	Sig. (2-tailed)	.463	.039	.000	.000	.106		.778	.001	.000
PE	Pearson Correlation	-.204**	-.024	.035	.023	.009	.018	1	.323**	-.179**
	Sig. (2-tailed)	.001	.711	.585	.726	.889	.778		.000	.005
BTM	Pearson Correlation	-.160*	-.333**	-.365**	-.317**	.047	-.210**	.323**	1	-.311**
	Sig. (2-tailed)	.013	.000	.000	.000	.464	.001	.000		.000
DPS	Pearson Correlation	-.085	.012	.289**	.389**	.143*	.662**	-.179**	-.311**	1
	Sig. (2-tailed)	.187	.855	.000	.000	.027	.000	.005	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

As defined in the book by Levine et. al (2011): correlation is “a measure of the relative strength of a linear relationship between two numerical variables” with the values ranging from -1 (a perfect negative correlation,) to +1 (a perfect positive correlation), indicating that as one variable of interest increases the other one decreases and vice versa. The correlation matrix (see Table 3) indicates that current ratio (findings are consistent with the available literature, see: (Muhammad and Ali, 2018), who studied the fundamental signals for the prediction of stock returns), dividend per share, debt to equity, book to market as well as earnings per share exhibit negative yet insignificant correlation with the dependent variable stock return, where significance is defined as at a level of 0.05. On the other hand, Return on Assets, Return on Equity exhibit positive yet insignificant correlation with stock returns. Thence, the only variable in this model that demonstrates a significant yet negative correlation with the dependent variable is Price to Earnings ratio, leading to a conclusion that as Price to Earnings ratio increases the Stock Returns decrease and vice versa.

5.4 Testing Assumptions

Multiple regression requires that certain assumptions such as normality, linearity, homoscedasticity, multicollinearity and autocorrelation are tested. Per (Razali and Wah, 2011, p.21): “Parametric statistical analysis is one of the best examples to show the importance of assessing the normality assumption. Parametric statistical analysis assumes a certain distribution of the data, usually the normal distribution. If the assumption of normality is violated, interpretation and inference may not be reliable or valid”. The verification can be done through numerical and graphical tests. Among the most commonly used numerical tests are Shapiro-Wilk and Kolmogorov-Smirnov hereafter named as ‘S-W’ and ‘K-S’ respectively, however given the findings of Stephens (1973), where K-S test was found to be less powerful relative to other normality tests including Shapiro-Wilk, which was originally intended for use in sample sizes of less than or equal to 50 observations. (see: Razali and Wah, 2011), we have decided to proceed by performing a visual assessment of the normality through the figures presented below (See Figure 1 - Figure 16).

Figure 1. Histogram of Current Ratio

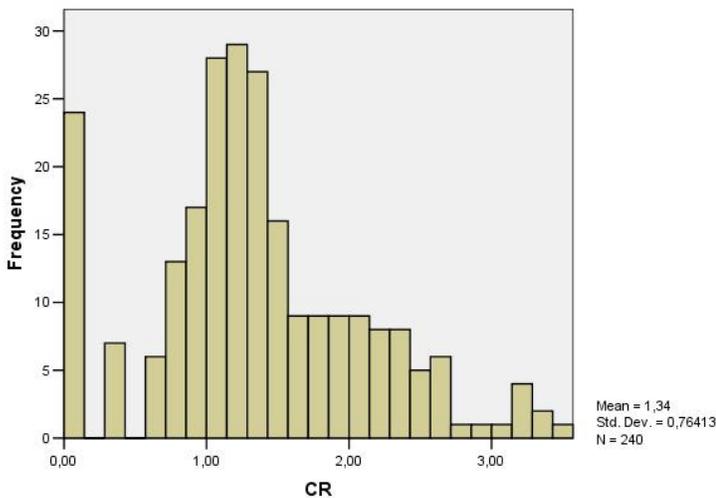


Figure 2. Q-Q Plot of Current Ratio

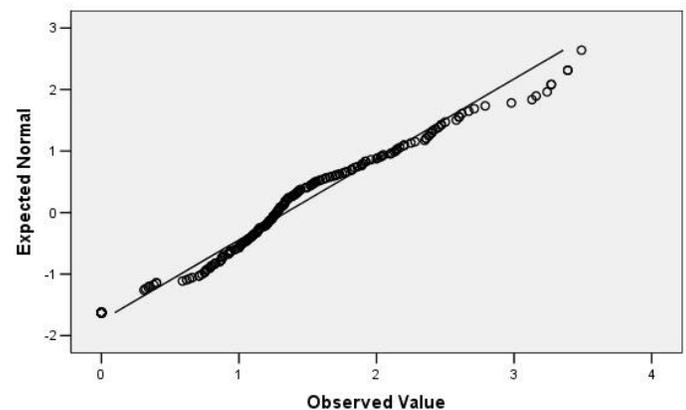


Figure 3. Histogram of Return on Assets

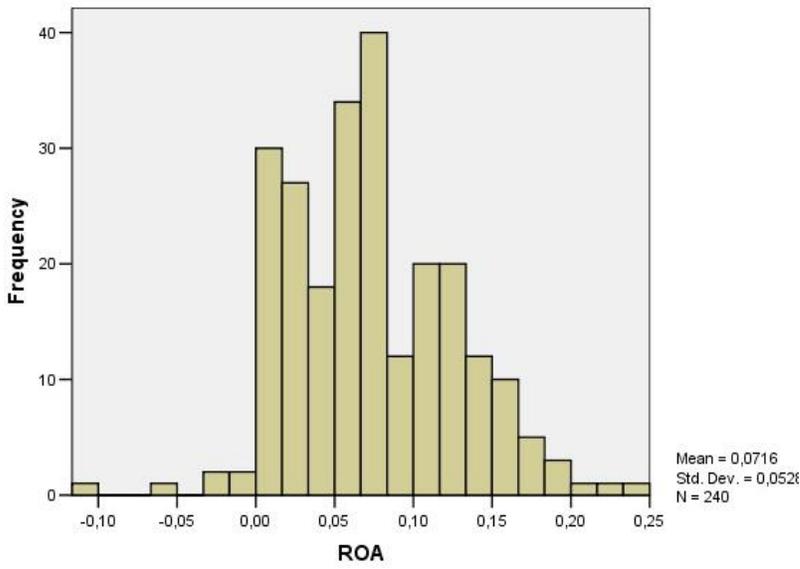


Figure 4. Q-Q Plot of Return On Assets

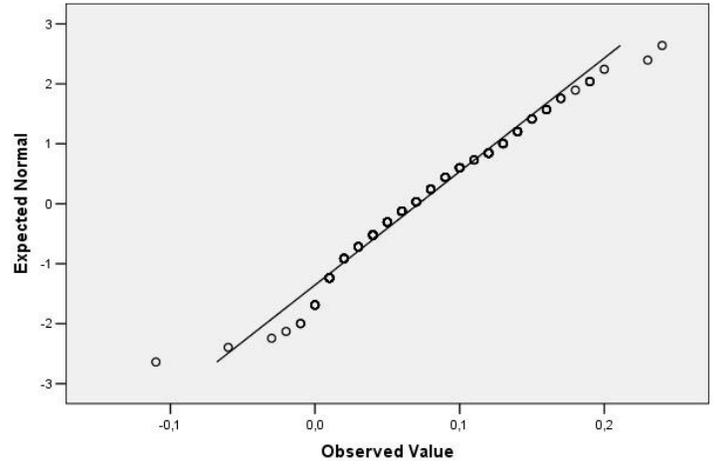


Figure 5. Histogram of Return on Equity

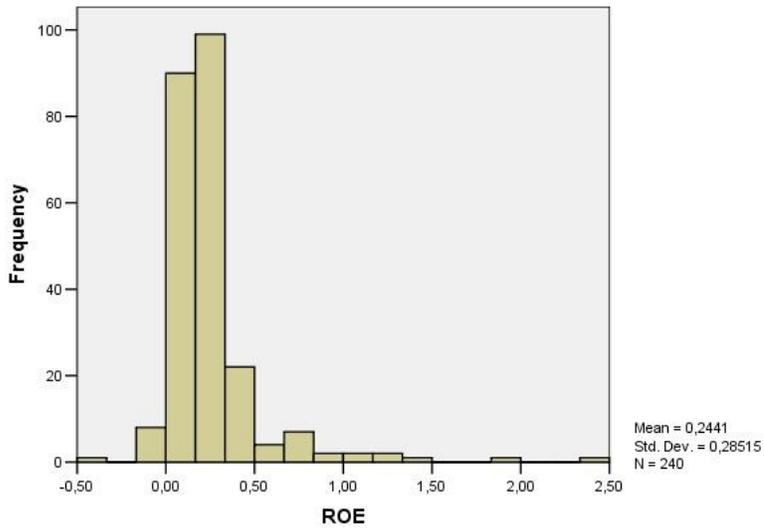


Figure 6. Q-Q Plot Return on Equity

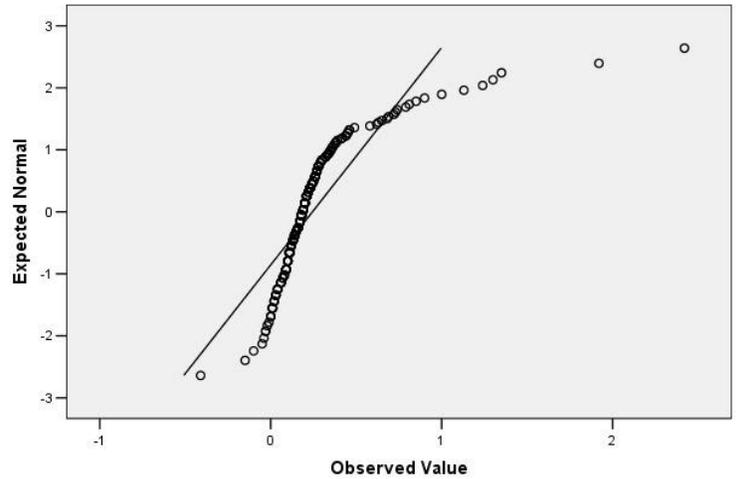


Figure 7. Histogram of Debt to Equity

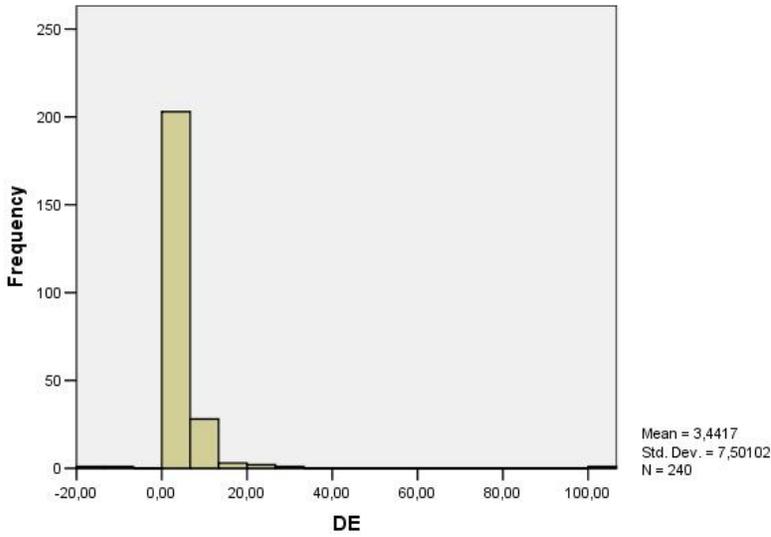


Figure 8. Q-Q Plot of Debt to Equity

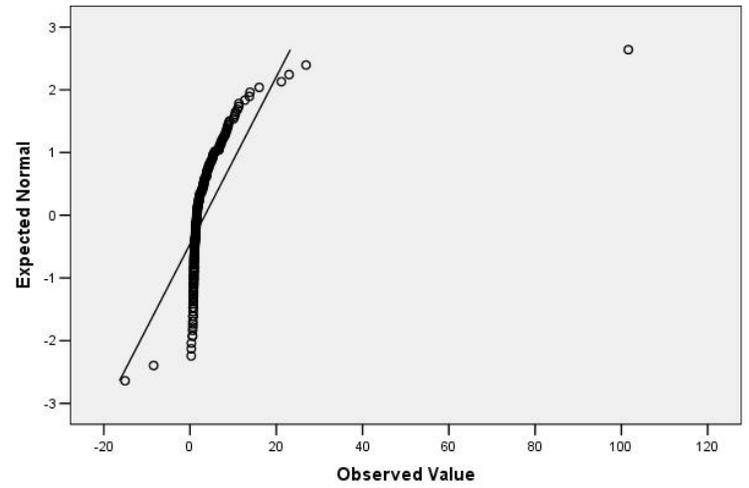


Figure 9. Histogram of Earnings Per Share

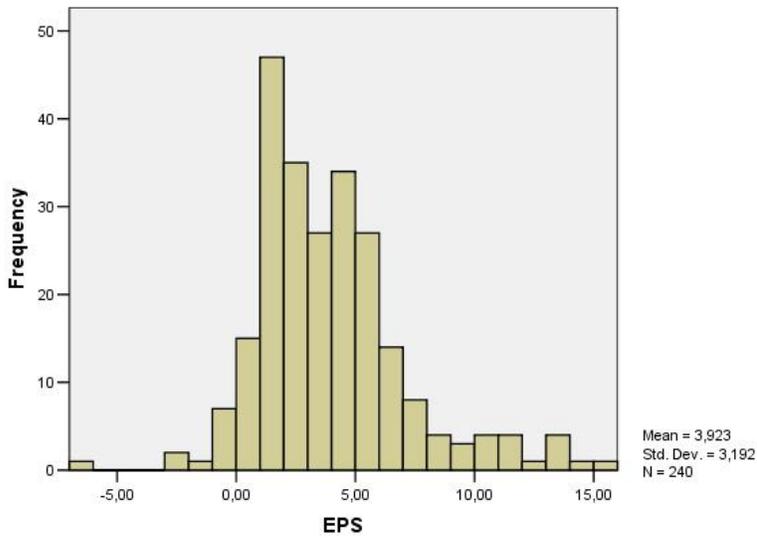


Figure 10. Q-Q Plot of Earnings Per Share

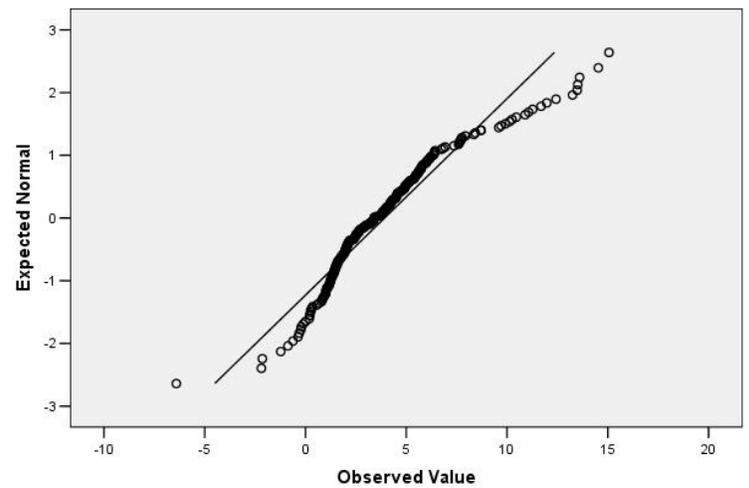


Figure 11. Histogram of Price to Earnings

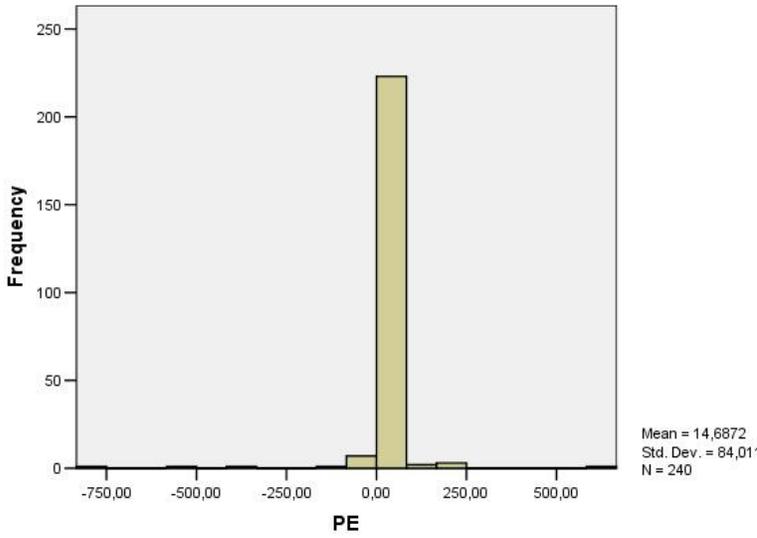


Figure 12. Q-Q Plot of Price to Earnings

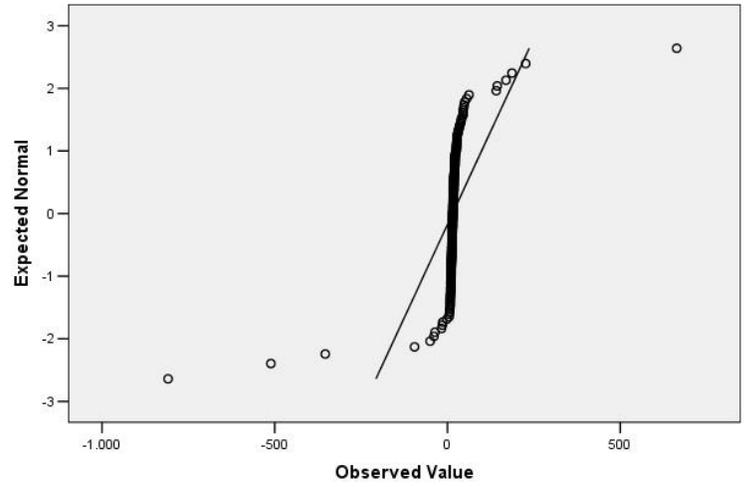


Figure 13. Histogram of Book to Market

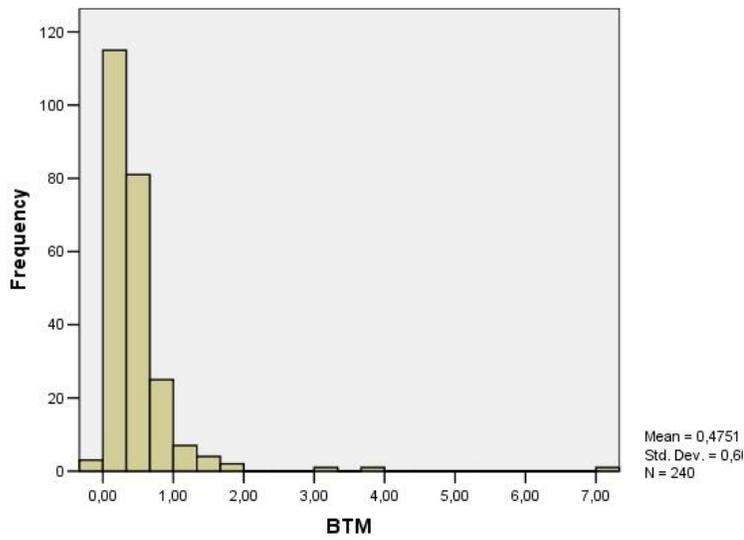


Figure 14. Q-Q Plot of Book to Market

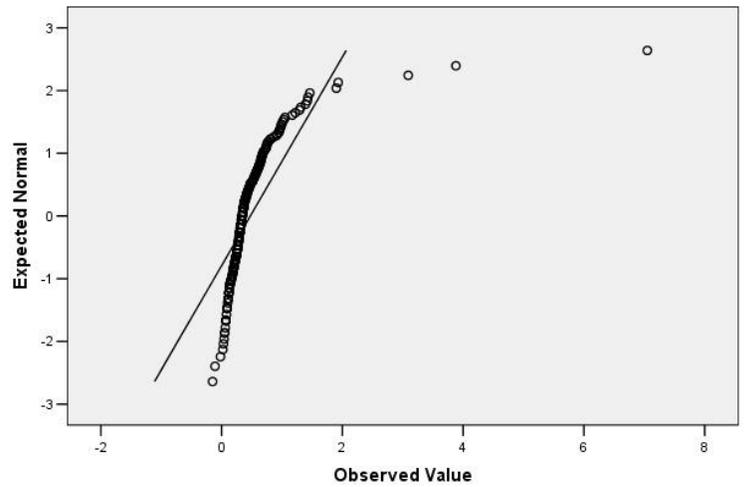


Figure 15. Histogram of Dividend Per Share

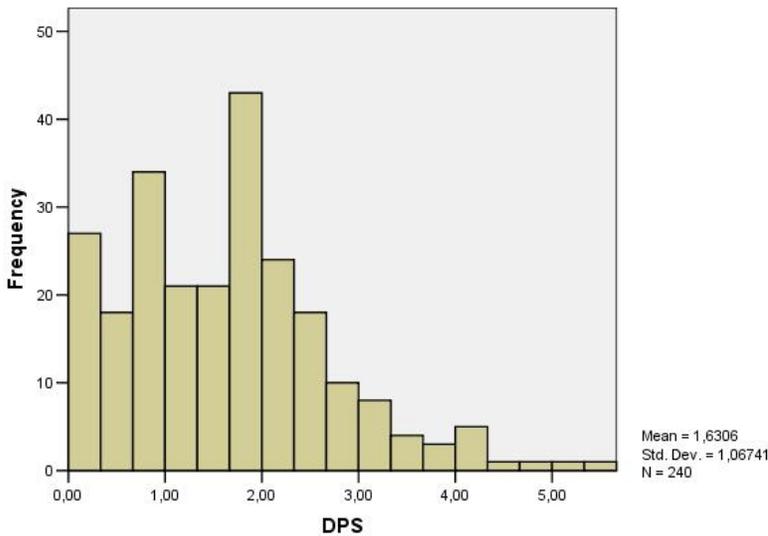
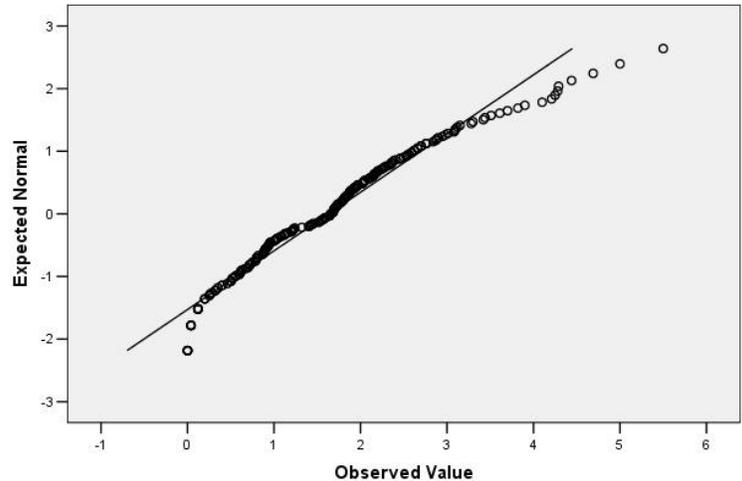


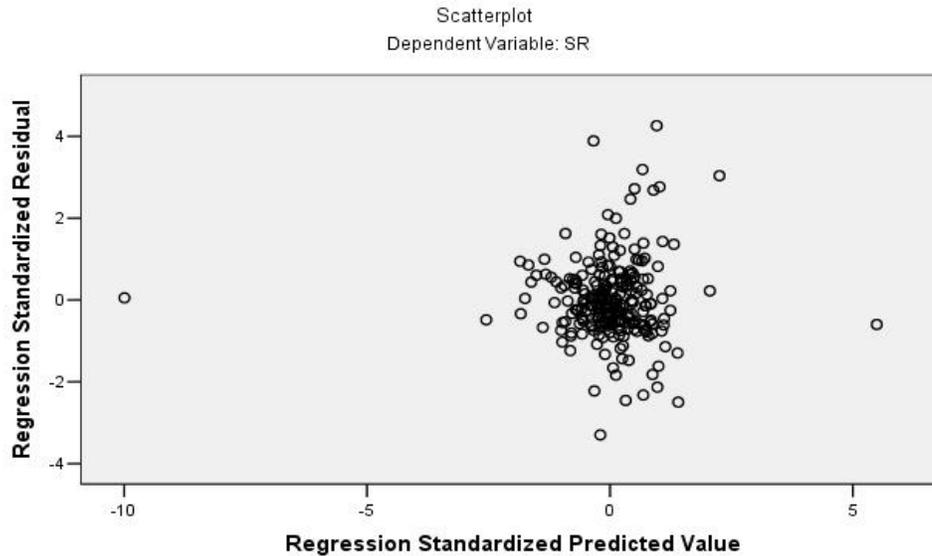
Figure 16. Q-Q Plot of Dividend Per Share



From the individual inspection of the Histograms and QQ Plots it can be concluded that not all variables exhibit normal distribution. Even though normality is not met, the literature proposes that “Linear regression models with residuals deviating from the normal distribution often still produce valid results (without performing arbitrary outcome transformations), especially in large sample size settings (e.g., when there are 10 observations per parameter)” (Schmidt et. al, 2014, p.4). Therefore, it is safe to say that our model fits the minimum requirements of observations per parameter with exactly 30 observations per parameter or a total of 240 observations.

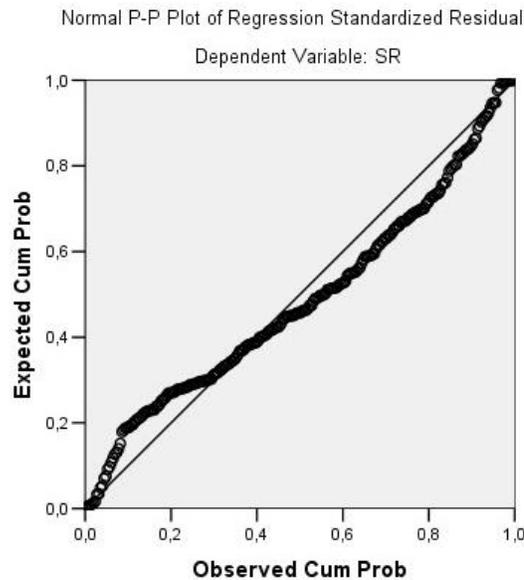
As previously mentioned, a linear relationship between the dependent and explanatory variables must exist. The results from the scatter plot are shown in (Figure 17, Scatterplot). As evident from our scatterplot, no linear relationship exists, likewise on the Y axis few observations are above the upper limit (i.e., +3). To evaluate whether the deviations are based on realistically explainable values or errors we proceed to test for Cook's Distance, as data with large deviations can significantly impair the statistical analysis and thus shift the line of best fit, reducing our model's validity. Per (Statistics Solutions, 2019), Cook's Distance <1 is the maximum acceptable value, and anything above may prevent proper analysis. Our testing indicates that no values greater than 0.635 are observed in our model, thus we can conclude that the deviations are based on realistically explainable values rather than errors.

Figure 17. Testing of the linear relationship between dependent and independent variables.



The third important assumption is the one of multivariate normality, in all variables. The results in Figure 18, indicate that the assumption of multivariate normality is met. Furthermore, we need to demonstrate that multicollinearity is not present in the model. As defined in the book of Michael Patrick Allen (1997) multicollinearity is a situation when an independent variable that is highly correlated with one or more independent variables will exert high standard error, implying that certain regression coefficients are unstable and will vary from one sample to next. Leading to a conclusion that when a model exhibits multicollinearity, it prevents proper assessment of the effect of independent variables on dependent variables. In our model Variance Inflation Factor (VIF) is applied which measures the level of influence on the behavior of an independent variable by interacting with another independent variable. The literature suggests that “VIFs above 10 or tolerances below 0.1 are seen as a cause of concern)” (Landau and Everitt, 2004, p.116).

Figure 18. Testing the normal distribution of the error terms.



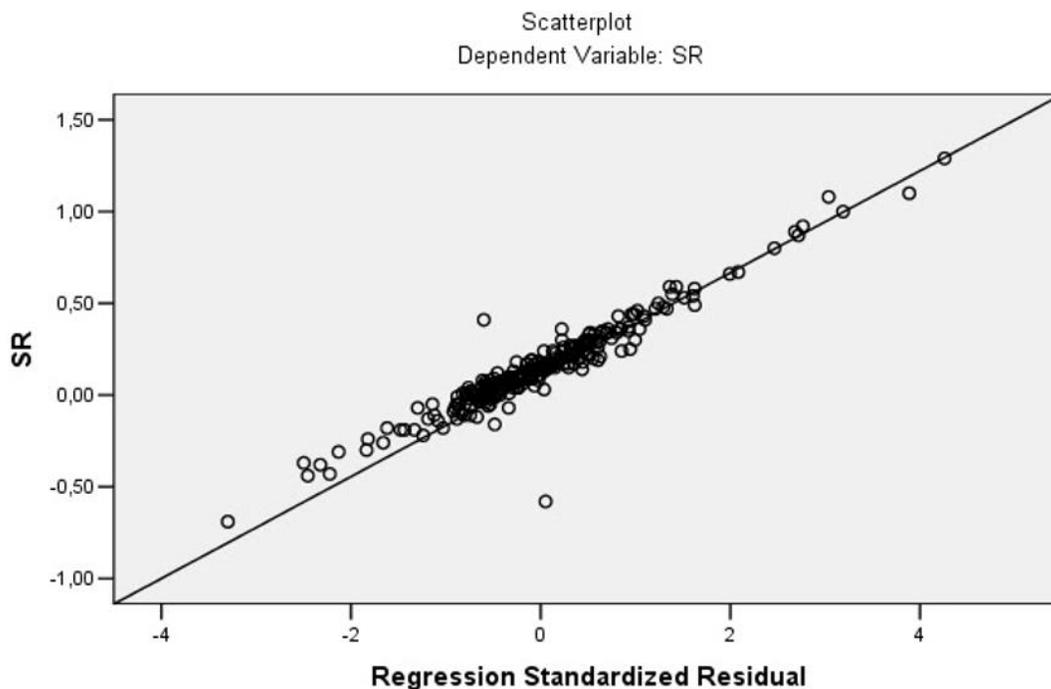
In (Table 4 Regression Output and Collinearity Statistics) low values for multicollinearity were found, with a maximum value of 2.47 and a minimum value of 1.44 for the proposed model, we ascertain that the model contains no multicollinearity. Aside from the Variance Inflation Factor, we performed a Pearson's correlation in order to further prove no existence of multicollinearity. A general rule of thumb for a maximum correlation coefficient of 0.8 is allowed between explanatory variables. As evident from (Table 3, Pearson's Correlation), a correlation of 0.662 is evident between Dividend Per Share and Earnings Per Share. From the latter, it is sufficient to conclude that multicollinearity is not present in our model.

Table 4. Regression Output and Collinearity Statistics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,281	,056		5,060	,000		
	CR	-,031	,027	-,091	-1,120	,264	,604	1,655
	ROA	,352	,452	,072	,779	,437	,461	2,168
	ROE	,004	,076	,004	,049	,961	,553	1,807
	DE	,000	,003	,012	,163	,871	,690	1,449
	EPS	,001	,008	,008	,077	,939	,404	2,473
	PE	-,001	,000	-,193	-2,775	,006	,821	1,217
	BTM	-,069	,033	-,160	-2,064	,040	,657	1,521
	DPS	-,048	,022	-,198	-2,200	,029	,490	2,041

In addition to multicollinearity, we must verify for autocorrelation, which refers to the level of correlation between errors. For the proposed model, the autocorrelation assumption was tested with the Durbin-Watson statistic. The results from (Table 5, Model Summary) show a Durbin-Watson statistic of 1,770. Durbin-Watson produces a statistic in the range of 0 - 4, where values close to 2 suggest less autocorrelation is present. And finally, we checked the assumption of homoscedasticity. From Figure 19 it is evident that the variables are equally distributed across the regression line. Hence, the assumption is fulfilled.

Figure 19. Testing of the homoscedasticity assumption.



5.5 Regression Output

Results related to our statistical sample can be found in Table 4 and Table 5. Given the data in Table 5, we can confidently reject the null hypothesis, ($F(8.231) = 2.639, p < 0,05$) and ascertain that at least one of the included explanatory variables is associated with stock returns. The R2 indicates that 8,4% of the variability in stock returns is explained by our model.

Table 5 Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,289 ^a	,084	,052	,25057	,084	2,639	8	231	,009	1,770

a. Predictors: (Constant), EPS, PE, DE, CR, BTM, ROE, DPS, ROA

b. Dependent Variable: Stock Return (SR)

Furthermore, our results from (Table 4, Regression Output and Collinearity Statistics, p.49) clearly show that certain variables are significantly related to stock returns.

According to the data presented in (Table 4, Regression Output and Collinearity Statistics, p.49) on average for each increase in the short-term liquidity, stock returns decrease by 0,031. Furthermore, Return on Assets and Return on Equity, show effective utilization of assets and capital with average increase in stock returns of 0,352 and 0,004 for each 1 unit increase in profitability respectively, while a point change in the level of indebtedness suggests no effect on stock returns which is in line with the static trade-off theory indicating that financial distress is felt by investors only after a certain point, suggesting that if companies limit leverage below that point they may not experience a negative effect on stock prices. As for the security performance valuation indicators, a positive association is noted between earnings per share and stock returns, implicating that 1-point increase in earnings per share, on average increases stock returns by 0,001. Contrarily, companies that increase their dividend payouts on average see a reduction in their stock returns, likewise, companies that noted a point increase in their book to market value or price to earnings ratio saw a reduction in their stock returns, provided all other variables remain unchanged.

Table 4 further indicates positive yet insignificant association between Return on Assets, Return on Equity and Stock Returns ($\text{Sig} > 5\%$), given this lack of significance, we have no evidence to reject H_0 hence we state that there is insignificant association between profitability ratios and Stock Return. Furthermore, the model suggests no statistical significance between short term liquidity as measured in Current Ratio and Stock Returns. This finding is in conformity with couple of existing analyses (Muhammad and Ali 2018; Dwiyanto and Hatta 2012), as for the level of company indebtedness, no statistically significant association exists as well, ($\text{Sig} > 5\%$), on the basis of our evidence we reject H_2 and state that no statistically significant relationship exists between short-term liquidity expressed in current ratio, leverage as measured in Debt to Equity and Stock returns. On the other hand, statistical significance is noted between Price to Earnings ratio, Dividend Per Share, Book to Market and Stock Returns, furthermore, our model exhibits insignificant correlation between Earnings per Share and Stock Returns which is contrary to the findings and research of (Muhammad and Ali 2018), (Dwiyanto and Hatta 2012) and (Ebrahimi and Chadegani, 2011), given the case we have solid evidence to reject the null hypothesis and ergo accept H_3 .

Hypothesis	Expectations	Outcome
H1: There is a significant relationship between profitability ratios (ROA and ROE) and stock returns	There is positive and significant correlation between profitability ratios and stock returns	No evidence to reject H0. Positive and insignificant correlation between profitability ratios and stock returns
H2: There is a significant relationship between liquidity measured in (Current Ratio) and leverage ratio (Debt to Equity) and stock returns	There is negative and insignificant correlation between liquidity and leverage ratios and stock returns	No evidence to reject H0. Positive and insignificant correlation between leverage ratio and stock returns. Negative and insignificant correlation between liquidity ratio and stock returns
H3: There is significant relationship between market-based ratios (EPS, P/E, BTM and DPS) and stock returns	There is positive and significant association between market-based ratios and stock returns	Sufficient evidence to reject H0. Significant association between market-based ratios and stock returns. Statistical significance is noted between Price to Earnings ratio, Dividend Per Share, Book to Market and Stock Returns, while P/E ratio is negatively associated with Stock Returns.

6. Concluding Remarks

This thesis aims to assess whether historical financial information can be used to predict future share returns by means of fundamental analysis of the Dow Jones Industrial Index. By testing an eligible sample with 240 observations based on 30 companies listed on the Dow Jones Industrial Average through the utilization of eight indicators which aim to provide information regarding multiple areas of a company's operations i.e. profitability ratios: return on assets (ROA) and return on equity (ROE); liquidity ratios (Current Ratio); Leverage Ratio (Debt to Equity) and Market-based ratios earnings per share (EPS), dividend per share (DPS), price to book ratio (P/B), price-earnings ratio (P/E).

We study the validity and forecasting quality of fundamental analysis of companies operating in both financial and non-financial sectors and thus explore what, if any, implications do the aforementioned financial ratios used in this model have on stock returns. We hope that this thesis is of further use to financial analysts, bankers, and research fellows.

As for our results we conclude that there is an insignificant association between profitability ratio and short-term liquidity ratio Return on Assets, Current Ratio and Stock Returns respectively ($p > 0,05$), findings are in coherence with previous research done by (Dwiyanto and Hatta 2012) and (Muhammad and Ali, 2018). Furthermore, unlike previous research see: (Muhammad and Ali 2018); (Dwiyanto and Hatta 2012) and (Ebrahimi and Chadegani, 2011), the model fails to show any significant relationship between Earnings per Share and Stock Returns which came to our surprise. As for the level of company indebtedness, it is expected to be negatively correlated with stock returns, however per the static trade-off theory financial distress is felt by investors only after a certain point, thus indicating that if companies limit their level of exposure to leverage to that point they may not experience a negative effect on stock prices, which explains the positive correlation between leverage ratio and stock returns (see also: Muhammad and Ali, 2018). Furthermore, we concluded that security-based indicators such as dividend per share, book to market and earnings per share are significantly related to stock returns, and suggest that companies which increase their dividend payouts on average see a reduction in their stock returns, likewise, companies that noted a point increase in their book to market value or price to earnings ratio saw a reduction in their stock returns.

Overall, based on our model we conclude that fundamental analysis is weak in predicting stock returns as it only accounts for approximately 8.4% of variability of stock returns. We must also point out that this thesis has its limitations. First and foremost, is the period of analysis, we believe that in order to best capture at least a few economic cycles and thus form a better understanding of companies' performance over time we must extend the period of analysis. Moreover, even though the literature suggests that by following the Dow Jones Industrial Average investors are not misled (see: Shoven and Clemens, 2000), we believe that a more proper representation of the whole economy would have been an analysis on the companies listed on the S&P 500 (excluding any financial entities due to nature of their statement of financial position which is not prepared in a traditional manner and it does not constitute a typical working capital), and thus enriching our sample. Lastly, we must note that the variables used in this model are subject to change, and thus substituting them may improve this model greatly and therefore enhance the quality of the findings and conclusions drawn regarding the predictive power of fundamental analysis on stock returns.

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