2019

Implications of Non-Tangible Assets and Macroeconomic Parameters on Long-term Stock Performance

Leo Rajan Pereira
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral dissertation by

Leo Rajan Pereira

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Mohammad Sharifzadeh, Committee Chairperson, Management Faculty
Dr. Steven Tippins, Committee Member, Management Faculty
Dr. David Bouvin, University Reviewer, Management Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Abstract

Implications of Non-Tangible Assets and Macroeconomic Parameters

on Long-term Stock Performance

by

Leo Rajan Pereira

M.Phil. Walden University, 2019

M.B.A. (Finance) Keller Graduate School of DeVry University, 2009

Diploma (Music), KJ Yesudas' Tharanganisari School of Music, Govt. of Kerala, 1987

M.A. (Econometrics), University of Kerala, 1987

B.Sc. (Math) University of Kerala, 1981

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management - Finance

Walden University

May 2019

Abstract

A rational long-horizon stock investment decision is a complex process due to uncertainty in supply and demand, competitive advantage, macroeconomic parameters and various perspectives of investors. Today, the ‘non-tangible assets’ (NTA) that include goodwill and intangible assets are a significant part of corporate assets, but their role in stock performance has not well studied. The purpose of this research is to empirically analyze the implications of NTA and of gross domestic product (GDP) of the United States on the stock price. According to the efficient market hypothesis, stock price reflects all relevant information. The research question focused on the extent to which NTA and the GDP reflected in the stock price. To determine the extent to which NTA and GDP reflected on the stock price, regression analysis and other statistical tests were used. The sample for the empirical study was 56 corporations listed on the New York Stock Exchange (NYSE) and National Association of Securities Dealers Automated Quotation (NASDAQ). The required data from October 2007 to September 2018 were collected from the United States Securities and Exchange Commission (SEC) and the United States Bureau of Economics (BEA). The key findings of the study are: the NTA and stock price of 45 corporations have a statistically significant correlation as opposed to 11 corporations. The combined NTA of these 11 corporations for the third quarter of 2018 was $531.64 billion. Furthermore, the GDP and stock price of 53 corporations have a statistically significant correlation, but no evidence for three corporations was found. The significance for positive social change is knowledge from this research about the implications of NTA and GDP on stock performance that the investors, policymakers, and other stakeholders could use for preserving the limited resources and creating wealth.

Implications of Non-Tangible Assets and Macroeconomic Parameters

on Long-term Stock Performance

by

Leo Rajan Pereira

M.Phil. Walden University, 2019

M.B.A. (Finance) Keller Graduate School of DeVry University, 2009

Diploma (Music), KJ Yesudas' Tharanganisari School of Music, Govt. of Kerala, 1987

M.A. (Econometrics), University of Kerala, 1987

B.Sc. (Math) University of Kerala, 1981

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management - Finance

Walden University

May 2019

Dedication

To my mom, Stella Lopez and dad, Nazareth Pious Pereira (Rajan) who taught me the value of education at my childhood; your love and support have helped me to make who I am today.

To my beloved wife, Patricia Leo and my adorable daughter, Sabrina Leo whose love and thoughtfulness have sustained me through one of the hardest academic periods of life.

I also dedicate this dissertation to my favorite teacher, Ms. Virgin D'Cruz and to my three uncles: Anucletus Lopez, Edwin P. Fernandez, and Antony P. Fernandez who were my mentors.

Acknowledgment

First and foremost, I acknowledge God, the Almighty for all His blessings upon us that helped me to sail through the tough time of life and earn Ph.D. "Nada é por Acaso Tudo esta Escrito."

I have immensely appreciated doing research under dissertation advisor, Dr. Mohammad Sharifzadeh. His guidance had helped me to thrive for excellence, and I aspire to one day achieve at least his level of success in guiding many researchers. I also express my sincere gratitude to the committee members, Dr. Steve Tippins, and Dr. Davin Bouvin for their support throughout the dissertation process. I also acknowledge the support of Dr. Rick Hay, Dr. Sara Witty, Dr. Sandy Kolberg the course director, and all the professors who bring the best out of me during the Ph.D. program.

I also extend my gratitude to Dr. Billing of Columbia University, Klein the former Chancellor, and other inspiring educators at New York City Department of Education where once I dedicated a big part of my life.

A special acknowledgment goes to my beloved wife Patricia Leo and to my adorable daughter Sabrina Leo. I am also grateful to Sonia Fernandez of Toronto, my brothers Joy, Dainatius, Theopaul and Noel Tensil, and the extended *Leo Bhavan families*. I acknowledge all the acquaintances of Puthenthope Church in Trivandrum, St. Leo’s Church Corona Queens, and the Queens Church of God in New York City. Lastly, but not least, I am grateful to those who gave me hardships and troubles that helped to thrive for better and made me stronger than ever before.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

Stock trading is one of the salient methods of wealth creation in today's global financial market, but stock trading strategies and the investment environment are changing rapidly. Standard and Poor's 500 index (S&P 500) is one of the indices in the financial market that gauge 500 large capitalization equities in the United States. The market capitalization of 500 corporations that constitute S&P 500 was $23.7 trillion as of April 2018, and their annual return varied with a high of positive 37.58%, a low of negative 37.00%, and median 14.69% (S&P 500, 2018). The positive high and median annual returns mean the opportunities for wealth creation were available. However, the high of positive 37% and the low of negative 37% gives the warning sign of the 'zero-sum game' in which the resultant outcome is zero. For rational stock investment, selection of the right stocks of corporations in a fast-paced and volatile business environment is overwhelming.

The Stock market is volatile owing to the variety of factors that affect the market. Bachelier (1900) claimed that the stock price is a factor of positive or negative "random errors." The sources that are not immediately obvious cause unpredictable random errors, and it may take a long time to find out the sources. However, investors expect an above-average return to take a risk and compensate for the opportunity cost, but their lack of knowledge on the factors that drive the market makes it difficult to make rational investment decisions (O'Reilly, 2010). The scholarly literature on the influence of non-tangible assets (NTA) that includes intangible assets (IA) and goodwill of corporations is either absent or limited in the available studies. For instance, based on the Securities and Exchange Commission (SEC) data of Quarter 3, 2018 (Q3 2018), NTA of 56 corporations in 11 various sectors of the S&P 500 was valued at $2.74 trillion (SEC, 2018). However, literature to explain how significantly NTA reflected on the stock price in every sector was not available (Sherman, 2017). Bryan, Rafferty, and Wigan (2017) claimed that the IA was elusive in many instances. The IA in the knowledge-based economy enhanced corporate growth (Arcabic, Globan, & Raguz, 2013; Thabet, 2014; Canibano, 2012; Finch, 2010). Modigliani and Miller (1958) argued "the corporation finance specialist" were concerned with various financing methods for survival and growth. Research and development (R&D) require funds that enable to creating IA and goodwill which are the significant portion of the entire business value (Sherman, 2017). Although, investors focus on many other metrics that do not consider the value of NTA for valuation and fail to acquire an above-average return consistently (Damodaran, 2016; Piketty, 2018).

Empirically analyzing the factors that significantly affect the stock price is essential for rational stock investment which is the practical application of this research. Ross (1976) claimed that many macroeconomic factors determine stock price. In the stock market, past performance is not a clear indicator of future return, but investors use various metrics based on historical data (Malkiel, 2016; Pearson, 1905). The weak-form efficient market hypothesis (EMH) states that the stock price reflects publicly available past information and only new information can change the stock price in the future (Fama, 1976). In this research, I empirically analyzed 44 quarters' financial data of 56 corporations listed on New York Stock Exchange (NYSE) and National Association of Securities Dealers Automated Quotations (NASDAQ) to scientifically explore the extent to which the stock price reflected NTA, the macroeconomic parameter, and the price to earnings ratio (P/E). The stock investors may use the results of this study to make better investment decisions.

In Chapter 1, I provide an overview of the organization of the research. In Chapter 2, I present the literature review and the gap in the literature. In Chapter 3, I discuss the methodology and Chapter 4, I present the results, and in Chapter 5, I discuss the results, limitations, recommendations and the significance of the study for a positive social change. In the next section of this chapter, I discuss the general stock investment practices and challenges, the importance of analyzing the factors that significantly affect the stock price, the problem statement and the purpose of the research, research questions (RQs) and hypotheses, theoretical and conceptual frameworks, assumptions and limitations, and the significance of this research. In the final section of Chapter 1, I recap the background, RQs, and the significance of this research.

Background of the Study

The stock market is the driving economic force in today's global economy, but the volatile market makes stock investment challenging. In 1999, the total value of stocks traded in the world was only 31.9% of global gross domestic product (global GDP); that value increased to 145.69% of the global GDP in 2000, 163.62% in 2015, and 124.75% in 2016 (World Bank, 2018a). This data indicated that the volume of stocks traded in the world exceeded the global GDP in 1 year, from 1999 to 2000 (see Table 3). However, it took another 15 years for about 18% growth, and then within 1 year, the volume reduced by about 38%. In this volatile market, for rational investment, investors use various metrics and models to analyze how efficiently the stock market determines the price and to what extent to which significant factors reflect in the stock price. Furthermore, making consistent profit in the stock market is elusive (Lubos, Stambaugh, & Taylor, 2017; Welch & McIntyre, 2015). Empirically analyzing the correlation between the factors that significantly affect the stock price may enable investors to make informed investment decisions is the relevance of this research.

In the volatile market, various factors such as federal policies, market information, liquidity trading, irrational exuberance, and other information can cause market fluctuation (Bianchi, 2017; Gu & Gao, 2013; Shiller, 2000). In the United States, between 1950 and 2008, the stock market experienced 46 extreme shocks on a single day, it gained at least 4.5% 20 times, and it lost at least 4.5%, 26 times (Lu-Andrews &

Glascock, 2017). These depressions are not limited to a few days, and the stock market crashes are cyclical and take many years to come back to normal after every crash.

Many theories were developed over time to explain the stock market crashes and fluctuations. Bachelier derived a law by considering the price process as the Brownian motion limit of a random walk (Courtault, Kabanov, Bru & Crepel, 2000). A random walk is a stochastic process formed by independent and identically distributed random variables. Bachelier's method of calculation based on stochastic calculus and mathematical finance was counterintuitive because it contradicted the century-old practice of speculation in the stock market (Courtault et al., 2000). The proponents of the efficient market hypothesis (EMH) claim the financial market determines the price of assets precisely and the stock price reflects all the available information but fail to explain market crashes. Despite many inconsistencies in empirical analysis, EMH remains the central concept of financial economics (Alajbeg, Bubas, & Sonje, 2012). When the stakeholders rejected the 'curiosity items' of behavioral finance, behavioral economist Shiller predicted the last recession precisely with "irrational exuberance" (Shiller, 2005). Irrational exuberance is a warning for the overvalued stock market. Lo (2005) developed the Adaptive Markets Hypothesis that incorporated modern financial economics and behavioral finance. Modigliani and Miller (1958) claimed that dividends drive the stock price, while Ross (1976) claimed that macroeconomic factors drive the price. However, Pearson (1905) and Malkiel (2016) argued that past stock performance was not an indicator of future performance in the stock market. According to Cochrane (2013), the expected investment growth must link to expected stock return, but many empirical studies have proved otherwise. Because many factors affect stock price, analyzing the nexus between various factors and stock return continues to be a challenge in the stock market.

Stock trading strategies transformed from speculations to innovative applications of applied economics, mathematics, and technology. In the mercantilist period (17^{th} and 18^{th} century) stock investors used mere speculations and strategic trade policies for wealth creation (Irwin, 1991). Today, investors mainly use the three valuation methods, namely the discounted cash flow model, the comparative model, and the residual model for stock selections. The foundation of value investing is to buy undervalued securities for less than their intrinsic value by using fundamental analysis based on historical accounting profits. Value investors prefer stocks that have high dividend yields, a low (P/E), and a low price-to-book ratio (P/B ratio). However, the assumptions about the intrinsic value, future distributions, and discount rates make the stock investment process unrealistic.

The lack of literature that explains the significant factors that affect the stock price during a depression and recession leads to the investigation of the empirical relationship between the NTA, GDP of the United States, and the stock price. Investors use many metrics based on historical data for stock selection when the past stock performance cannot guarantee future performance in the stock market (Pearson, 1905; Malkiel, 2016). Stock investors do not include intangible assets (IA) in the quantitative valuation models and instead focus on earnings as well as cash flows (Damodaran, 2017). Not only the value of IA of corporations increases but the number of companies with high IA also increase year after year (Sullivan & Sullivan, 2000). As shown in Table 1, based on 2014-2017 SEC data, NTA, the sum of IA and goodwill constitute a significant portion of corporate assets. In 3 years, from 2014 to 2017, NTA of 30 large corporations from the United States increased by $272.11 billion (see Table 1). Further, the NTA of these corporations increased to $1.02 trillion in 2017 (SEC, 2018).

Table 1

Non-tangible Assets of 30 Corporations of the S&P 500

Items	Non-tangible Assets (in millions)			
	2017	2016	2015	2014
Goodwill	703,458	577,962	537,213	509,843
Intangible assets	321,108	268,278	238,640	242,613
Non-tangible Assets	1,024,566	846,240	775,853	752,456

Note. Source: Securities and Exchange Commission - 30 Corporations' Annual Reports from 2014–2017. Non-tangible assets (NTA) = Sum and intangible assets and goodwill as shown in the financial reports.

IA drive shareholder values, business growth, and are the ultimate capital efficient strategy, but the business community still needs to find ways to better leverage the value of NTA that already existed (Sherman, 2018). Bryan, Rafferty, and Wigan (2017) claimed that NTA is elusive in many instances. The value of goodwill depends on the reliability of impairment tests under IAS 36 (Klimczaka, Dynel & Pikos, 2016: Gros, 2018).

As of today, investors use various techniques, such as metrics and models, to understand the economic health of a corporation. The widely used metrics are earnings per share (EPS), P/E, P/B ratio, enterprise value (EV), earnings before interest tax (EBIT), earnings before interest tax dividends and amortization (EBITDA), and price-earnings to growth ratio (PEG ratio). The basis of these metrics is the historical accounting information. As shown in Table 2, the valuation metrics that widely used by investors do not include NTA that constitute IA and goodwill.

Table 2

Valuation Metrics and factors Included

Metrics	Factors Included	Factor Not Included
EPS	Total earnings, Total shares	NTA
P/E	Number of shares, EPS	NTA
P/B ratio	Share price, Net asset	NTA
EV	Share price, Number of shares, Total debt, Cash	NTA
EBIT	Earnings, Interest, Tax	NTA
EBITDA	Earnings, Interest, Tax, Depreciation, Amortization	NTA
PEG	Number of shares, EPS, Earnings growth	NTA

Note. EPS is the Earnings per share, P/E is Price earnings multiple, P/B ratio is price to book ratio, EV is enterprise value, EBIT is earnings before interest and tax, EBITDA is earnings before interest, tax, depreciation. and amortization, PEG is price earnings growth, NTA is Non-tangible Assets (IA + Goodwill)

The IA is the foundation for the market dominance and continuing profitability for leading corporations, and today, almost 75–90% of the corporate value constitutes IA (Adriana, 2013; Lin & Tang, 2009). The NTA form a significant part of the financial statements that is the value of information and knowledge and creates competitive advantage, market capitalization, and corporate growth (Peng, Lai, Chen, & Wei, 2015; Saad & Zantout, 2014; Canibano, 2018). The components of the S&P 500 market value have changed significantly in the last 4 decades, where the tangible assets to IA ratio was 17% to 83% in 1975, 32% to 68% in 1985, 68% to 32% in 1995, 85% to 15% in 2005, and 88% to 12% in 2013 (Sherman, 2017). However, the NTA, including IA and goodwill, have no role in the metrics analysis; yet, little research has explored the implications of NTA on the stock prices of corporations in various sectors. For this reason, in this research, I intend to empirically analyze the correlation between NTA and the stock prices of corporations from 11 global industry classification sectors (GICS) such as industrials, healthcare, financials, and information technology of the S&P 500.

Various factors affect the stock price differently, but previous research was inconclusive regarding significant determinants that affect the long-term stock price. For rational investment, it is essential for investors to empirically analyze the implications of the NTA, a significant portion of corporate assets on the stock price. For wealth creation and policy-making, other stakeholders are required to understand the unique characteristics of NTA in the knowledge-based economy.

Until this quantitative research, there was little information available on the extent to which the stock price reflected on the NTA of corporations listed on NYSE and NASDAQ. In this quantitative study, I also quantify the correlation between the stock price of 56 corporations, NTA, GDP of the United States, and P/E. As per the weak-form EMH, the stock price reflects all the publicly available information and only the new information can change the stock price (Ross, 1965a). Then, the historical data on NTA should reflect in the stock price of all corporations to hold EMH.

Problem Statement

The extent to which the value NTA including IA and goodwill reflects in stock prices is not clear, and this contradicts the EMH (Bryan, Rafferty, & Wigan, 2017; Hsu, Kaufmann, & Srinivasan, 2017). However, up to 87% of the total assets of corporations are NTA (Cañibano, 2017; Gu & Lev, 2011; Sherman, 2017). NTA is absent from many valuation metrics that investors use for investment.

The general problem is that investors, as well as equity analysts, do not fully incorporate the NTA when evaluating and investing in the stock market (Bianchi, 2017; Li & Sloan, 2017). The specific problem is that the stock prices of corporations that comprise the S&P 500 stock index do not adequately reflect the cash flow-generating value of their NTA (Mendoza, 2017; Russell, 2016). There is a gap in the research regarding how investors should incorporate the value of NTA when investing in the stock market.

Purpose of the Study

The purpose of this quantitative research was to examine the correlation between NTA and stock price by using a randomly selected sample of the S&P 500 stocks while controlling the GDP. The GPower 3.0 software (GPower) enabled to determine the minimum sample size required. For this study, I collected the secondary data on financial reports for sample companies for the period 2007–2018 through the SEC website and the GDP data from the Bureau of Economic Analysis (BEA) website. After the parametric statistical analysis, I developed the regression model with the stock price as the outcome variable and the NTA as the dominant predictor variable. Further, I tested the weak-form EMH that states that the stock price reflects all relevant historical information by using the runs test (see Figure 1). The long-term stock investors and other stakeholders may use the findings of this study for making better investment decisions and policy making.

Research Question and Hypothesis

The independent variables (IV) in this study were NTA, GDP of the United States, and P/E and the dependent variable (DV) was the stock price. That constituted three research questions and three hypotheses.

Research Question 1 (RQ1): To what extent are NTA reflected in the stock price?

Null hypothesis ($H_0 1$): NTA is not a predictor of the stock price

Alternate hypothesis ($H_a 1$): NTA is a predictor of the stock price.

The stock price was the outcome or DV, and NTA was the predictor or IV. This study involved a simple linear regression analysis because a relational study existed between the two variables. Simple regression analysis is the best choice for empirically analyzing the correlation between two variables (Bruce & Bruce, 2017; Levine, Stephen, Krehbiel, & Berehnson, 2011). The regression models are typically fit by the method of least squares, and the regression line is the estimate that minimizes the sum of squared residual values. By using the following regression model, I tested Hypothesis 1.

$\hat{Y} = B_0 + B_1\mathrm{N} + \varepsilon$ ………………………………………………… (1)

Where,

$\hat{Y}$ = dependent variable (stock price)

B_0 = constant (risk-free rate)

B_1 = regression coefficient for N associated with Ŷ

N = nontangible assets that include IA and the goodwill

ε = model deviations called regression residual.

Simple regression analysis is the choice to find the linear relationship between variables (Koijen, Lustig & Van Nieuwerburg, 2015). In the hypothesis testing, to empirically analyze the correlation between the stock price (DV) and NTA (IV), I used simple regression analysis. The hypothesis was that the stock price depends on the NTA.

Research Question 2 (RQ2): To what extent are the GDP reflected in the stock price?

Null hypothesis ($H_0$2): GDP is not the predictor of the stock price

Alternate hypothesis (H_a2): GDP is the predictor of the stock price.

The stock price was the outcome or DV and GDP was the predictor or IV. This study involved a simple linear regression analysis because a relational study existed between the two variables. Simple regression analysis is the best choice for empirically analyzing the correlation between two variables (Bruce & Bruce, 2017; Levine et al., 2011). By using the following model, I tested Hypothesis 2.

$\hat{Y} = B_0 + B_1 G + \varepsilon$ …………………………………………………… (2)

where:

Ŷ = dependent variable (stock price)

B_0 = constant (risk-free rate)

B_1 = regression coefficient for G associated with $\hat{Y}$

G = GDP of the United States

ε = model deviations called regression residual.

This hypothesis testing involved a simple linear regression analysis with GDP as the predictor variable and the stock price as the outcome variable.

Research Question 3 (RQ3): To what extent are the NTA, GDP, and P/E reflected in the stock price?

Null hypothesis ($H_0 3$): The NTA, GDP, and P/E are not predictors of the stock price

Alternate hypothesis ($H_a 3$): The NTA, GDP, and P/E are predictors of the stock price.

In Hypothesis 3, the stock price was the DV. The NTA, GDP, and P/E were the IVs. This hypothesis testing involved a multiple regression analysis with three IVs. In this testing, I attempted to establish a linear relationship between the DV and IVs. Multiple regression analysis is the robust parametric statistical tool for empirically analyzing the correlation between multiple variables (Koijen, Lustig & Van Niewerburg, 2015; Levine et al., 2011).

By using the following regression model, I tested the hypothesis.

$\hat{Y} = B_0 + B_1\mathrm{N} + B_2\mathrm{G} + B_3\mathrm{R} + \varepsilon$ ……………………………………………… (3)

where:

$\hat{Y}$ = dependent variable (stock price)

B_0 = constant (risk-free rate)

B_1 = regression coefficient for N associated with $\hat{Y}$

N = nontangible assets that includes IA and the goodwill

B_2 = regression coefficient for G associated with $\hat{Y}$

G = GDP of the United States

B_3 = regression coefficient associated with $\hat{Y}$

R = P/E

ε = model deviations called regression residual.

The regression residual is zero in all three equations. The NTA that included IA and goodwill, GDP of the United States, and P/E were IVs and the stock price was DV. This study involved a multiple regression analysis. For the data that do not meet the normality assumption, bootstrapping is an option (McCormick, Salcedo, Peck & Wheeler, 2017). However, I used various transformations to comply with parametric assumptions.

To hold EMH, NTA and GDP must reflect in the stock price. After the regression analysis, I employed the runs test to analyze the randomness of stock price. I explain the testing process in the flow chart (see Figure 1).

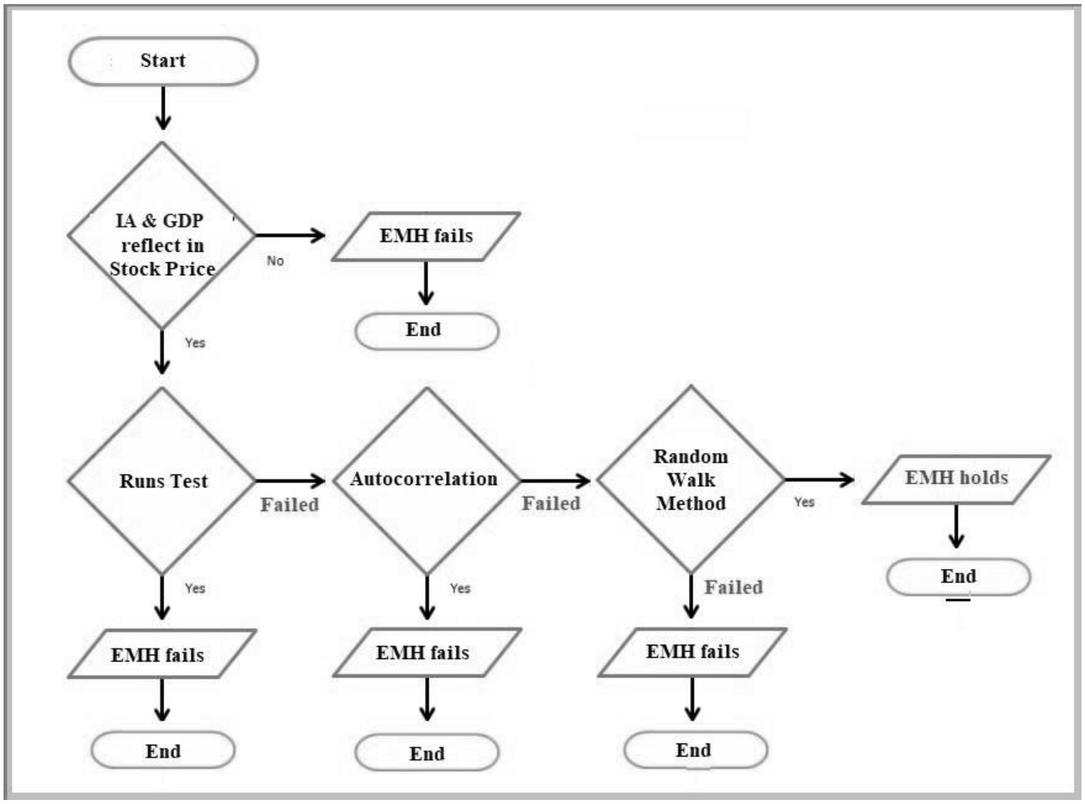


Figure 1. Flow Chart – Hypothesis Testing

Theoretical Framework

The theoretical framework of this research was the EMH, one of the cornerstones of finance. The EMH states that the price of a security reflects all the publicly available information and only the provision of new information can change the price (Fama, 1965a). However, the technical analysts claim that the historical price data indicates the current price movements and search patterns to ascertain arbitrage opportunities. However, the fundamental analysts use various multiples such as the P/E based on historical data, to determine the intrinsic value of corporations for long-horizon investments. The theoretical framework aids in determining how a study fits into what is already known as well as how it contributes to the topic (Denzin, 2017). The theoretical framework enables the derivation of multiple hypotheses and the construction of the different variables in the research question. The EMH implies that in an efficient market, it is impossible to make an abnormal return for a long time because only new relevant information can change the stock price; the new relevant information on various factors that affect the stock price is unpredictable (Fama, 1965b). The lack of literature available explains how significantly various factors such as NTA affect the stock price. In this study, I included the NTA, GDP, and P/E to empirically analyze the extent to which they affect the stock price.

The other framework of the study was the arbitrage pricing theory (APT). The arbitrage relies on a fundamental principle of finance: the law of one price (Ross, 1976). The APT is a multifactor asset pricing model in which many factors, such as macroeconomic parameters or market index, can be a part of a linear function. The primary task of the APT is to evaluate the present value of the payoffs or cash flows discounted for risk and time lags to estimate the stock price (Celik, 2012). When the market is at equilibrium, Ross (1976) claimed that the return on a zero-investment and zero-systematic risk portfolio is zero. In the stock market, a profitable arbitrage opportunity can disappear quickly (Ross, 1976). The arbitrageur uses the APT model to determine the misprized securities for investment purposes. The APT enables the incorporation of different variables in this study; I considered GDP as a significant factor and chose to study the empirical relationship between GDP and the stock price.

The APT is an alternative form of the Nobel Laureate Markovitz' capital asset pricing model (CAPM) that has only one factor, which is the systematic risk. By including many variables that may have an impact on the stock return, the APT model has an advantage over CAPM. In the multi-factor model, the beta of an asset measures the risk of the asset concerning the market portfolio, which is the average risk of all assets. High beta assets can earn a higher average return in equilibrium. Kashif, Saad, Chhapra, and Ahmed (2018) claimed the 3-factor and 5-factor models explained the risk-adjusted returns whereas CAPM failed.

The CAPM makes many unrealistic assumptions, such as the investors have the same preferences, have the same information and hold the same portfolio. When CAPM incorporated the firm size and value, it explained the variability of returns in the Chinese A-shares (Cheung & Huguet, 2015). Many factors affect the stock price differently in various contexts. Firm size played a significant role in the relationship between debt-equity ratio and growth in the Indian market (Girma & Vencappa, 2015). Bortoluzzo, Minardi, and Passos (2014) tested CAPM in the Brazilian Stock Market by using data from 2007 to 2007 and found a negative or null correlation between systematic risk and return. CAPM failed to establish prior long-run return patterns (Chen, Da & Zhao, 2013).

Whereas, the APT has only a few assumptions such as all securities have finite expected values and variances.

The factors in the model are NTA, GDP, P/E, and the stock price. In the APT model, the expected return on the security is the dependent variable. In the regression model, I include two independent variables such as GDP and P/E to control other extraneous variables that may affect the stock price. In this study, I include GDP as a systematic factor and the P/E as well as NTA as the firm-specific factors. Then, the following linear equation derives the stock price.

$\hat{Y} = B_0 + B_1\mathrm{N} + B_2\mathrm{G} + B_3\mathrm{R} + \varepsilon$ ………………………………………………… (1)

where:

$\hat{Y}$ = dependent variable (stock price)

B_0 = constant (risk-free rate)

B_1 = regression coefficient for N associated with $\hat{Y}$

N = NTA that included IA and the goodwill

B_2 = regression coefficient for G associated with $\hat{Y}$

G = GDP of United States

B_3 = regression coefficient associated with $\hat{Y}$

R = P/E

ε = model deviations called regression residual.

The model included two primary components which were NTA and GDP. The NTA is a significant part of the assets of a corporation in the knowledge-based economy, whereas GDP is an external factor that reflects all the economic prospects of the country in which the corporation operates. In this study, I tested the weak-form EMH; EMH states that the stock price changes only due to new relevant information and the price reflected all the historical data. I empirically analyzed whether the historical values of NTA, GDP, and P/E had already reflected in the stock price. This study involved 44 quarterly data on the GDP of the United States, IA, goodwill, P/E, and the stock price of 56 corporations from October 2017 to September 2018. I collected all the relevant data electronically from the SEC and BEA for the research.

Conceptual Framework

The EMH states that the stock price reflects all the relevant information. In a perfect market, there is no arbitrage opportunity, and investors cannot make a profit consistently over an extended period. This market condition is a compelling issue in long-term stock investments. In this research, by empirically analyzing the data on NTA, GDP, P/E, and the stock price of 56 corporations for 11 years from 2007 to 2018, I explored whether the changes in NTA, GDP, and P/E fully reflected in the stock price.

When many random variables drive the market, long-term investment becomes complicated. In the knowledge-based economy, about 87% of the assets are NTA that includes IA and goodwill (Sherman, 2014). The comparative advantage of a corporation reflects the value of goodwill. The factors such as IA and goodwill that earn money in future add value to a company. The NTA was included in the model because NTA enables future cash flows, adds corporate value. The inclusion of the P/E also constituted controlling the extraneous variables. GDP was another significant external factor that might affect the business environment. Ross (1976) claimed in APT that the macroeconomic parameters drive the stock price. GDP, interest rate, exchange rate, and money supply are various macroeconomic factors. Because of many constraints, in this empirical study, I incorporated only one macroeconomic parameter, GDP of the United States. The NTA, P/E, and stock price of 56 corporations of the S&P 500 were other factors. The context of this study was NYSE and NASDAQ, where the 56 corporations of the S&P 500 listed. However, the theoretical relevance can apply in a different context by incorporating various stock exchanges, different stock market indices, and different macroeconomic variables.

The EMH and APT enabled the derivation of the hypothesis and the incorporation of different variables in this study. The variables in this study were the NTA, GDP, P/E, and the stock price. However, the theories allow the use of different variables such as earnings per share (EPS), real GDP, or interest rate in other hypotheses. This study allows the discourse community to explore similar studies in a different context and various stock market indices with different variables such as dividend yield, basic net income per share, exchange rate, interest rate, so on and so forth.

Nature of the Study

This study was deductive and had a theoretical basis. The theoretical basis was the EMH that states the stock price reflected all relevant publicly available information (Fama, 1976). Empirically analyzing the characteristics of factors that significantly drive the stock market are relevant for investment decisions. That led to selecting the significant factors for this quantitative study. Yallwe and Buscemi (2014) claimed that both tangible assets and IA also perform a hugely significant role in corporate growth. By using the methodology proposed by Gu and Lev (2017), another recent study claimed that the IA had a positive and significant relationship with stock performances for the computer software and hardware sector (Basso, de Oliveira, Albuquerque, Kimura & Braune, 2015). Bianchi, Doni, Corvino, and Rigolini (2016) argued that the content of relational capital disclosure (RCD) of European listed companies and corporate financial performance are correlated. In this correlational study, I empirically explored the extent to which the stock price reflected NTA, GDP, and P/E of 56 corporations listed on NYSE and NASDAQ.

Ross (1976) claimed in APT that various macroeconomic parameters drive the stock price. The two theories, EMH and APT, enable the incorporation of NTA, GDP, P/E, and the stock price in this study for the empirical analysis. For a systematic analysis, in this research, I included the financial data of 56 corporations from all 11 GICS sectors of the S&P 500, such as industrials, information technology, utilities, energy, telecommunication services technology, materials, health care, financials, real estate, consumer discretionary, and consumer staples. The sample constituted about 11% of the corporations from each sector of the S&P 500 that tracks 500 corporations listed on NYSE and NASDAQ. By incorporating the theories and the research questions, I developed the hypothesis that guides the empirical data collection and analysis. The flow chart that I developed depicts the process of hypothesis testing (see Figure 1). From the robust statistical analysis of the sample data on 56 corporations, I generalized the results for the population, 500 corporations that constituted the S&P 500, listed on NYSE and NASDAQ.

The objective of this quantitative study was to empirically quantify the relationship between the NTA, GDP, P/E, and stock price. The results revealed how efficiently the past information reflected in the stock price, which was a test on EMH. In this research, I do not intend to provide additional information about the causality in the form of a qualitative study, but rather a relational study to determine the significant factors that affect the stock price. The quantitative study is the most suitable method to perform the relational study (Graziano & Raulin, 2012; Repko, Szostak, & Buchberger, 2016).

Testing the hypothesis and trying to answer the research questions was the objective of a deductive mode of research (Creswell, 2013). From the problem statements, I derived the research question and hypothesis. For this correlational study, quantitative research was the most appropriate method. In this research, I used simple regression analysis and the multiple regression analysis in the deductive mode to find how significantly the NTA, GDP, and P/E reflected in the stock price and hence I chose the quantitative research method.

The data in this quantitative study was secondary data, which consisted of numerical variables in a ratio scale and there were no categorical variables in the hypothesis testing. For the empirical analysis, I collected all the necessary data from the websites of government agencies such as the SEC and the BEA. The data from the governmental agencies were authentic, proximate, and relevant for the study. Statistical methods such as mean, variance, simple regression analysis, and multiple regression analysis enabled to analyze the relationship between the variables. The quantitative research method was the most appropriate choice for a correlational study (Privitera & Ahlgrim-Delzell, 2018). For testing the three hypotheses, there were altogether 9900 data points that include four variables such as IA, goodwill, P/E multiple and stock price for 44 quarters from Q4 2007 to Q3 2018 for 56 corporations in the study. The four variables in this study were the stock price, NTA (IA and goodwill), GDP, and P/E.

In this study, the GPower software habilitated to select the sample size as 43 at power 80% and effect size 15% (Figure 3). Since there was multiple regression analysis involved, I decided to sample 56 corporations so that I could eliminate the corporations that have noncontributing variables and to use the minimum required samples in the final study. The GPower recommended the sample size 55 at 80% power, and effect size 15% for two-tail multiple regression analysis (see Figure 2). The stratified random sample method enabled to select 56 samples from 11 various sectors of the S&P 500. Each industry sector was a stratum in this sampling method, and for this study, I selected about 11% of the corporations from each of the 11 GICS of the S&P 500. The stratified random sampling method is a probability sampling method in which every element (corporation) from various sectors in the population (the S&P 500) has the same probability of selection (Bruce & Bruce, 2017). This method helped to avoid bias in sample selection and provided an opportunity to include full representation of every industry sector of the S&P 500 in this study.

After the statistical analysis, I generalized the results to the population. The analytical software programs such as SPSS, R-studio, GPower, and Excel enabled a robust study. The research design assisted in testing the hypothesis and analyzing the relationship between the variables in a robust manner. In this study, there was no deductive approach, and hence, both the qualitative method and mixed research methods were not applicable. Student's *t*-test and *F*-tests are the parametric tests that I used in this study. The quantitative research method was the choice of relational study for employing the parametric statistics in this study for robust statistical analysis.

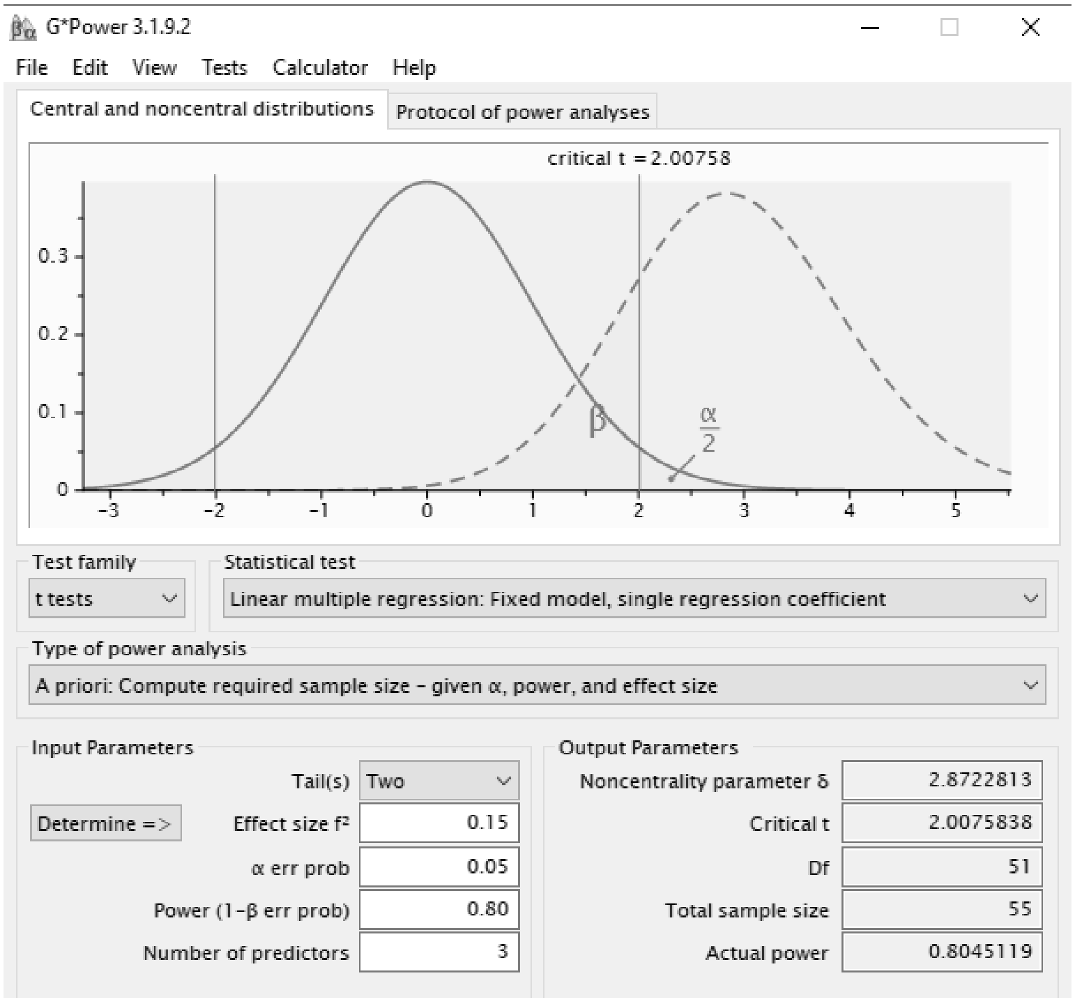


Figure 2. GPower output for a minimum required sample size at 95% CI

Definitions

Arbitrage pricing theory: Arbitrage pricing theory (APT) is an asset-pricing model that uses several factors, based on diversification and arbitrage principles, in determining the price of a security.

Beta: The measure of market risk in portfolio theory. The degree to which a stock's return moves with the market's performance.

Capital: Capital is the long-term assets, or the money used to support long-term assets and projects.

Capital gain (loss): The difference between the sale and purchase prices of an asset held over a period.

Capital market: Capital market is a financial market in which longer-term (at least one year) where investors trade debt and equity securities.

CAPM: Capital asset pricing model is a statistical model that enables to measure the required returns in financial markets.

Common stock: Common stock is the security representing ownership of a corporation, equity.

Discounted cash flow (DCF): Discount cash flow calculates the present and future values of money under the action of compound interest. Also called the time value of money.

Diversification: In finance, selecting an optimum portfolio of different (diverse) investments to limit the overall risk borne by the investor.

Efficient frontier: The set of portfolios that has the smallest possible standard deviations for its level of expected return and has the maximum expected return for a given level of risk.

Efficient market: The prices of traded securities reflect all the information and the price changes only due to new information.

Expected return: The return an investor believes is most likely to an investment that is, the investor understands that the actual performance may be somewhat different in certain investments like stocks.

Financial assets: Stocks and bonds, also called security. More generally a document giving its owner a claim to specific future cash flows. Stocks base that claims on ownership (equity) while bonds base it on debt.

Financial instrument: The financial instrument is called security or financial asset.

Financial market: A financial market is where the clients trade financial assets - for example, the stock market.

Financial statements: Financial statements are the reports created from accounting records that summarize a firm's performance in money terms.

Free cash flow (FCF): Free cash flow is the cash generated by a business above that needed for asset replacement and growth.

Fundamental analysis: A systematic process of estimating the performance of the underlying company and the future cash flows to value a security. These are discounted to arrive at an intrinsic value of the security (stock).

Gordon Model: Gordon Model is a mathematical model for valuing stocks, based on the assumed constant growth rate into the indefinite future.

Insider information: Insider information is the information about companies that can influence the stock price which is available to insiders but not to the public. It is illegal to make profits by using insider information.

Institutional investor: A nosiness organization that buys and sells securities.

Intrinsic value: Intrinsic value is an underlying or fundamental value.

Liquidity: Concerning to a company, the ability to pay its bills in the short run. It is about the readiness of an asset to convert to cash.

Listed company: Listed company is a firm that is registered on a stock exchange and permitted to trade security.

Market risk: Market risk is a variation on the return on a stock investment caused by things that tend to affect all stocks.

Net present value (NPV): Net present value is a capital budgeting technique that rates projects according to the total current value of all their associated cash flows.

Non-tangible assets (NTA): Nontangible assets include the values of IA and goodwill.

Opportunity cost: The benefit forgone by using an asset. Usually, the income or profit it would produce in its next best use.

Portfolio: Portfolio is a collection of investment.

Preferred stock: Preferred stock is a security that pays a constant dividend forever which is a hybrid form of stock between debt and common equity.

Ratio analysis: A technique for analyzing the strength of a company by forming (financial) ratios out of sets of numbers from the financial statements

Real asset: A tangible object with the value derived from the service it provides such as a factory, machinery, house or a car. Distinguish from a financial asset which is a piece of paper giving its owner a claim to future cash flows.

Required return: The minimum return that keeps an investor in a stock. Generally, a function of the risk perceived in the investment.

Return: Return is the payment to an investor for the use of funds.

Risk (in finance): Risk in finance is the probability that the return on investment will be less than expected.

Risk aversion: The premise that most people prefer a lower risk investment when expected returns are about equal.

Securities analysis: Security analysis is a systematic approach to valuing securities, especially stocks, by studying an issuing firm's value. The securities analyst plays an essential role in the financial sector.

Securities and Exchange Commission (SEC): The federal agency responsible for regulating securities dealings.

Security: A financial asset. Commonly a stock or a bond. An asset pledged to guarantee the repayment of a loan.

Speculation: The assumption of measure risks in the hope of financial gain, usually with substantial knowledge of the process that generates gains and losses.

Stock: Stock is a financial asset representing a share of ownership of a corporation.

Stock exchange: Stock exchange is a physical place where the brokers trade stocks on behalf of their investor clients.

Stock market: Stock market is the network of exchanges, brokers, and investors that trade in stocks.

Stock performance: Return on stock on a periodic basis (daily/quarterly/auually)

Systematic risk: Through portfolio diversification, investors cannot eliminate systematic risk.

Technical analysis: technical analysis is an approach to valuing securities by examining past patterns of price and volume. The basis of the technical analysis is that the patterns repeat themselves.

Time value of money: Time value of money is a calculation that considers the present and future values of money under the action of compound interest.

Valuation: A systematic process to determine the price at which security should sell in financial markets.

Assumptions

In this quantitative study, there are several assumptions related to the reliability and validity of the secondary data. For the study, I collected the secondary data from governmental agencies such as SEC and BEA. For this study, I assumed that all the secondary data of the 56 samples from the SEC is representative of the 500 corporations that constitute the S&P 500, listed on NYSE and NASDAQ. Another assumption was that all the data from the governmental agencies is error-free and valid. In Chapter 3, I explain all the assumptions related to the theories and statistical analysis in detail.

One assumption was that all the relevant information such as quarterly reports reflected in the stock price. The profitable arbitrage opportunity quickly disappears in an efficient market, and only the new information affects the stock price, not the historical data (Fama, 1976). I assumed the information disseminated in such a manner that every stakeholder receives it at the same time without creating an arbitrage opportunity.

Another assumption was that all the internal information of corporations reflected in the P/E and the NTA, and the external information of the business environment reflected in GDP. The IA including human capital is assumed to possess the ability to increase investor confidence through the corporations' creativity and inventiveness in their products and services (Canibano 2018). Sherman (2014) argued that successful companies, such as Google, Amazon, Microsoft, and Facebook, only have 1–3% of tangible assets as compared to their market capitalization. Like many experts in the industry, I consider NTA is an asset that can use strategically for a competitive edge in today's economic conditions and sustainable growth.

Another assumption in this study was that all the information about the market including the financial reports reaches every investor at the same time and investors use that information wisely. Investors assume that the future earnings of a company determine its intrinsic value. Rational investors prefer more wealth to less and choose the stocks that have a high probability of growth in the future. In this study, I assumed that the evidence and literature referred to were free from individual ideas and beliefs, were robust and reliable, and were systematically collected facts without bias.

Scope and Delimitations

Selecting the value stocks and creating a portfolio that yields the required return is the practical application of this study. Many investors switch to long-term investing from short-term investing and refocus on value discovery from price discovery since the cost of "active investment" is high owing to the transaction cost (Ellis, 2014). The sustainable growth of the corporation, expected return, and the overall economic growth are the objectives of the long-horizon investment in stocks. Buy and hold, dollar cost averaging, and direct investment and reinvestment plans are the long-term investment strategies.

To analyze the variables that significantly affect the stock price, I chose the minimum number of corporations that the software GPower recommends from the list of the 500 corporations that comprise the S&P 500, listed in NYSE and NASDAQ. For this study, I randomly chose 11% of corporations from each of the 11 industry sectors were true representatives of the corporations of the S&P 500. In this study, I employed the stratified sampling method for selecting the samples from 500 corporations that constitute the S&P 500. The stratified sampling method allows incorporating high probability representation of all the sectors in the S&P 500 that increases the accuracy of representation of the population (Cooper & Schindler, 2013).

The link between human capital, which is one of the IAs, and economic growth remains critical to the empirical analysis, because of the measurement issues related to human capital stock (Skare & Lacmanovic, 2016). In this study, I calculated the value of NTA from the corporations' financial reports at the SEC. This procedure delimits the tedious and critical process of measuring the IA and goodwill that adds validity to the study.

In this empirical study, the IV were the NTA, GDP, and P/E. These predictors were the internal and external factors of a corporation that affect the stock price in the long horizon. For this study, I collected the quarterly data of GDP from the BEA for 44 quarters, from Q4 2007 through Q3 2018. I assume the data from the governmental agencies such as SEC and BEA were error-free, valid, and reliable for the research. According to EMH, all relevant information reflects in the stock price, and the relevant information can range from country risk and business risk to the competitive edge of corporations, as well as the weather forecasts and the political turmoil in other countries.

However, in this study, I could include only a few variables to understand the stock market phenomenon because of the limitations of the dissertation process and available resources, which includes the time limit.

Limitations

For this study, I used the secondary data from the annual reports of corporations that the SEC published periodically and the data on GDP from BEA. BEA publishes the financial reports of listed corporations in the United States (United States Department of Commerce, 2015). The secondary had certain limitations. All the data NTA, GDP, P/E, and the stock price used in this study were in ratio scale and assumed error-free. However, measuring and reporting NTA to comply with various accounting principles was a challenge. Accounting conservatism requires a high degree of verification. By using samples from 20 countries, Brown, He, and Teitel (2006) claimed the accounting conservatism depends on the country-specific level of accrual intensity. Because of the use of various accounting standards, the methods of value recognition of NTA differ from country to country. That is one of the limitations when conducting cross-country research.

In the APT, Ross (1976) assumed that many factors affect stock performance but did not specify those factors. Many internal factors, such as investments, liabilities, and NTA, or external factors, such as interest rate, exchange rate, money supply, GDP and investor perspectives affect the stock price. However, the study included only NTA and GDP as the significant predictor variables.

This study included only the secondary data from 56 corporations listed on NYSE and NASDAQ. However, there were 19 stock exchanges in the world whose market capitalization was over $1 trillion each, and they accounted for 87% of the global market capitalization as of April 30, 2018 (WFE, 2018). Including all the corporations listed on the stock exchanges from around the world was beyond the scope of this dissertation. Hence, the stratified sampling method had been employed to select 56 corporations from every GICS sectors to incorporate the general characteristics of the various corporations of the S&P 500, listed in NYSE and NASDAQ. This selection procedure eliminated the limitations caused by having a bias in selecting samples; however, it covered only a small portion of the global market.

By using the Fama and French 3-factor model and Carhart 4-factor model Yu (2012) hypothesized that the stock market was semi-strong efficient. Testing strong-form EMH required insider information, and that was not feasible for this study. With the publicly available information, I tested the weak-form EMH. The laminations of this study did not intend to test the semi-strong form EMH and strong-form EMH.

Evaluating all the IA and determining their relationship by using performance indicators was a critical issue in modern economies (Mehrazeen, Froutan, & Attaran, 2012). Zhang (2015) claimed that many shareholders pressurize company management in to maximizing short-term earnings and increasing only the short-term value. This behavior adversely affects investing regarding the long-term intangible investments such as innovation; however, it adds value in the long run. Saad and Zantout (2014) argued that the large firms that significantly increase R&D expenditure experience negative abnormal returns for three years. Investors initially underestimate the excess investment in R&D of these firms and overvalue their stocks. The subjective and theoretical factors affect the valuation of the IA, and this varies for every corporation and in every sector, but the values of IA from the quarterly reports of corporations from the SEC website are considered acceptable. The governmental agency publishes the actual value of IA of corporations in their quarterly reports. Accounting standards do not permit to include IA that the corporations create internally. However, about 87% of the corporate value is IA in the knowledge-based economy (Sherman, 2014).

In behavioral finance, the focus is on the investors' attitudes towards risk and beliefs regarding probabilities. Many aspects such as the behavioral and psychological aspects of investors, the transaction costs, and many hidden costs of portfolio management are absent in this study. All the stock investors may address inflation, taxes on capital gain, and investment costs. Furthermore, the capital gain tax and the transaction costs associated with the stock trading vary from country to country are also absent in this study, and that was a limitation of this study.

The relevant information that may significantly affect the stock price are many, but in this study, I included only three factors such as NTA (IA and goodwill), GDP, and P/E. After determining or calculating the variables, I employed the analytical program such as the SPSS to determine the correlation between the variables. Many assumptions related to the statistical analysis that is evident in other quantitative studies are also another limitation of this study.

Significance of the Study

Empirically analyzing the significance of the macroeconomic variables and the internal factors that positively affect the economic prosperity of a corporation is essential for all the stakeholders and the long-term investors (Farsio & Fazel, 2013; Moreira, 2013; Sikalao-Lekobane & Khaufelo Lekobane, 2014). In this quantitative study, the objective was to explore the empirical relationship between the NTA, GDP, P/E, and the stock price of corporations. In stock market analysis, stock price prediction is crucial but a complex issue (Sun, Shen, Cheng & Zhang, 2016). The purpose of this research was to choose the significant factors that significantly affect the stock price in the long horizon with the robust statistical analysis, to test the weak-form EMH, and to build the most suitable model for predicting the long-term stock price of four corporations if the weak-form EMH was not conclusive. The stakeholders may use the results for various investment purposes, and the policy-makers may use the results for preserving the limited resources (NTA) and use them strategically for wealth creation.

Significance to Theory

Efficient Market Hypothesis (EMH). The significant contribution of this study is in the efficient market hypothesis which is one of the controversial theories in finance. The EMH states that only new information can change the price and past data has no relevance in determining the stock price but already reflected in the price. Choosing the relevant variables that drive the stock price and developing the best fit regression model that can predict the stock price have a compelling impact on the EMH. Since the 'insider' information was not using in this study, I tested only the weak-form EMH. Testing the semi-strong form EMH and the strong-form EMH was not the purpose of this study.

Arbitrage Pricing Theory (APT). The APT is a multifactor asset pricing model in which a linear function can incorporate many factors, such as macroeconomic parameters or the market index. This study included GDP as a significant factor for testing its empirical relationship with the stock price. The other independent variables in this relational study were NTA and P/E. Unlike CAPM, which is a single factor model, I included three different variables in this study to expand the multifactor analysis of the APT. Empirically analyzing the significant relationship between the variables emphasized the validity of the theory in today's market condition.

Significance to Practice

The corporations' performance assessment, asset valuation, and predicting the long-term stock price are critical elements in the market economy. Soe, the researcher at the S&P 500 (2015), claimed that in 2014, the S&P 500 had its double-digit gain of 13.69%. However, 86.44% of large-cap fund managers underperformed the benchmark over 1 year (Soe, 2014). Most large-cap fund managers failed to understand the significant factors that affect the market even if all the tools for technical analysis and fundamental analysis were at their disposal.

In this research, I intended to empirically find the relationship between the NTA, the macroeconomic variable GDP, and the stock price by analyzing financial data of 56 corporations from the S&P 500 for 44 quarters. However, as an investment strategy, for the long-term investment in stock price in the domestic and foreign market, investors can explore the correlation between other variables of corporations listed on various stock exchanges in other countries. Study on the influence of exchange rate on the stock price of a corporation that operates globally can increase the economic value (Feldman, Jung & Klein, 2015; Khan, Gul & Ali, 2016). Many big corporations of S&P 500 listed on NYSE and NASDAQ that derive about 46% of sales from abroad, blame the economic parameters and strong dollar value as a cause of their declined profit, and many others that generate most of their sales from domestic operations have fared well in recent years. By understanding the significant relationship between the macroeconomic parameters, such as GDP, interest rate or exchange rate of other countries, and the stock performance of corporations, the investors could explore the competitive advantage and corporate growth in different geographical regions.

The factors that affect the performance of value stocks and growth stocks are less known and more controversial, have made the investment choice difficult (Emm & Trevino, 2014). However, in this study, I explored many factors that have a significant relationship with the stock price by analyzing 44 quarters' financial data of 56 corporations and the GDP of the United States. The significance of this study was to empirically analyze the correlation between the factors, including the NTA. P/E, and the stock price of 56 corporations from the 11 industry sectors of the S&P 500. The empirical evidence on the significant factors that drive the stock price may assist the long-term stock investors to make informed investment decisions. The information on the empirical relationship between the factors and the stock price may increase the investors' trust in the market, in turn, that yield more savings and investments. The results of this study may also enable them to make more productive decisions on portfolio management and governmental policy-making.

Significance to Social Change

Many studies show that there is a positive correlation between social change, the growth of an organization, and the growth of the global economy. Investment and resources are necessary elements for every social change. Condorcet, the French philosopher, mathematician, and political scientist (1796), claim that finance and economics could solve many fundamental problems of humankind. Without economic prosperity, social change is challenging. By empirically testing the weak form EMH and explaining the century-old issue with the EMH in today's market conditions adds value to humanity. Brzeszczyski and Mcintosh (2014) claimed that the British socially responsible investment (SRI) stocks yield higher returns compared with the market indexes. The stakeholders may use the result of this study, to focus on SRI for wealth creation in a sustainable manner.

Various kinds of funds, including the enormous amount of retirement funds, are available for long-term investments and economic growth; the building blocks of life-cycle funds are broad-based index funds such as stock funds tied to the S&P 500 (U.S. Social Security Administration, 2015). This research is all about finding an analytical method to aid the making of more informed stock investment decisions and the wealth creation for the goodwill of society. Better investments create wealth, creating a better business environment and entrepreneurs, which drives the domestic consumptions and economy. The information on the effect of macroeconomic parameters and the combined effect of different factors that significantly affect the stock price of corporations may help the stakeholders for efficiently employing the limited resources for sustainable growth, which is a corporate social responsibility.

Summary

The stock market is the driving economic force in today's global economy, but there are various challenges in predicting the return and risk of investment. Investors use many theories and models based on historical data to understand economic reality.

According to the EMH, the stock price reflects all the information and the price changes only due to new information. Both the technical analysis and fundamental analysis fail since there is no consistent arbitrage opportunity for investors. In this study, I used various factors such as NTA, GDP, P/E, and the stock price to quantify the correlation between them and to test the weak-form EMH.

The purpose of strategic management is to create value, and this study intended to create value for the stakeholders by empirically analyzing the factors that play a significant role in driving the stock price. From the systems theory's perspective, I chose many factors in the model, and the APT was the best choice to accommodate all those factors. In this study, I included GDP as it reflected the economic health of the country and included the P/E as it reflected many economic conditions of a corporation. Finally, the model included the NTA, the strategic asset that reflects the economic prospects of the corporation. By empirically analyzing the correlation between the stock price, NTA, GDP, the P/E, and the stock price, I tested the weak-form EMH. For the research, I used the data from the governmental agencies such as the SEC and the BEA to maintain a high degree of originality. The study contained 9900 data points including GDP of the United States, and the NTA, P/E, and the stock price of 56 corporations from the S&P 500, listed on NYSE and NASDAQ. The following Chapter 2 consists of the Literature Review in which I explain the background of the study, issues, and practices in the stock market, and the gap in the literature.

Chapter 2: Literature Review

Introduction

Stock valuation is subjective, but investors use many metrics based on historical data to evaluate shares for investment. Lo (2016) claimed that when there is friction in the market, the financial market changes entirely, and the investors should determine the source of the change and the way they relate to each other. According to the weak-form EMH, the stock price changes only due to new information and not based on past performance (Fama, 1976). The EMH holds when the stock price reflects all the relevant information about the NTA and the GDP. However, the NTA that includes IA and goodwill are absent from many metric evaluations that the stock investors use, which limits the investors from making informed stock investment choices (Sherman, 2017).

My prime objective for this study was to empirically analyze to what extent NTA and GDP of the United States reflected in the stock prices of 56 corporations from 11 sectors of the S&P 500 listed on NYSE and NASDAQ. Furthermore, I focused on the correlational analysis of multiple variables such as NTA, GDP of the United States, P/E and the stock price of 56 corporations over 44 quarters from Q4 2007 through Q3 2018. This analysis was a test on the weak-form EMH, one of the elaborate theories in finance of this century. In this chapter, I present the theories and practices in the stock market and exposed the gap in the literature.

In the first section of Chapter 2, I present an overview and then discuss the literature search strategies, sources, and the purpose of literature for the study. In section 3, I explain the theoretical foundation and the conceptual framework in detail and then elaborate the literature relevant to this research. In the subsequent sections, I describe the financial market, the investment in stock, and stock evaluations in detail. In the final section of Chapter 2, I discuss various valuation metrics that the investors use for making long-term stock investment choices and the gap in the literature.

Literature Search Strategies

For a critical, in-depth evaluation of the existing research on long-term stock investment strategies and the EMH, I searched multiple databases. These databases included ProQuest, EBSCO, ABI/INFORM, PsycINFO, SageStats, Harvard Business Review, MIT Sloan Management Review, Financial Analysts Journal of CFA Institute, World Bank, International Monetary Fund, and other sources including dissertations as well as theses from Walden University and other universities, in addition to industry publications and conferences. For the search technique, I used the Boolean system and the three Boolean operators – AND, OR, and NOT – which allow the narrowing or broadening of the search by combining the terms. The qualifiers such as, ‘full text,’ ‘peer-reviewed,’ and ‘from the year 2013 to 2018’ enabled to include relevant articles. In this study, I mainly used the peer-reviewed articles but also included the seminal work at from different times that laid the background of the topic and exposed the gap in the literature.

One of the main objectives of the literature review was to perform the analytical synthesis of the problem from different perspectives. Researchers should analyze the various research works of the past to understand the background of the study (Ridley, 2009). This practice gave the opportunity to engage with the primary and seminal works associated with the topic of this study and to create active reading strategies as a scholar. The second objective was to identify a gap in the existing literature. Studying the literature enables to provides a rationale for the study (Creswell, 2013; Graziano & Raulin, 2007). The next purpose of the literature review was to provide a rationale for the statistical tools that I employed. For testing the hypotheses, using a valid research method and tools that accepted in the past has given validity (Leavy, 2017; Lo & MacKinlay, 1988).

To condense the topic and to select the relevant research papers from multitudes of research on various interrelated topics was a complicated process. Many research works were a continuation of the previous study. The primary keywords and phrases used to search in the database for this study were:

- *stock price, equity market, bull market, and bear market*
- *finance theories*
- *stock valuation and investment practice*

- *value investing and growth investing*
- *fundamental analysis and technical analysis*
- *strategies and limitations of long-term stock investment*
- *factors affecting stock price, macroeconomic factors, gross domestic product (GDP)*
- *causes of the stock market crash, depression, and recession*
- *limitations of earnings per ratio (EPS), the price-earnings ratio (P/E), enterprise value (EV), earnings before interest and tax (EBIT), earnings before interest, tax, depreciation, and amortization (EBITDA), price-earning to growth ratio (PEG), and momentum*
- *effect of transaction cost and capital gain tax*
- *asset allocation and portfolio management*
- *IA and goodwill*

Furthermore, I used synonyms such as long-term, stock return, and stock performance to modify the search. A review of the title and the abstract of each research paper led to a further analysis of the methodology and the results. Based on the relevance to the topic, research equations and methodology, I chose the current literature.

After collecting the literature, I assessed based on the parameters of provenance, arguments, objectivity, and value or significant contribution to the topic. Then, I wrote the bibliography. After that, I organized the literature around the topic and the issues regarding stock price and the stock market for long-term horizons based on the thematic reviews rather than the progression of time. There was negligible or no bias in the selection of the literature, and the evidence demonstrated that the literature selection method was robust as well as transferable or replicable.

In the following sections of Chapter 2, I discuss how did I use the literature review to formulate the compelling topic of study that was necessary for a positive social change. In the subsequent sections of Chapter 2, I explain the theoretical foundation, conceptual framework. Then, I discuss the challenges and opportunities on the stock market, valuation metrics, and the gap in the literature.

Theoretical Foundation and Conceptual Framework

A theory has logically related symbols that people think may occur in the world; it simplifies reality and guides in testing its accuracy (Manheim, Rich, Willnat, & Brians, 2008). Many accounting and economic theories are the basis of valuation metrics that the investors use for making investment decisions. The fundamental analysts use many metrics such as the P/E, EPS, and PEG which were developed based on historical data and economic theories to determine the intrinsic value for the long-term investment. The technical analysts claim the historical price data reflects the current price movements and use many methods such as on-balance volume, accumulation distribution line, and Aroon indicator. Many theories in economics and statistics are the basis of these methods. However, many theories fail to explain the economic cycles; the cycle of the bull market and the bear market continues. Investor confidence and optimism are the characteristics in a bull market because the price rises consistently as opposed to a bear market in which the price falls.

By using various mathematical and statistical theories, Bachelor (1900) claimed that the stock market was a speculation, Lo and MacKinlay (1988) argued that the stock prices did not follow random walk, Fama (1965) claimed that only new information could determine the stock price, and Shiller (2000) argued with “irrational exuberance.” Financial economists developed many theories over time with little consensus among them to understand the role of the different factors that drive the stock market. In this quantitative study, I tested two theories such as EMH and APT.

Theoretical Foundation

Fama (1976) in EMH stated that the current stock price reflects all the relevant information on the market, and the stock price changes only due to new information. New relevant information can be the financial reports that the corporations publish periodically, the federal government’s announcements about macroeconomic parameters or the trade deals with other countries. In the efficient market, the market reaches equilibrium immediately after every news irrespective of fluctuations in price. Investors cannot predict the stock price and “beat the market” consistently. In this market condition, the value investors who ‘buy and hold’ securities for capital gain cannot accomplish their desired target (Smithers, 2009). Nobel Laureate, Fama, called the "father of modern finance" developed EMH.

The EMH has three forms which are:

- Weak-Form Efficiency – Weak-form efficiency states that only new information or new economic events, such as the announcement of quarterly financials, and news about macroeconomic parameters, such as GDP, influence the stock price. This price change occurs immediately after the news, and hence, analyzing the past data has no relevance in predicting stock price. The technical analysis fails in this form, and the growth investors cannot make profit consistently.
- Semi-Strong Form Efficiency – Semi-strong form efficiency states that all publicly available information immediately reflects in the stock price. In this form, the value investors who use fundamental analysis fail. In this semi-strong form, only private information was not accessible to the public when making stock investment decisions. In this form, investors cannot make a consistent profit unless they use insider information, which is illegal.
- Strong-Form Efficiency – Strong-form efficiency states that investors cannot earn an excess return from both public and private information. In

this form, the stock price is entirely random, and even insider information cannot help in making a consistent profit.

The other framework of this study was the arbitrage pricing theory (APT). The arbitrage relied on a fundamental principle of finance: the law of one price. Ross (1976) claimed that many macroeconomic factors determine the stock price. In the stock market, past performance was not a clear indicator of future return, but investors use various metrics based on historical data (Malkiel, 2015; Pearson 1905). The APT a multifactor asset pricing model in which many factors such as macroeconomic parameters or market index, can be a part of a linear function.

The primary task of the APT is to evaluate the present value of the payoffs or cash flows, discounted for risk and time lags, to estimate the stock price (Celik, 2012). When the stock market adjusts the price, a profitable arbitrage opportunity disappears quickly (Ross, 1976). The arbitrageur uses the APT model to find the misprized securities for investment purposes.

The APT is an alternative form of the Nobel Laureate Markovitz's capital asset pricing model (CAPM) that has only one factor, which is the systematic risk. Analysis of a case study in the Netherlands showed the Markovitz's theory could contribute to designing portfolios of investments in flood risk management with few variables (Aerts, Botzen & Werners, 2015). By including various variables that may have an impact on the stock return, the APT model has an advantage over CAPM. In the multi-factor model, the beta of an asset measures the risk of the asset concerning the market portfolio, which is the average risk of all assets. High beta assets can earn a higher average return during equilibrium. The CAPM makes many unrealistic assumptions such as investors had identical preferences, the same information, and held the same portfolio. The CAPM fails to establish long-run prior return patterns (Segal & Jain, 2014). Whereas, the APT only makes a few assumptions, such as all securities have finite expected values and variances.

The factors in this study were the NTA, GDP, P/E, and the stock price. In the APT model, the expected return on the security is the dependent variable. To control the other extraneous variables that affect the stock price, I include two more independent variables in the regression model, GDP as a systematic factor and the P/E as the firm-specific factor. Thus, by using the linear equation that incorporated NTA, GDP, and P/E, I calculated the price of a security $\hat{Y}$.

$\hat{Y} = a + B_1N + B_2G + B_3R + \varepsilon$ ……………………………………..(1)

Where,

$\hat{Y}$ = dependent variable (stock price)

a = constant (risk-free rate)

B_1 = regression coefficient for N associated with $\hat{Y}$

N = NTA that include the IA and goodwill

B_2 = regression coefficient for G associated with $\hat{Y}$

G = GDP

B_3 = regression coefficient associated with $\hat{Y}$

R = P/E

ε = model deviations

The NTA and GDP were the two major components in the model. NTA is a significant part of the assets of a corporation in the knowledge-based economy, and GDP is an external factor that reflects all the economic prospects of the country in which the corporation operates. This study used 44 quarterly financial data from Q4 2007 through Q3 2018 of 56 corporations listed either on NYSE and NASDAQ. By using descriptive statistical analysis, simple regression analysis, and multiple regression analysis, I tested the three hypotheses to determine the extent to which the stock price of 56 corporations correlated with their NTA, GDP of the United States, and P/E

Conceptual Framework

The conceptual framework is a critically important component of research (Antonenko, 2015). In this section, I will explain the relationship between the concepts and variables. The weak-form EMH states that the stock price reflects all relevant information (Degutis & Novickyte, 2014). In a perfect market, there is no arbitrage opportunity, and investors cannot make a profit consistently over an extended period. This phenomenon may be a compelling issue for long-term stock investors. By empirically analyzing the relationship between the NTA and the stock price of 56 corporations, I tested the weak-form EMH.

Furthermore, I quantify the relationship between GDP and the stock price. In this study, I also developed the optimal model with three variables such as NTA, GDP, and P/E for predicting the stock price of eight corporations from various GICS sectors of the S&P 500. However, the challenges for a long-term investor are becoming increasingly complicated, as there exist many unpredictable variables that drive the market.

The factors that earn money in the future constitute an integral part of the value of a company. In the knowledge-based economy, about 87% of assets are NTA, which include the IA and goodwill (Sherman, 2018). The intellectual capital (IC) is an IA that has dynamic, learning, and innovation capabilities. However, the industry ignored operational capabilities of IC (Hassan, Mei, & Johari, 2017). The comparative advantage of a corporation reflects the value of goodwill. I included NTA in the study because its enables future cash flows. IA, (a component of NTA) is the main factor that ensures a sustainable development (Gribanov, Mitrokhin & Vilkova, 2017). To control the extraneous variables, I included the GDP and P/E in this study. The P/E is the internal factor that may reflect the health of a corporation and GDP is a significant external factor that may affect the overall business environment. The BEA has estimated the GDP of the United States as $21.5 trillion for 2019 (BEA, 2018). Based on the BEA data, the GDP of the United States was $10.28 trillion in 2000, and it was 20.50 trillion in 2018; doubled the amount in 19 years (see Figure 3). In this study, I included GDP as a significant factor and analyzed its empirical relationship with the stock price.

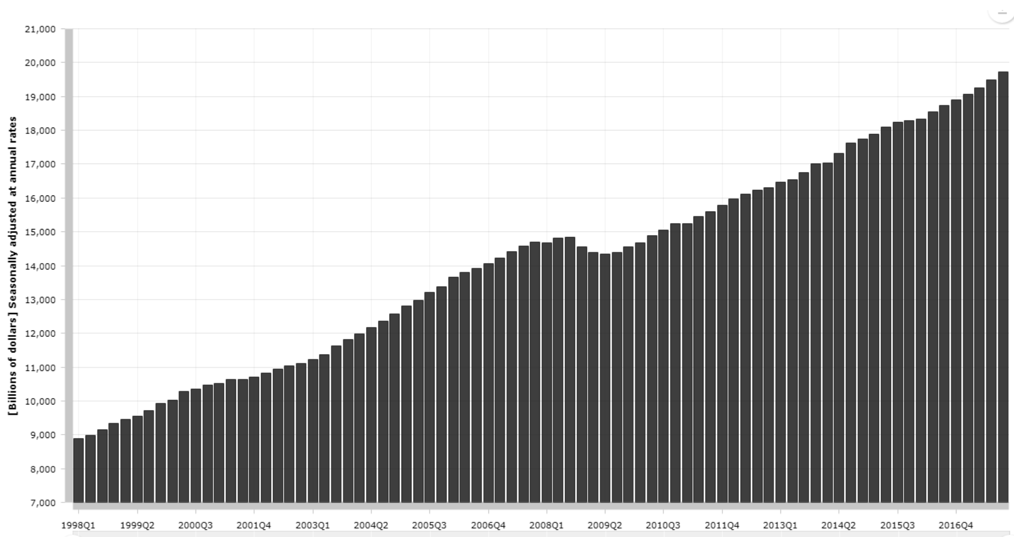


Figure 3. GDP of the United States from Q1 1998 to Q4 2016 (in billions)

The stock market is the driving economic force in today's global economy, but there are various challenges when predicting the return and risk for investment. Investors use many theories and models based on historical data to understand economic reality, but past performance is not an indicator of future stock price (Malkiel, 2015). From the systems theory's perspective, the model can include many factors and APT is the best choice to accommodate all those factors. The stock price reflects the investor behavior, and GDP reflects the economic health of the country and the P/E reflects the health of a corporation. NTA reflect the prospects of a corporation (Sherman, 2018). In this model, I included NTA, GDP, P/E, and the stock price to test the weak-form EMH.

In this study, I incorporated two theories, the EMH and the APT. As per the weak-form EMH, the stock price reflects all the publicly available information and APT states the stock price can be a linear function. By using EMH and APT, I developed the linear function in which NTA and GDP were different factors to predict the stock price. To test the weak-form EMH, firstly, I empirical analyzed to what extent NTA reflected in the stock price of 56 corporations, secondly, I analyzed to what extent GDP reflected in the stock price, and thirdly, I quantify the relationship between three predictors, NTA, GDP and P/E, and the outcome variable, the stock price. Then, I developed the model by using multiple regression analysis. Finally, I employed the runs test to understand the random walk properties of the stock price. If the best-fit model that I developed from the data analysis succeed to predict the stock price, the weak-form EMH fails, but that stands the test of time.

Literature Review

Financial Market

The financial market is an open market system wherein the investors trade stocks, bonds, derivatives, currencies, and commodities. Individuals, corporations, and institutions who require money or have money to lend or invest can convene and trade in either a virtual or physical world (Block & Hirt, 2016). In this market, investors consider the opportunity cost, while the borrowers consider the cost of equity. Both investors and borrowers want to exploit the arbitrage in an inefficient market, but the arbitrage vanishes when the deviation of price from the fair value diminishes. The most fundamental concept of economics states that supply and demand determine the price of a product, applies in the financial market.

Carpenter, Lu, and Whitelaw (2015) claimed the corporate investment efficiency made China the world's largest investor. Chinese stock market has a low correlation with other stock markets offer high alpha to diversified investors. Not only the economic health of a country or the investment efficiency but also numerous other factors, from the weather to social media, influence the supply and demand, which conversely affects the risk and return.

Many factors affect the stock market differently in various countries. Shiller (2005) claimed the behavioral economics that created many economic institutions such as workers' compensation and insurance firms played a fundamental role in history. African stock markets are small, segmented and illiquid but the developments in the world stock markets affect them significantly (Ncube & Kapingura, 2015). The information release on bonuses also affected on the Nigeria Stock Market during the 2002-2006 period (Manasseh, Ozuza, Ogbuabor (2016). Seibert (2015) argued that in the case of 29 out of 30 custom portfolios, made buy/sell decisions by using only operating earnings data that outperformed the S&P 500 buy and hold portfolio. Srinivasan and Umashankar (2014) claimed that a firms' intangible values adversely affects when the firms' ticker symbol was not similar to its corporate name (DLL for Dell, Inc.). The studies are inconclusive regarding the extent to which the various factors affect the risk and return in the volatile financial market have made a rational investment critical. However, arbitrage opportunities make the stock market dynamic.

The value of a financial asset depends on the productive power or performance of the underlying real asset (Bodie, Kane, & Marcus, 2012). Today's derivatives market that includes the stock market of the world is $ 1.2 quadrillion, which is about 16 times the entire world's GDP of $ 71.8 trillion (World Bank, 2018). Investors use financial assets, such as stocks and equity investments to maintain their claims on real assets such as land, buildings, machinery, and knowledge that produces goods and services. The influence of the financial market on every field is tremendous. Various governmental agencies, such as the SEC, regulate the financial market in the United States. Financial integrity is essential for economic and social development (World Bank, 2018).

Functions of Financial Market

An essential function of the financial market is to facilitate the transfer of funds (Thomas, 2006). Block and Hurt (2016) claimed that the pension funds and mutual funds own a large part of United States corporations, and the institutional investors who own these funds exercise an immense amount of control. Other forms of the market are primary, secondary, over the counter, cash and derivatives. In this market, the financial intermediaries, such as banks, insurance companies, and mutual funds, link the borrowers to the investors. To compensate for the risk, investors seek a higher return.

Financial Instruments: Development and Significance

The three characteristics of the financial instruments are liquidity, risk, and yield. Liquidity is the ease of converting an asset into cash, and risk means an owner may not recover the investment partially or entirely, and the yield is the rate of return on an investment (Thomas, 2006). The three types of securities are equity security (stocks), debt security (bonds), and derivatives security (options, futures contracts, forward contracts, swaps, and warrants).

As per government regulations, many agencies regulate the financial system in the United States and ensure the disclosure of reliable, accurate, and timely information pertaining the financial conditions of firms (Brealey, Myers, & Allen, 2013; Block & Hirt, 2016). These agencies are the SEC, Commodities Futures Trading Commission (CFTC), Federal Reserve System (FRS), Office of the Comptroller of the Currency (OCC), Federal Deposits Insurance Corp (FDIC), and State Banking Insurance Commissions (SBIC).

Correlation between the stock market and the economy is significant for the development of both. In many countries, stock market development leads to the economic growth of a nation (Asiri & Abdalla, 2015; Rahman & Siddique, 2014). The economic growth also leads to the development of the stock market, and the capital market significantly influences the economic policy and practice (Spaseska, Risteska, Vitanova, Odzaklieska, & Risteska, 2016).

The valuation of large capitalization (large-cap) stocks and the median capitalization (mid-cap) stocks were critical in developing countries which led governments to change economic policies (Allirajan, 2017). For instance, the stock market conditions influence the government to change interest and money supply (Noreen, brewer & Garrison, 2016). Evidence showed that small-capitalization (small-cap) stocks were less risky than large-cap stocks but typically viewed as riskier (Estrada, 2014).

The two types of securities are debt-based and equity-based. The debt-based short-term financial instruments, such as T-bills and commercial papers, last for 1 year or less. The long-term financial instruments, such as bonds, last for more than a year. The equity-based financial instruments are stocks or otherwise called shares. In this study, I focused on common stocks of 56 corporations, the stratified sample of the S&P 500 but that was only a fraction of the financial market wherein the corporations trade their stocks to raise funds for expansion, growth or other purposes.

Stock Market

Investing in stocks means buying shares, buying a percentage of ownership of a corporation; more investment in stocks means owning more shares. The prospects of corporate growth and the perspectives of investors determine the stock price. There are different forms of corporate growth such as domestic and global expansion, new related or unrelated product launch, product improvement, client retention, and acquisition of new clients (Navarro, Casillas, Carlos & Barringer, 2012). Zumbrun (2014) argued that millions of investors who exited the stock market had lost the opportunity to benefit from the equities boom since 2009. Nobel Laureate, Shiller (2014) claimed that the stock markets seem to follow "where tP is the equilibrium price, tV is the fundamental value, tD is the operator, and fr is the constant risk-free rate of return."

Investor's financial literacy, propensity to trust, and sociability determine their perceptions about the stock market (Dobini & Racine, 2016; McAiliffe & Grant, 2014). Stocks are the financial vehicles for corporations to raise funds to expand. The growth of a corporation needs enough cash flow or funds to sustain it. Corporations sell shares in the market to raise funds. By using various valuation metrics and risk-return models, investors select stocks. Although the unpredictable factors make it a difficult choice, the quest to choose the right stock for investment continues for wealth creation.

Yallwe and Buscemi (2014) claimed that tangible and IA play a significant role in the future success of a corporation. In the market-based economy, both tangible assets and IA are significant factors for economic growth. The IA is a non-physical asset, including corporate intellectual property such as patents, trademarks, copyrights, goodwill, and brand recognition. Innovation plays a significant role in acquiring a competitive edge in long-term growth (Dumitrescu, 2012). However, many recent studies show that most managements choose short-term gains and neglect to invest in IA such as R&D and training. Haji (2018) claimed that between 34% to 60% of corporations have intangible liabilities. However, Al Tongliang (2018) argued that the value of R&D is higher than that of tangible assets and lower than that of organizational assets in the manufacturing companies listed in China.

As shown in Table 3, based on the World Bank report, the stock market develops in many countries at a higher rate (World Bank, 2018b). From the study, Cizkowicz and Rzonca (2013) claimed that ownership concentration significantly affects corporate growth. Their context was the five GCC countries, namely Kuwait, Qatar, Saudi Arabia, Bahrain, and Sultanate of Oman. In contrast, Girma and Vencappa (2015) argued that capital structure was significant for the growth of domestic private firms in the Indian market. Mesly (2014) hypothesized that asymmetry of information regarding stock market enabled few investors to gain higher returns.

During the economic cycle, by changing many macroeconomic parameters, the government can control the stock market environment (Ryack & Sheick, 2016). The federal government's monetary policies, such as altering the interest rate and money supply, could raise or lower the 'heat from the market.' Based on the World Bank data, the volume of stocks traded in the United States has exceeded 225% of the GDP (see Table 3). By using the Hidden Markov Model (HMM), Nguyen and Nguyen (2015) successfully used four macroeconomic variables – inflation or consumer price index (CPI), industrial production index (INDPRO), stock market Index (the S&P 500), and market volatility (VIX) – to predict stock performance. However, only a little literature is available on how the stock market affects the economy. In this study, the main goal was to empirically analyze the extent to which the NTA and GDP can explain the variance in stock price.

Table 3

Volume of Stock Traded in Different Countries (% of GDP)

Country	1999	2000	2015	2016
Brazil	1.27	14.35	23.28	31.24
China	-	62.13	355.42	163.36
India	-	-	36.94	34.99
Japan	49.06	50.76	126.77	105.68
Nigeria	-	-	0.85	0.37
Switzerland	155.20	233.07	140.62	125.18
United States	33.98	289.57	228.46	225.89
World	31.91	145.69	163.62	124.75

Note: Source: World Bank (2018b). GDP = Gross Domestic Product

Many economic parameters, such as the exchange rate, interest rate, unemployment rate affect GDP which plays a significant role in stock market fluctuations. The market risk also affects the asset price, but the interest rate and rate of inflation represent the market risk (Caroleveschi, 2018). Inflation is another risk factor. A study in the Tel Aviv Stock Exchange showed that the contemporaneous inflation rate negatively affected the real stock index return (Kudryatsev, Levav, & Shahrabani, 2014). Low frequency and the trend components of stock prices were the driving forces of the S&P 500 index (Tiwari, Dar, Bhaja & Gupta, 2016). In the Keynes' analysis, the investment expenditure is a factor that affects the interest rate, but today, many factors, such as transaction cost and capital gain tax, play a prominent role in choosing investment strategies.

According to systems theory, many interconnected factors may affect the stock price, but this research is not feasible to incorporate all the factors that may affect the stock price or economy. The various risks, such as macroeconomic shocks, volatility risk, liquidity risk, and high moment risk influenced market risk (Deng, Liu, & Zheng, 2014). Many theories on market failure can explain various bubbles of assets such as equities and financial derivatives; busting these bubbles and inflation can lead to the financial crisis (Yang, 2017). Cash is the best hedge against inflation in the short-run, but when the investment horizon increases, bonds, stocks, and real estate are more attractive options (Koniarski & Sebastian, 2015). Portfolio diversification is one method to mitigate risk. However, I limit the study with three factors such as NTA, GDP, P/E as predictors and the stock price as the outcome variable.

Stock Market Development

In the United States, the stock price tripled from 1995 to 2000, and during the same period the stock price triples in France, Germany, and Italy (Thomas, 2006). Many economists claim that the changes in economic parameters were the reason for similar behavior. The effect of minimum trade unit reductions improves price efficiency and investor confidence in the stock market (Ahn, 2014). Investors use the stock market indexes, such as Dow Jones Industrial Average (DJIA), the S&P 500, and NASDAQ, as benchmarks to compare the stock performances (Damodaran, 2016). Both macroeconomic factors and institutional factors had an impact on stock market development (Ho, Nijindan, 2017). Legal protection of investors, trade openness and liberalization stimulate stock market development. Ripamonti and Kazuo Kayo (2016) tested the stock market development theory of Dermirguc-Kunt and Maksimovic (1996) in Brazilian stock market, and they claimed to have a positive and significant correlation between stock and debt in an improved corporate governance context. Shiller (2013) claimed the three recent innovations were the benefit corporation, crowd-funding and the social impact bond that explained how capitalism modernized steadily to be successful.

Many stock markets in the developing countries grew at a faster pace in the last 20 years. In Malaysia, IA development lags by about 20 years as compared to advanced markets (Salamudin, Bakar, Ibrahim and Hassan, 2010). Shaikh and Kashif (2017) claimed that the asset growth anomalies existed on Karachi Stock Exchange. They also recommended investing in small-cap to generate abnormal higher returns.

Risk in Stock Market

All the financial instruments are not risk-free; the unpredictable environment and the investor behavior render the stock market volatile. The bond market is directly proportional to the improvements in the stock market (Ripamonti & Kayo, 2016). The debt-based market and equity-based market are related. Many studies were not conclusive on what factors affect the stock price volatility (Ahmed, Ullah & Tanzia, 2014). Stock investment is always a risky proposition (Mehr-un-Nisa &, 2011). Sinha and Agnihotri (2015) claimed the value adjusted risk (VaR) was not accurate in real-world situations; VaR estimated the financial risk in a firm, portfolio or position within a time frame. The measure of market risk in the portfolio is beta. Assessing beta and the probability of rare and extreme events was an issue in the stock market (Magnou, 2017). Market volatilities were like “Tapper Tantrum” (Privitera & Reith, 2018). Russo (2016) claimed that the correlation between risk-adjusted return and risk was negative. For the investors, the capital gain in stock investment is not a guarantee, and there is a possibility of losing some or all value of the stock in the market.

The stock market risk in the United States of America is significant. Only four banks held about 95.9% of the United States derivatives market, and the stock investment risk is unpredictable. Dobini and Racine (2016) claim that the stock investors’ financial literacy, propensity to trust, and many variables related to personality, cognitive, and demography influence their perception of the stock market and stock investment. Stocks are an excellent medium to build wealth, but only for those investors who know what they can accomplish, how to utilize the opportunities, and adapt to the volatile stock market environment.

Volatility in the stock market varies from industry to industry. High-tech industries showed high volatility in stock returns (Gharbi, Sahut & Teulon, 2014). The stock market in many developing countries is in chaos that has properties such as nonlinearity, sensitivity to initial conditions, and fractality. Asymmetric multi-fractality is high in the financial crisis. Navarro (2012) claimed the financial crisis of the Eurozone countries such as Spain, Greece, Portugal, and Ireland were due to political causes. By using the Brock-Dechert-Scheinkman test, the Maximal Lyapunov exponent and the Box-Counting method, Gunay (2015) analyzed the chaotic conditions of emerging stock markets in Brazil, Russia, India, China, and Turkey (BRIC-T) and claimed the existence of the chaos in stock index returns of the BRIC-T. Khan, Gul, and Ali (2017) claimed inflation hurt stock returns while interest rate had a positive impact on the Karachi Stock Exchange during 2008-2012.

In Nigeria, the changes in exchange rate and oil price are correlated with the volatility in stock price (Lawal, Samoye & Babajide, 2017). Cash is the best hedge against inflation in the short horizon, but bonds, stocks, and real estate are the best options (Koniarski & Sebastian, 2015). Kung and Schmid (2015) claimed that the households feared the continuous economic growth cause low asset valuations which demand high-risk premia in the asset market. The study from China’s family publicly listed companies (PLC) revealed the corporate value of PLC first increased and then decreased (Luo & Liu, 2014). Investors are not thoroughly cautious about various economic characteristics of different industry sectors.

Choe, Kho, and Stulz (2015) found evidence of positive feedback trading by foreign investors during 1996-1997 before the Korean economic crisis. Understanding the risks associated with investment in securities is an essential element to mitigate the risk. However, investors cannot avoid numerous risks such as financial risk, interest rate risk, inflation risk, market risk, political risk, country risk, personal, and emotional risk. For instance, the interest rate risk affects the growth of various sectors differently. The growth of banks is a function of the interest rate, and the interest rate has a significant role in determining the value of the bank's stocks (Tripathi & Ghoshm 2012). The legal restrictions, transaction costs, and foreign investment taxes make foreign equity investments more complex (Noreen, Brewer & Garrison, 2016). In those environments, investors require more critical analysis and study. Investment in international markets reduces systematic risk in the portfolio, and that is an advantage of foreign investments.

Kartosova (2013) found a correlation between the primary factors forming individual investors' behavior on the Lithuanian stock market and personal characteristics such as gender, age, investment experience, and profession. Ryack and Sheikh (2016) claimed that a young person with a strong financial risk tolerance chooses a large percentage of high-risk investments to build a retirement portfolio. To be risk-averse or risk-seeking is a significant issue for many investors because the high risk does not guarantee a high return. Risk-tolerance behavior is influenced not only by age but also personality traits, which affects portfolio selection (Pak & Mohmood, 2015). From the study on demographic trends, Favero, Gozluklu, and Tamoni (2011) claimed the correlation between the middle-aged to young ratio (MY), and the dividend-price ratio was inconclusive. The risks are not limited to individual stocks, but in the portfolio, a significant risk of a single stock can bring a surplus of risk to the overall portfolio (Strachinaru, Gutu & Ilie, 2014).

Chen, Mantegna, Pantelous, and Zuev (2018) claimed the degree of dynamic correlation and cointegration between pairs of stock markets in the United States, United Kingdom, and Eurozone increased during economic, financial, and political shocks. The exchange rate volatility also showed the dynamic correlation among the three stock indices, the S&P 500, FTSE 100, and EURO STOXX 50. For that matter, diversifying the risk by investing in the United States, the United Kingdom, and Eurozone is limited. The macroeconomic shocks, volatility risk, liquidity risk, and higher moment risk influenced the market correlation risk, and the degree of stock market correlation increased when the market index fell (Deng, Liu & Zheng, 2014). Diversifying the risk is also a challenge.

Investment in developing countries has a higher risk and yields high rewards as compared to developed countries. The stock investors can use the indicators such as risk premium of market, firm size, and book-to-market value for aiding investment strategy (Tay & Gan, 2016). Small-cap liquidity stocks had more idiosyncratic risk than liquid and large-cap stocks (Lu-Andrew & Glascock, 2016). The investors consider small-cap stocks to be riskier than large-cap stocks and value stocks to be riskier than growth stocks. This conventional wisdom is true but not applicable to long-term stock investments (Estrada, 2014). Chen and Pottier (2015) claimed that the 12-months-ahead estimates of stock returns of corporations were only the explicit estimates of their future market value; the miscalculations happen due to either analysts' optimism, inaccuracy, or a combination of both. The stock return forecasts and financial strength rating of publicly traded corporations often show less social responsibility with misguided financial forecasts.

In the short-term analysis, Bortoluzzo, Minardi, and Passos (2014) found a negative or null relationship between the systematic risk and returns in the Brazilian stock market. In the intra-day analysis, by using high-frequency data in the Indian stock market, security returns demonstrated a reversal in their direction within a few minutes of extreme price rises and falls. This characteristic implies that the predictability of price movements is more reliable for day traders. However, the value investors use the fundamental analysis to make long-term stock investment decisions.

Sehgal and Jain (2014) claimed that the CAPM failed to establish a long-run prior return pattern, but the Fama-French Three-Factor model could explain long-term prior return patterns in stock returns with a few exceptions. In the long-term analysis, Sehgal and Jain found that the momentum patterns existed, and the value factor was more prevalent than the size factor of a corporation. The 2007–2009 financial crisis in the United States caused to reduce 1.3% of the total wealth (Kim, Hanna, 2016). After the stock market crash, the shareholders persuaded the corporate management to maximize short-term earnings and, consequently, short-term value, which led to a reduction in the long-term intangible investments such as innovations. In 2010, the Dodd-Frank Wall Street Reform Consumer Protection Act was enacted in the United States to protect the stakeholders. Zhang (2015) argued that the investment in innovation (R&D expense), after the 2007–2009 financial crisis, continued to add to the corporate value. Without innovations, a corporation cannot grow in future (Block & Hirt 2008).

Modeling volatility to conduct stock price analysis is essential for strategic investment decisions and risk management. Investors have reacted more to adverse shocks than to positive shocks (Sevil, Kamisli, & Kamisily, 2015). Barak and Modarres (2015) developed a hybrid algorithm to forecast the market volatility by studying the Tehran Stock Exchange (TSE) data from 2002 to 2011. Factors such as political risk and interest rate hike reduce stock returns and investor confidence (Noreen, Brewer & Garrison, 2016). Areal, Oliveira, and Sampaio (2013) claimed that investment in gold is the better option in economic distress. By studying daily data from 2010 to 2015, Bunnag (2016) argued that the volatility in gold price had an impact on the volatility on the S&P

500 indexes. Thabet (2014) claimed that changes in money supply in the United States had an impact on stock markets not only in the United States but also in Canada. From the systems theory perspective, many interrelated variables impact one another.

The confidence of the public of the United States in the stock market is low. Zumbrun (2014) claimed that families at all income levels owned stocks in the 1990s; but since 2001, only the highest earners owned stocks; even those who were earning an average of $123,000 a year have exited the stock market. When the per capita GDP was only $59,500 in 2017, the gross national saving in the U.S. was only 17.5% of GDP (CIA, 2018). The data indicates that the number of investors is decidedly low in the United States. The information about which variables and the extent to which they drive the market can reinstate the investors' confidence in the stock market. This study is an attempt at finding an answer to the pivotal question in finance: is the stock market efficient and how significantly do various factors that affect the stock price?

Stock Investment Style

Investment strategies change with the investment horizon. Depending on various objectives and the acceptable level of the risk, investors choose either short-term stocks or long-term stocks. The strategies to deal with the two types of investments are also different. The short-term stock traders enter or exit a stock position for a short period, which can be as little as one day, and focus on exponential moving averages and rapidly changing stock market patterns. Merely holding the S&P 500 (benchmark strategy), the return was 1.65% per year from 1970 to 2012 but using the leading economic indicator strategy generated 2.76% more than the benchmark strategy (Feldman, Jung and Klein, 2015).

Long-term stock investments have substantial monetary and non-monetary impacts. The long-term stock traders are not preoccupied with the short-term volatility and patiently wait for a long time for corporate growth. Measuring the value of long-term stocks is a control issue of great importance. It is not merely a buy-and-hold strategy; the investors engage in the market to exit and re-enter the market.

The risk is a significant factor that many investors consider before making investment decisions. In the portfolio, high-beta low performing stocks are not desirable. The strategy of buying low-beta stocks and shorting riskier high-beta stocks delivers significant risk-adjusted returns (Asness, Frazzini, & Pedersen, 2014). However, taking a high risk does not guarantee high returns in the stock market.

The control stocks (superior voting class) and public stock (inferior voting class) play different roles. During positive events, the average price discovery of control stocks was 46.6% and in adverse events was 40.5%; this contributed to the price discovery stability (Wang & Yang, 2015). Issues of price discovery in the stock market are sophisticated to resolve efficiently.

Emm and Trevino (2014) claimed from the study on risk-return characteristics of companies from 1940 through 2012 that the large-cap companies had minimal average return and risk compared to small-cap companies. The Amazon stock price went up from $ 1.54 in June 1997 to $ 982.59 in August 2017 (SEC, 2017). That was a 63,704% gain in 20 years. Amazon's growth is not a lone case; many corporations such as Home Depot, Microsoft, Apple, and numerous others started as penny stocks and became market movers in a decade or two. Investors must choose the investment strategy judiciously for long-term stock investments. This study enables the investors to make intelligent investment decisions by using the information of which factors significantly drive the stock price.

Psychology of Decision Making

Stock investment is a human decision that investors make after analyzing numerous data and options in the volatile stock market where all the variables fluctuate rapidly. The stock market fluctuation occurs mainly due to changes in three significant factors: fundamental values, technical analysis, and investor behavior. Both the fundamental values and the trading pattern shift all the time, but the investor behavior that involves greed and fear has been the same for centuries. In behavioral finance, 'irrational exuberance' takes over results in greed and panic spins creating volatility in the stock market (Mesly, 2014). The risk tolerance of a person drives his or her financial decision (Ryak, Kraten & Sheik, 2016). For positive decision making, effectively reducing the overconfidence bias was possible by using a fixed value method as opposed to the standard fixed probability method (Ferretti, Guney, Montibeller & Winterfedt, 2016).

In the decision-making process, there are mainly seven steps – identify the decision, gather the relevant information, identify the alternatives, weigh the evidence, choose from the other options, act upon the decision, and review the decision (Saaty, 2008). Based on the specific theories, investors attribute weight to each attribute according to its importance. These weights change from investor to investor and scenario to scenario. Quality management systems (QMS) play a significant role in the strategic decision process, but QMS varied according to different industries (Dumitrescu, OacheSu & Cerchia, 2015).

There are specific issues associated with decision-making. The first issue is distortion. Humans are prone to illogical thought processes due to social pressure, others' opinions, preconceived notions of what is acceptable by society, and the instinctual need to survive at all costs (Rezaei, 2015). The second issue is the meta decision-making process that is about the dual role, and the idea of being 'not oneself' is the basic concept (Wang, 2000). The third issue is of the different challenges that make the decision-making process difficult. The influx of data in the stock market and the multitudes of analysis make the decision-making process critical. The fourth issue is about making intelligent choices. Many psychological and agentive dissonances of the investors may negatively affect their decision-making process. The stock price changes and stock market volatility are not just about corporate growth and the business environment.

According to EMH, the stock prices reflect all the information and the price responds instantly to new information (Breal, & Mayers, 2007; Bealy, Mayers, & Allen 2013; Berk & de Marzo, 2016; Welch, 2011). When the results of the fundamental analysis and technical analysis change all the time, the stock market adjusts immediately and reflects all the information on the stock prices. According to EMH, when the stock price follows a random walk, the fundamental analysis and technical analysis based on past data is not relevant. However, the third factor, investment behavior is the primary cause of stock fluctuations as described by Shiller in his seminal work, ‘Irrational Exuberance’ (Shiller, 2008). When everything changes significantly, it is only the human behavior that does not change much, but the investors adapt to their environment. In this study, by testing the EMH, I explored the extent to which the significant factors, NTA, GDP, and P/E affect the stock price.

Biases in Stock Investment

Biases in stock selections affect the outcome of stock returns. When the biases affect the supply or demand of stocks, the stock price changes. Many biases are due to personal judgments and decisions (Montibeller & Winterfeldt, 2015). The two cognitive biases that may affect the investment decision are home bias and recency bias (Bianchi, Guidolin & Ravazzolo, 2017). The home bias is the tendency to invest large equities in a domestic market because many investors are not familiar with the opportunities and threats in a foreign market. Home bias adversely affects this opportunity.

Recency bias is another bias in the financial sector. The Party Effect or Recency Bias is where stock market participants evaluate their portfolio performance based on the recent results or their perspective on the recent results (Gilovich, Griffin & Kahneman, 2002). Montbeller and Winterfeldt (2018) argued the individual biases could be cognitive or motivational, overconfidence and wishful thinking. These biases are potential challenges for investors as they skew the judgment. Siegrist and Sutterlin (2014) claimed the people’s cost-benefit analysis is irrational because they evaluate equally adverse outcomes differently depending on the cause. This practice in the stock market leads to them arriving at incorrect conclusions that ultimately lead to them taking incorrect decisions regarding the future behavior of the stock market. To understand the stock market environment and the economic health of a corporation, investors and other stakeholders widely use many valuation metrics.

Valuation for Investment

Value in the Classical Period

The means of production, not the IA, is the primary focus of classical economists such as Marx, Smith, Riccardo, Schumpeter, Becker, and many others. However, the more sophisticated knowledge-based economy of today demands new methods and methodologies to explain growth, productivity, effectiveness, and sustainability

(Duzinskas, Arturas & Verslo, 2014). The importance of goodwill and the IA in the quarterly reports may have a significant effect on corporate performance. Not many research works have been conducted in the United States market to study their significance on long-term stock performance. However, various models and methodologies used to measure the IA are available, but they do not use the same methodology and standards for measuring the value of the IA in every market around the world.

The investors use asset pricing models to evaluate the present value of payoffs or cash flows discounted for risk and time lags (Celik, 2012). Valuations become critical when the factors that affect the cash flows change irrationally. Many assumptions of the pricing models such as no taxation or investor’s similar preferences make the pricing models obsolete to use in today’s market conditions. Stakeholders should focus on stock indexes and value discovery rather than price discovery (Ellis, 2014).

In a long-term investment, the value of NTA is a significant factor that could determine the stock performance. Based on the financial data at SEC, the cumulative value of NTA for 2015 of 30 corporations that decide the Dow Jones Industrial Average, was $ 212.82B; the S&P 500 tracks the same corporations (SEC, 2018). These 30 corporations, the pride of the U.S. enterprise have a significant influence over the Wall Street stock trading. Based on the SEC data, the combined NTA for Q3 2018 of 56 corporations in this study was 2.74 trillion (SEC, 2018). Not the total assets, but the NTA of these corporations listed on NYSE and NASDAQ alone is more significant than the combined GDP of BRICK countries; today the value shifted significantly from tangible assets to NTA.

The implications of NTA on their corporate performances or stock prices were absent from the literature. That gap in the literature has led to the conducting of this research. There was a statistically significant correlation between NTA and the stock performance; NTA was a considerable portion of the assets presented under the asset class of the financial reports. The purpose of this study was not to explore the critical valuation method of NTA or the anomalies of stock pricing but to empirically study the correlation between NTA reported in the financial statement and the stock performance. By empirically analyzing how the change in NTA and GDP alter the stock price was the test of the EMH

Technical Analysis

In the technical analysis, investors analyze the stock price movements by using innovative computer and telecommunication technology. The short-term stock investors use technical analysis. This trading style is also known as algorithmic trading or quantitative trading. For wealth creation, the stock investors use different strategies from the 'short-term horizon,' such as high-frequency trading (HFT), to 'long-term horizon,' such as value investing (VI). The HFT uses highly technological innovations based on algorithms and mathematical models to analyze and execute a substantial number of transactions that could beat the four-millisecond barrier. The high-frequency traders act on information revealed by low-frequency traders (O'Hara, 2014). Park and Irwin (2011) conducted 95 studies, out of which 49 did not comply with the technical analysis. Technical trading rules have a failure rate of about 41% when predicting the stock price. Park and Heaton (2014) analyzed 7,846 technical trading rules for their study, and they found some empirical support for using technical analysis to use as an investment tool for the Australian Stock Market.

Technical analysts claim that the price patterns based on the historical price data reflect the current price movements that enable investors to make informed investment decisions. Few price patterns in the technical analysis are ‘head and shoulders,’ ‘reverse head and shoulders,’ ‘double top,’ ‘double bottom,’ ‘ascending and descending triangles,’ ‘trend lines,’ ‘break out above resistance,’ ‘break out below support,’ and ‘gaps.’ The historical data is the basis of all these charts.

From the recent study that involves 14 Lithuanian companies listed on the NASDAQ and OMX Baltic, Dzikevicius and Saranda (2016) claimed that there was no justification for using extremely complex forecasting models that integrate both technical and fundamental analyses, even if they are industry practices that have less success. If the investors can predict current stock prices based on historical data, then the market is not weak-form efficient; however, in a ‘strong-form’ efficient market, the stock prices are random (Fama, 1976). This study focused on understanding market behavior by testing weak-form EMH. The various evaluation metrics also failed in many instances, which emphasizes the importance of understanding the stock market behavior.

Fundamental Analysis

In the fundamental analysis, investors study the most fundamental financial level of corporations by analyzing their revenue, expense, assets, and liabilities. Investors interpret the earnings, growth and corporate value differently for various investment purposes. The fundamental analysis includes the analysis of financial reports or financial statements such as balance sheet, income statements, and cash flow statements that contain historical data.

The objective of the fundamental analysis is to analyze the intrinsic value of the stocks, and the value investors claim that the corporations' fundamentals are the key drivers for long-term stock prices. In China, all the stock prices are significantly related to the firm's fundamentals and have low correlation with other equity markets (Carpenter, Lu & Whitelaw, 2018).

According to the managing editor of Yahoo Finance, Ro (2016) claims past performance is not an indicator of future outcomes for 92.7% of mutual funds. However, the managing director of Global Research and design at S&P Dow Jones Indices Soe (2016) states 'due to either force of habit or conviction" investors consider past performances and related metrics to select funds for investment. Investors widely use the stock price forecast models that integrated both technical and fundamental analysis but not justified comprehensively (Dzikevicius & Saranda, 2016).

Valuation Metrics

A rational investor and the shareholders need a reliable measure to understand a company's financial health, but the only certainty in the stock market is uncertainty. The past performance of a company is not a guarantee for future returns as the environment and the factors that affect the market are always rapidly changing. Sherman and Young (2018) stated, "Lurking within the financial statements and communications of public companies is a troubling trend." Accounting quality is a significant factor in asset valuation. Hua, Dao, and Fornaro (2016) claimed that adopting Statement of Financial Accounting Standards No. 157 and ensuring the fair value reporting increased the accounting quality. However, there was an insignificant negative correlation between audit quality and market crash on Tehran Stock Market (Khajvi & Zare, 2016). The objective of a business is to maximize its value (Damodaran, 2017). Company value has loaded with uncertainties and committing a high level of errors in the valuation are liabilities (Nogueira Reis & Augusto, 2014; Qiming, Weitin & Chen, 2017).

Investors use the following many metrics or multiples to value a corporation: market capitalization, the earnings per share (EPS), the P/E, the enterprise value (EV), the earnings before interest, tax depreciation and amortization (EBITDA), the price/earnings to growth (PEG ratio), and the Dividend Yield. These metrics provide an analysis of the well-being of the past or present financial condition of a corporation but not of future performances. Many custom metrics do not conform with GAAP and IFRS, but investors and analysts use widely (Sherman & Young, 2017). Some common custom metrics called, non-GAAP measures are FCF, EBITDA, funds from operations, adjusted revenues, adjusted earnings, and adjusted EPS.

Investment analysts expect these metrics to be the indicators of future price movements in the stock industry and calculate all these parameters from the quarterly reports of the corporations submitted to the SEC. The companies listed in the stock exchanges in other countries also file their quarterly reports to their respective governmental agencies, and investors use that historical data for predicting future stock price. The following part of this section focuses on the strengths and weaknesses of the metric that investors and analysts use widely.

Market Capitalization

Market capitalization or merely the market-cap determines the size of a company. It is the total dollar value of a company's outstanding shares, which is the product of many outstanding shares and the current market price of a single stock. Like any other organism, companies are born, grow, sustain, decline, and die; however, the size of a company is not a guarantee of its prospects (McConnell & Bruce, 2014). The statistics show that the small-cap technology companies have a high growth rate and high yield, but the large-cap companies have small returns in a short period horizon; companies that focus on sustainable growth survive longer with consistent performance.

In many developing countries, stock markets are small, segmented, and illiquid but are growing with the world stock market. The market capitalization of regional corporations with a high growth rate and high return may not reflect their sustainable growth in the long-run (Ncube & Miniigiri, 2015). The market capitalization indices are not mean-variance efficient to form portfolios with the highest expected returns because of their price sensitivity (Arnott, Hsu & Moore, 2005). Hodnett, Bots, Daswa, and Davids (2014) claimed that the market capitalization index is meaningful only in an efficient stock market. The vast capitalization growth stocks and large-cap value stocks perform differently than the medium capitalization stocks (Nittayakasetwat & Buranasasiri, 2014). Value stocks had higher exposure to innovations, and the market's expectation in future return was different from that in growth stocks (Koijen, Lustig & vanNieuwerburgh, 2017). The governmental policies are also not useful in developing countries to bring back almost bankrupt corporations, similar to General Motors and Ford in a country with a strong stock market base, to the growth phase in a short period. For a stock investor, the market capitalizations may be misleading.

Earnings Per Ratio (EPS)

The EPS is a measure of the profitability of a company that determines the value of a stock. Each common stock gets the unit portion of the company's profit. In a study that constituted of 395 non-financial companies in the primary market of Bursa Malaysia, Nakhaei (2016) claimed that the accounting measures, such as NI, NOPAT, and EPS, are significantly related to stock returns than the market value added (MVA). In another study that constituted 90 companies at the Karachi Stock Exchange for a period of six years, from 2006 to 2012, the researchers claimed that the accounting measures, such as NI, NOPAT, and EPS, are more significant than the economic value added (EVA) in explaining MVA (Yaqub, Mehmood, Naveed-ul-Hassan, Zohaib & Bukhari, 2015). Parvaei & Farhadi (2013) claimed the EVA was the best measure for evaluating the performance of a firm but had low predictability for stock performance. When the companies buy back the outstanding shares, the EPS increases, and for that reason, the EPS is not always a reliable factor in determining the value of a company. This simple strategy of buying back shares to show the higher EPS without wealth creation might distract or mislead many investors for years.

Price Earnings Ratio (P/E)

Investors use the price-to-earnings ratio (P/E), also called PE multiple to determine if the shares are at a premium or a discounted price. It is a widely used stock evaluation measure and is merely a number obtained by dividing the company's current share price P by the earnings per share EPS in the trailing 12-month period. It explains the amount the investor pays per share for one-dollar earnings. For a rational investor, a smaller P/E is better. The P/E can not only be applied to individual stocks but also to study the entire market. The long-term investors prefer discounted shares for value investing, and the P/E helps to choose the value stocks.

When the denominator of the P/E is zero, the P/E becomes invalid. In a study conducted by Dudney, Jirasakuldech, Zorn, and Emekter (2015), with the data samples from 1996 to 2008, showed that the stocks with larger negative residuals have lower returns and reward to risk ratio, and this pattern is good for the short period. A similar study conducted using the quarterly financial data from 1951 to 2012 showed that the P/E immediately dropped following shocks to the change in Tobin's q ratio, which means that the P/E is not an exact measure that can be strategically used to estimate the performance of a company (Sum, 2014).

In another study that includes P/E of 240 companies from 2000 to 2014, Herawati, Achsani, Hartoyo, and Sembei (2017) claimed that about 65% of the stock price lower at the time of initial public offering (IPO). However, Chung, Liao, and Chiang (2015), after studying the stock market in the United States using the stochastic dominance (SD) approach, claimed that the P/E and cash flow to price ratio (CF/P ratio) are better measures to determine investment strategies than using the book-to-market ratio, company size, and divided-to-price ratio. Evaluation methods are not reliable at the different stages of corporate life, be at an initial stage or a mature stage. In a developing market, the lack of market imperfection and efficiency creates a complex environment to predict stock prices decisive factors. The risk of value index was higher than that of the growth index and smaller than the risk of Dow Jones Industrial Average index in a short horizon between 2008 and 2012.

Chung, Liao, and Chiang (2015) claimed the inverse of P/E, the earnings-to-price ratio (E/P) is positively correlated with stock price. E/P is related to fundamental determinants, but they cannot explain the residual portion; larger positive residuals are correlated with higher returns (Dudney & Jirasakuldech, 2015). Hodnett (2014) analyzed the value-growth spread on the Johannesburg Stock Market (JSE) by using data from 1997 through 2013 by using E/P. Hodnett (2014) claimed that the correlation between value-growth spreads and near-term market risk premium was positive but could not explain the forward market risk premium. Both P/E and E/P cannot explain many phenomena of the stock market.

Enterprise Value (EV)

The enterprise value (EV) is the economic measure of a company's total value. It is the sum of market capitalization, debt, minority interest at market value, and preferred shares less the total cash and cash equivalents. Holding more cash and cash equivalents reduce the value of EV. Investors use EV for corporate evaluation as well as risk analysis and for comparing values of companies with a diverse capital structure. Amiri, Ravanpaknodezh, and Jelodari (2016) used ordinary least-square regression (OLSR) to study the relationship between the values of 40 companies in Tehran Stock Exchange and their stock prices and claimed that the price-to-book ratio (P/B ratio) was the best indicator for stock valuation.

Without using the EV measure or any other metric, Yodmun and Witayakiattilerd (2016) employed two technical analyses, namely the fuzzy analytic hierarchy process (FAHP) and technique for order preference by similarity to the ideal solution method (TOPSIS) for creating a portfolio. Investors use various strategies for stock predictions and neglect the fact that corporate growth depends on how efficiently use NTA to maximize products and services.

Price to Book Ratio (P/B ratio)

Investors use the price-to-book ratio (P/B ratio) to evaluate the worth of stock and to compare the stock prices within industries. It is one of the value growth benchmarks, calculated by dividing the product of the current stock price and the number of outstanding shares by the last quarter book value of the company. The book value is the total asset less total liability, represented as ‘stockholder equity' in the balance sheet of a company. Investors determine the book value by subtracting the total liabilities from the total asset, as it includes a considerable value of goodwill, intangible assets, and preferred stocks. Penman et al., (2007) studied P/B ratio and found the financing and operating components of P/B ratio had a negative relationship between financial leverage and stock performance, but the financial theories imply that there must be a positive correlation between equity return and the financial leverage.

The P/B ratio determines the amount of equity the investors pay for each dollar in the net assets. If the P/B ratio is more than one, the stock price of the company is overvalued and vice-versa. The overvalued company's acquisitions can reduce the book value, which can mislead the P/B ratio analysis. Foye and Mramor (2016) claimed that the correlation between financial leverage and the stock return is positive. Many inconsistent studies make the P/B ratio an unreliable metric. P/B ratio is not useful for a company with massive R&D expenditure or firms with fixed assets.

Earnings Before Interest and Taxes (EBIT)

Investors use the earnings before interest and tax (EBIT) as a measure of profitability of a corporation. The EBIT is the operating income that includes interest and tax but does not include the cost of the capital structure (Datar & Rajan, 2016). Interest and tax vary from corporation to corporation and country to country. The EBIT excludes the recurring charges, and that could skew the earnings report (SEC, 2018c). A valuation measure without interest and tax is confusing in a world where interest and tax play a significant role.

Earnings Before Interest, Taxes, Deprn. & Amortn. (EBITDA)

Investors use the earnings before interest, taxes, depreciation, and amortization (EBITDA) to measure the operating performance of a company. Every country or business exists with all or any of the following – interest, taxes, depreciation, and amortization. Capital expenditure is absent in this metric, which is one of its significant flaws. A negative EBITDA indicates that a company has a severe issue with cash flow and profitability. The GAAP does not accept EBITDA, but investors use it for security analysis. The EBITDA excludes the recurring charges, and that could skew the earnings report (SEC, 2018c). In this instance, understanding the actual characteristics of the stock market is more vital than using the wrong valuation metrics for making investment decisions, and this is the significance of this study.

Price/Earnings to Growth (PEG ratio)

The next metric is the PEG ratio that demonstrates whether a stock price is higher than the earnings growth of the corporation. This metric is another tool for selecting undervalued stocks. To yield the PEG ratio, divide the stock's P/E by the growth rate. The firms with a lower PEG ratio yield higher returns in the Vietnamese market (Le, Tran, Nguyen, Ngo & Huynh, 2018). If the P/E is 12 and the future expectation of earnings growth for the next five years is 8%, the PEG ratio is (12/8) 1.5. Future growth is a factor for calculating the forward PEG ratio, and the historical growth is using for calculating the trailing PEG ratio. Investors claim that the PEG ratio provides a complete picture of the stock evaluation than the P/E because the P/E only explains the worth of the stock as compared to past earnings, while the PEG ratio reveals the future intrinsic value of a stock.

A higher PEG ratio means that the market expectation of growth is higher than the estimates. It also exhibits the high demand and the higher price of the stock. A PEG ratio that is ‘higher than one’ indicates that the stock is relatively overvalued, and one that is ‘lower than one’ suggests that a share is relatively undervalued below its fair value. Forecast of the ‘12-month forward’ PEG ratio of The Boeing Company was 1.34, and that of Apple Inc. was 1.28 (NASDAQ, 2017).

Meher and Sharma (2015) claimed that the PEG ratio is more effective than the P/E ratio. The PEG ratio is suitable to understand the relative stock value comparison where there is no dividend yield. This metric is invalid or inaccurate when comparing corporate performances that provide dividends to its shareholders. The growth rates of mature and large corporations are low and steady as compared to many disruptive corporations in the technology industry. For that reason, the PEG ratio is not a comparative metric. Instead of PEG ratio, portfolio analysts use new trends in the metric, modeling, and portfolio analytics system design. Other areas of valuation are stock screening, text analytics, traditional and modern uses of factor models, smart beta, and new visualization software and cloud-based solutions for data management and analysis (Pachamanova & Fabozzim, 2014).

Cash Flow Analysis

The next metric is the Cash Flow Analysis. Foerster, Tsagarelis, and Wang (2017) claim that the direct method cash flow measures have stronger predictive power for stock return than the income statement measures. The cash, taxes, and capital expenditures can also provide incremental predictive power for stock returns (Foerster, Tsagarelis, &

Wang, 2017). Russell (2016) claimed that the discounted cash-flow analysis of pharmaceutical patents is value relevant.

Cash flow analysis could not predict the recessions. A historical study proves that during the economic turmoil from September 1998 to March 2000, growth stocks outperformed value stocks, and small stocks outperformed large stocks, however, during the bearish period from March 2000 to October 2002, they correspondingly underperformed (Gu, 2015). Impact of IA on cash flows in various sectors was significantly different (Mendoza, 2017). Chen, Da, and Zhao (2008) argued the cash flows and the discount rates played different roles in the asset pricing that made the asset pricing models problematic. Dickinson (2011) claimed that investors did not incorporate the information contained in cash flow patterns and undervalued mature firms.

Momentum

Another metric is the momentum that investors use to measure the change in the analyst sentiment over time. Chiou (2015) argued that momentum is a predictor of cash flow growth and excess returns. In another extensive study of 148 quarterly earnings announcements from 2002 to 2008 and trading information on control and public shares, Wang and Yang (2015) claimed that the price discovery of control shares increased with the relative volume of control shares and decreased with the relative institutional ownership and volatility; the momentum affected the volume. Pirie (2016) claimed the institutional investors used momentum in making stock investment decisions on the Hong

Kong Stock Market. After studying the data of 493 companies from Bombay Stock Exchange 500 Index, Sehgal and Jain argued the momentum profits were consistent in the short-run.

Momentum during the bullish period and the bearish period are in the opposite direction. In contrast, a study by using the Prospect Theory and Mental Accounting proposed by Grinbaltt and Han (2005) in the Chinese market demonstrated that the disposition effect has no relationship on the momentum, unlike the stock market in the United States (Kong, Bai & Wang, 2015). Investors use momentum as they want to be inconsistent with the market fluctuations as they have short-term constraints, but the perspectives of the long-term investors are different (Pire, 2016).

Other Methods

For portfolio management, investors have used stock screening, text analytics, smart beta, new visualization tools available from vendors and open source software, and cloud-based solutions for data management and analysis (Pachamanova & Fabozzi, 2014). Chang, Huang, Chang, and Lin (2015) claimed that the investors exhibit gambler's fallacy in the stock trading of good companies with overconfidence as well as self-attributions even if they are not good stocks and "lottery-type stocks" demonstrate better performance than others. On an average trading day, less than 5% of the total shares are traded and determine the price, and this affects the price of other 95% of shares. A minority of investors have a significant impact on the overall performance of the stock price. This perspective illustrates a different trend in stock investment that is about unpredictable ‘herd behavior,’ which is beyond the scope of the standard accounting information or financial models.

Chen and Pottier (2015) claimed the stock ratings are not reliable for investors because the increase in actual or forecasted stock return has little relation to rating upgrades. However, companies listed in the “100 Best Companies to Work for in America” rewarded 2.3% to 3.8% higher return than their peers from 1984 to 2011(Edmans, 2013). From the empirical study of corporations from the S&P 500 index, Schauten, Stegnik, and Graaff (2010) argued the levered cost of equity was the best proxy for the required return in IA.

Many metrics were developed over time to meet various investor needs. Singh and Kaur (2014) claimed the companies that fulfill at least four Graham’s criteria yielded excess returns in the Indian market. Chiou (2015) argued that the fundamental cash-flow ratio was a predictor of cash flow growth and excess returns in the Taiwan Stock Market. Cheng, Lin, and Liu (2017) developed a risk-adjusted performance metrics for the real estate sector. An increase in the debt/capital ratio negatively affects the growth rate of capital stock in Brazil (Moreira, 2013). Stock return on customer satisfaction portfolio based on the American Customer Satisfaction Index (ACSI) was significantly high. Customer value construct is essential, but it needs to reflect customers’ multidimensional values and what matters to the company (Zubac, Hubbard & Johnson, 2010). The cumulative satisfaction portfolio yielded 518% over the 2000-2014 period as opposed to 31% increase for the S&P 500 (Fornell, Morgeson & Hult, 2016). Huang, Shieh, and Kao (2015) claimed that economic value added over equity (EVAOE) is a better measure for analyzing abnormal stock returns but had limitations. Sun, Shen, Cheng, and Zhang (2016) hypothesized that incorporating market confidence index demonstrated better stock price prediction in two Chinese stock exchanges.

O'Reilly (2010) claimed that there was a consensus among investors that the methods and models employing for valuing common stocks were inadequate. By using the standards risk models, investors inefficiently price stocks in the developed capital market (Smolic & Skok, 2017). In the Belgrade Stock Exchange, investors dominantly used the DCF-based capital budgeting metrics, profitability index, IRR, and NPV compared to traditional metrics (Todorovic & Kalicanin, 2015). Trinh and Tran Ngoc Thao (2017) claimed the DCF and CAPM were useful tools in corporate valuation and value-based management. When EVA was widely using in Japan, Tsuji (2006) claimed cash flow and other earnings measures were better than EVA for corporate valuation.

Every earnings multiplier or metric has many limitations when using for a comparative purpose or using for stock investment purpose. According to EMH, the stock price reflected all relevant information and only the new information could change the stock price (Fama, 1976). The objective of this study is to analyze the factors that significantly drive the stock price empirically. This literature review leads to the gap in the current literature and the significance of this study.

Gap in the literature and the Parameters in the Study

Intangible Assets

There is minimal scholarly literature available to study the role of the value of NTA that includes IA and goodwill in corporate growth. The IA is non-physical assets and corporate intellectual property such as patents, trademarks, copyrights, goodwill, and brand recognition. Caritat and Condorcet (1796) claimed that “we came to that point of civilization at which the people derive profit from intellectual knowledge not only from the services and products but by making IA a sort of patrimony.” Yallwe and Buscemi (2014) claimed that tangible and IA play a significant role in the future success of a corporation. According to IASB, IA is “an identifiable non-monetary asset without physical substance” (IASB, 2005). The United States GAAP classified IA into two major categories, namely purchased IA or internally created and limited life IA or unlimited life IA. The corporate management estimates the economic or useful life of an IA, and the market conditions may alter the value that reflects in each quarterly report. Peters and Taylor (2017) claimed that IA was more critical in the high-tech industry.

For an extended period, there were many issues when measuring, reporting, and calculating the impact of IA on corporate growth because the industry did not establish a common framework for measuring them (Alves & Martin, 2014; Jarva, 2009; Lev, 1996;

Smith & Parr, 2000; Zambon, 2004). Most of the techniques and methods used to classify and measure the IA are controversial. Hubbard (2014), the inventor of applied information economics, claimed that investors could measure IA, risks, and value without too many errors, solving many problems in business and life in general. Customer satisfaction is a valuable IA. Study based on the American Customer Satisfaction Index (ACSI), Peng, Chen, and Wei (2015) argued that investing in the Strong-ACSI portfolio was superior compared to investing in the market index. Customer satisfaction is only a part of IA, but there was only a little information on the effect of the entire value of IA on the stock price.

Some of the IA are marketing, customer or contract-related, and the other factors are intrinsic and technology-related. The R&D, without which scientific developments are impossible, is one of the significant IA (Chen, Kohlbeck, & Warfield, 2008: Sullivan. 2000). IA push the firm towards better technologies and to use present technology efficiently (Battisti, Belloc & Gatto, 2015; Duzinskas & Arturas, 2014). The productivity of a firm depends on the application of IA efficiently to produce goods and services (Cleary & Quinn, 2016). The strategic investment in IA are correlated with stock return and idiosyncratic risk (Hsu, Kaufmann & Srinivasan, 2017). However, the correlation between investment on intangibles and the corporate performance was an understudied area (Borisova & Brown, 2013). Gamayuni (2015) claimed the financial policies and IA were not correlated, but IA had a positive and significant effect on the firm value.

However, measuring the value of IA is critical in different accounting formats. For accounting purposes, the straight-line amortization method enables to amortize the IA that has many limitations. The lack of proper measurement and the myth that it is inappropriate to measure the intangibles lead to the draining of the national economy, public welfare, the environment, and national security (Hubbard, 2014).

The value of most of the tangible assets, such as machinery and buildings, depreciates year after year and becomes negligibly small over time. For accounting purposes, the depreciation method is used to allocate a part of the tangible asset's expense to its useful life. The purchase is not used for the year of purchase because it is not entirely expensed and has a more useful life, whereas the value of IA increases over time quite often, creating more value. The brand names of General Electric, General Motors, Ford, Boeing, Coco-cola, Pepsi, Apple, Microsoft, Cisco, Facebook, and BP are as successful as they are quickly recognizable. In the knowledge-based economy, the value of the NTA constitutes over 87% of the total value of the corporation. However, there are special rules for the outbound transfer of IA (Cornell University, 2018).

Corporations may create or purchase intangible assets at a cost, and that does not reflect well on their balance sheets due to the numerous restrictions imposed by the Financial Accounting Standards Board (FASB, 2018). The SEC designated the FASB as the organization responsible for setting accounting standards in the United States. The Governmental Accounting Standards Board (GASB) oversight 'generally accepted accounting principles' (GAAP). International accounting standard (IAS 38) outlines the accounting requirements for IA. The amended IAS 38 and IAS 16 are used to report amortization and the depreciation effective for the annual period, beginning on or after January 1, 2016. The amendments define the IA in a more precise and logical manner so that the fair value of IA reflects in the financial reports. Li and Liu (2014) claimed that the correlation between R&D expenditure and stock return was similar to the correlation between tangible investment and stock returns. Lin and Tang (2009) investigated the correlation between IA and the value drivers in Taiwan. However, the value of IA that reflected in the stock prices was not clear from the literature.

The United States GAAP has definite rules for recognizing IA for financial reporting. For that reason, corporations cannot include all IA in the manner the management wants. In the merger and acquisition, as per IFRS 3 and SFAS 141, the acquiring corporation must recognize the IA of the acquired firm under 'goodwill,' or as separately identified assets. However, identifying and separating the IA is not only a tedious process but most of the methods and techniques are controversial (Sacui & Szatmary, 2015; Yallwe & Buscemi, 2014). Su and Wells (2015) claimed that there was no loss of IA on a transition to IFRS.

In the balance sheet, the values of the IA and goodwill are reported separately under the asset class, and the SEC scrutinizes all these amounts. For instance, 30 corporations listed in NYSE and NASDAQ have $1.2 billion IA, and the effect of this on the stock price is unknown (see Table 1). According to EMH, the stock price reflected all the IA. In this study, I explored to what extent the value of NTA which includes IA reflected in the stock price of 56 corporations of the S&P 500 listed on either NYSE or NASDAQ.

Goodwill

The goodwill is the excess of net earnings over the fair return on the net tangible assets. Goodwill is scalable and transferable in the event of a merger and acquisition. The United States Tax Court *Staab*1 has stated that goodwill is an intangible asset that consists of the excess earning power of the business (U. S. Tax Court, 2018). Regs. Sec. 1.197-2(b)(1) defines goodwill as “the value of a trade or business attributable to the expectancy of continued customer patronage,” and that “[t]his expectancy may be due to the name or reputation of a trade or business or any other factor” (Cornell, 2018). Moreover, the accounting profession defines goodwill as “an asset representing the future economic benefits arising from other assets acquired in a business combination . . . that are not individually identified and separately recognized.”

Kucharska and Flisokowski (2018) claimed the brand value (goodwill) is the most valuable asset of a company correlated with GDP per capita income. There are two types of goodwill, one is business goodwill, and the other is personal goodwill. Business goodwill is an intangible asset owned by the operations of the business and is related to the same. However, there is an association between personal goodwill and the shareholder’s reputation, expertise, skill, and knowledge, as well as the customer relationship. Distinguishing the business and individual goodwill makes the evaluation a challenge.

Goodwill represents synergies and superior earnings power (Sherman, 2018). Goodwill has the earning capacity and is a long-lived asset. The economic determinants of goodwill and the correlation between goodwill and future performance is not known. Based on the SEC data, the monetary value of NTA that includes the IA and goodwill of 56 corporations, the sample of this study, was $2.74 Trillion for 2018 Q3 (SEC, 2018). According to the efficient market hypothesis (EMH), the value of the stock price must reflect all the publicly available information. In this study, I explored to what extent the stock price of 56 corporations of the S&P 500 listed on NYSE and NASDAQ reflect NTA and GDP of the United States.

Macroeconomic Parameters

Countries regularly track their gross domestic product (GDP) as an indicator of their economic progress (Lange, Wodon, & Carey, 2018). The health of the stock market and the nation’s economy are directly related (Thomas, 2006). The international crisis in public finance and the lack of financial sustainability became a vital issue for governments. Although the European Union (EU) and other international organizations have recommended governments to monitor the economic variables, only a few studies have considered the economic variables on financial stability (Rodriquez, Navarro-

Galera, Munoz & Lopez, 2015). The economic variable, GDP affect many aspects of the financial market including consumer spending. Epaphra and Salema (2018) claimed the macroeconomic variables and stock prices were co-integrated on the Dar es Salaam Stock Exchange.

The consumer spending increases the stock price; the consumer spending and GDP are interrelated variables. In the last decade, the virtuous cycle improved the United States economy and stock prices. Gay (2016) investigated the relationship between the share prices and the macroeconomic variables of the BRIC (Brazil, Russia, India, and China) countries by using Box-Jenkins' ARIMA model and found no correlation between exchange rate and oil price on stock market index prices of either BRIC country. Angelidis, Degiannakis, and Filis (2015) claimed that oil price shocks have an incremental power in forecasting the state of the stock market. Farsio and Fazel (2013) claimed that the stock price was not correlated with the unemployment rates in the United States, China, and Japan

Various components such as the monetary policy, interest rate, and consumer durable goods expenditure affect GDP. When the interest rates are low, the amount of investment increases along with GDP. However, there was no evidence that the monetary policy shocks and the asset price bubbles were correlated (Gali & Gambetti, 2015). In Tobin's q theory, the monetary policy increases investment spending, stock prices, and GDP (Thomas, 2006). The monetary policy influences the stock price and the net worth of a firm. As shown in Table 3, based on the World Bank data, in 1999, the volume of stocks traded in the world was 32% of the World GDP, but in 2016, it was about 125% of the world GDP, an increase of 100% of the world GDP happened in 16 years (World Bank, (2018b). According to the efficient market hypothesis (EMH), the stock price reflects all the publicly available information. In this study, I explored to what extent the stock price of 56 corporations of the S&P 500 listed on either NYSE or NASDAQ reflects NTA and the GDP of the United States.

Summary

In Chapter 2, I discussed the purpose and strategies for selecting the relevant scholarly literature to understand the problem of the study from various perspectives and discussed the background and importance of the financial market in today's global economy. For the long-term investment in the stock market, investors rely on various metrics based on past data. The historical evidence proved that, in the stock market, the past performances were no guarantee in the future. Gu and Lev (2017) empirically demonstrated that the importance of predicting corporate earnings, which is the core of many investment processes, has tremendously decreased in the last 30 years. However, the focus has shifted to improved alternatives such as the strategic assets of the enterprise and their contribution to maintaining the corporations' competitive edge. The NTA that constitutes intangible assets and goodwill is the strategic asset that gives a competitive edge and adds corporate value. In this chapter, I discussed the limitations of the various metrics that do not include NTA that comprise up to 87% of the corporate assets.

For corporate growth, there are mainly two internal variables, real assets and NTA. However, there are many other external factors such as economic parameters, namely GDP, interest rate, and exchange rate as well as other external risk factors, such as country risk and political environment, over which a corporation has no control. The accurate and swift estimations and strategic asset allocations are critical, but the lofty stock valuation based in flawed rationale could give investors false confidence and misleading perspectives. The value of the real assets depreciates over time, whereas the value of most of the intangible assets increases. The NTA is the primary factor for possessing the competitive advantage that alters the perception of the investors. However, the scholarly literature on the role of NTA, which comprises about 87% of the value of the corporate assets of many corporations, in determining the stock price is scarce.

According to the EMH, the stock price reflects all the information and only the new information can change the stock price. Thus, the change in the NTA and GDP should reflect in the stock price. This study is an endeavor to determine whether the weak-form EMH was valid in today’s market condition. In the next chapter, I explain all the systematic steps, methods and statistical procedures used in this study to test the hypotheses and the weak-form EMH and to find the answers to the research questions.

Chapter 3: Research Method and Research Design

Introduction

The primary objective of this quantitative study was to empirically explore the extent to which the NTA that include IA and goodwill, and the GDP reflected in the stock price of 56 corporations of the S&P 500. In this relational study, I empirically analyzed the correlation between various historical data, and then, tested the weak-form EMH. The EMH holds when the stock price reflects all the relevant publicly available information (Fama, 1976). The IA, goodwill, GDP of the United States, P/E, and stock price are publicly available information. Fama (1965) claimed that an arbitrage opportunity arises when the stock price does not reflect all the publicly available information. In Chapter 1, I explained the purpose of this study in detail; however, I reiterate many elements of the research in this chapter for clarity.

In this quantitative study, I used the macroeconomic data and the financial data for 44 quarters from October 2007 (Q4 2007) through September 2018 (Q3 2018). By using parametric statistics, I analyzed the correlation between the stock price, GDP of the United States, NTA, and P/E of 56 corporations listed on NYSE and NASDAQ. With the extensive data for 11 years, I studied the correlation between:

1. NTA and stock price of 56 corporations of the S&P 500, listed on NYSE and NASDAQ.
2. GDP and the stock price

3. NTA, P/E, GDP, and the stock price

All the data that I used in this research was continuous and in ratio scale. For this research, I collected financial data on IA, goodwill, P/E, and stock price, of 56 corporations from the SEC and collected the data on GDP of the United States from the BEA. Firstly, with simple regression analysis, I empirically analyzed the correlation between the variables. Secondly, with the runs test, I tested the weak-form EMH. Moreover, with multiple regression analysis, I developed the best-fit regression model. Finally, I used the regression model to predict the long-term stock price of selected corporations for long-term investment purpose.

In this empirical study, from simple scatterplot to more complex multiple regression analysis, I employed various exploratory data analysis by using the available computing power and the robust data analysis software SPSS. The SPSS is a powerful computer program, predictive analytics that enables to run descriptive statistics, regression, and advanced statistics (IBM, 2018). I accomplish the methodological control by using a stratified random selection method. Cooper & Schindler (2013) claimed that the research plan is a blueprint that enables to organize, control, and conduct the research systematically and efficiently. This chapter is the research plan for the study. In Chapter 3, I present how the research question and purpose align with quantitative research method. In the subsequent sections of Chapter 3, I explain the research design and methods, data collection, data analysis, and validity and reliability.

Paradigm

Quantitative research is related to positivism. The proponents of quantitative research assume that the phenomenon is measurable by using deductive principles of scientific methods and involves experiments, surveys, and testing. In this quantitative research, I have not conducted any experiments or surveys and any interviews or observations for the relational study. I engaged with secondary data mainly from the SEC and the BEA, and many parametric and non-parametric tools to scientifically analyze the stock market phenomenon.

The two paradigms such as quantitative and qualitative research generate knowledge or the truth differently; a paradigm is a "worldview" or a set of assumptions about how things work (Rossman & Rallis, 2003). Denzin (2017) claimed that a paradigm has four concepts namely ethics, ontology, epistemology, and methodology. However, researchers approach these concepts differently. Chesebro & Borisoff (2007) have recommended that specializing in one research method is useful to deal with many elaborate types of research efficiently.

The researchers from both schools, approach knowledge discovery from an ethical perspective, have ethical constraints, and follow moral principles. The researcher is the tool in qualitative method and metrics, whereas the statistical methods are the tools in the quantitative method, and hence ethics plays a different role in these two research methods. The two researchers have a different ontology; ontology is about what exists or reality (Creswell, 2013). The perspectives of reality are different in these two research methods; realism is the ontology in the quantitative method, whereas relativism is the ontology in the qualitative method. The researchers also have a separate epistemology. Epistemology is the study of pure knowledge and evidence is used to justify the claims. The evidence must be of good quality, logical, and reasonable. There is only one truth in the quantitative method, but there are multiple perspectives of reality in a qualitative method. However, quantitative researchers believe that they can discover the hidden truth in the data and relate to the existing theory. Denzin and Lincoln (2017) claimed that epistemology is viewed in positivism as dualist or objectivist to find the truth, but in constructivism, it is only transactional or subjectivist to test findings.

The quantitative researchers use the 'scientific' method to find the cause, objectively. Whereas, the qualitative researchers use the natural environment to explore the reason subjectively (Rossman & Rallis, 2003). That means every question has multiple perspectives and answers in a qualitative method. To empirically analyze the correlations between the variables, I chose a quantitative method that involved hypothesis testing for this research. Exploring the causality is not an objective of this relational study.

The quality of research depends not only on the quality of the data but the entire process in the study including the data analysis, interpretation, and positive social change due to the research (Levine et al., 2011). In this research, I used evidence-based practice and the results may enable the stakeholders to protect the limited economic resources, to focus on sustainable growth, and cause a positive social change. With the focus on empirical evidence, in this quantitative research, I explored the significant factors that drive the stock price, and the stakeholders may use the evidence for wealth creation and positive social change.

Rationale for Selected Approach

For this study, the quantitative method is the choice. The main elements that determine the types of research method are the research question, research purpose, and feasibility (Bruce & Bruce, 2017; Delost & Naddar, 2014; DeFusco et al., 2018; Cooper & Schindler, 2013; Corbin & Strauss, 2017). From the research questions, I generated hypothesizes and tested the hypothesizes by empirically analyzing the data. There were 9900 data points in this study that includes 11 years of secondary data on IA, goodwill, P/E, and stock price of 56 corporations and GDP of the United States. In this study, I employed a robust statistical method called multiple regression analysis and simple regression analysis to empirically analyze the relationship between the variables and this study was not possible with other research methods such as qualitative method or mixed method.

The data from the SEC and BEA that I used in this study were appropriate, proximate, and available. In this study, I employed the quantitative research method to find the linear relationship between the variables. The theoretical background was a critical theory in finance, the EMH which states the stock price reflected all the publicly available information.

In this quantitative research, there were many theoretical frameworks such as EMH, APT, systems theory, and other financial concepts such as stock valuation metrics that I discussed in Chapter 1 and Chapter 2. By applying APT, the multi-factor model, I considered many factors such as NTA, GDP, P/E, and the stock price which were part of the linear function from which I estimated the stock price of corporations. However, the prime objective of this study was to test the weak-form EMH. By employing the robust statistical tool, multiple regression analysis, I empirically analyzed how does the NTA and GDP reflected in the stock price. By using the return-variance ratio, I calculated the variance of dependent variables to test the weak-form EMH (Lo, 1998).

In the realm of prediction, the nexus between statistics and data science is stronger; correlation measures the strength of association between the variables, but the regression quantifies the relationship (Bruce & Bruce, 2017). In a correlational study, the quantitative method is the preferable method than a qualitative study (Hamilton & Taylor, 2017). To quantify the degree to which the NTA, GDP, and P/E affect the stock price, I chose the quantitative method.

In this non-experimental design, I did not use any survey, case-control or cohort study. I conducted regression analysis by using secondary data that I collected from the governmental agencies such as SEC, BEA, and industry sources such as NYSE, NASDAQ, and World Bank. I used 9900 data points over 44 quarters time frame. Analyzing a vast number of data points is one of the characteristics of the quantitative method (Bruce & Bruce, 2017). Through the survey and experimental design, examining the relationship between and among variables is central to answering questions and hypothesis (Creswell, 2013). The objective of this correlational study was to find the significant factors that affect the stock return, not to understand the causation. Many factors may influence the stock price but selecting the most significant factors that affect the stock price increases the predictive power. With the data on NTA, GDP, and stock price, I tested the weak-form EMH.

The selection of research method depends on the research questions and hypotheses (Basias & Pollalis, 2015). Hypotheses are propositions about relationships between the variables or in other cases differences between groups involved in the research. In this study, I considered that there was no significant relationship between the variables such as NTA, GDP, and stock performance; that was the null hypothesis, and the alternate hypothesis was the opposite of this assumption. I tested the alternate hypothesis by using analytical tools such as SPSS, SAS, and Excel and use deductive reasoning from the statistical analysis to find the answer to three research questions. Deductive reasoning is the dominant feature of the quantitative research method. Making predictions based on correlation study is the regression analysis (Goodwin, 2005).

In this simple linear regression (RQ1 and RQ2), the variables were NTA, GDP, and the stock price but in the multivariate analysis (RQ3), there was one criterion variable (stock price) and three predictor variables (NTA, GDP, and P/E). This study involved both simple regression analysis and multiple regression analysis. Levine et al. (2011) explained that when quantifying the correlation between the variables in a relational study, a regression analysis is preferable.

While the quantitative research method was the choice for the research, I have not underestimated the power of other research methods such as qualitative methods or mixed research methods. The mixed method is a relatively new concept and a developing method that incorporates both qualitative and quantitative methods. The mixed method is time-consuming and less efficient in this academic research; thus, I preferred only the quantitative research method in this study.

Research Design and Method

Variables

In this research, to test the efficient market hypothesis, I chose four variables such as NTA that include IA and goodwill, GDP of the United States, P/E, and the stock price. According to the EMH, the stock price changes only due to the new information and all the relevant information reflected in stock price. Then, the NTA and GDP should reflect in the stock price to hold EMF. Many internal and external factors affect stock performance, but in this study, I focused on NTA and GDP. In this study, I wanted to include the stock market index, another external factor, but I limited to NTA and GDP of the United States due to many constraints.

Dependent Variable

The stock price of a corporation was the DV in the three hypotheses of this research. The stock price depends on many internal and external factors. Corporations can control some of the internal factors but have no control over many external factors such as GDP, interest rate, inflation, exchange rate, and country risk. Every investor expects a capital gain on their investment and a handsome return, but the volatile stock market imposes many challenges. Sometimes the market correction erodes investments and reduces their value by 30% or 50% or even 100%. Estimating the expected return in the volatile market is challenging but possible. Selecting the significant factors that affect the stock return and creating the best fit model for predicting the stock return (DV) was the secondary objective of this research. It may help the investors to efficiently manage their portfolio and make critical investment decisions that eventually create wealth and cause positive social change.

Independent Variables

The NTA that include IA and goodwill, GDP, and P/E were the IVs in this research. In Hypothesis 1, I empirically analyzed to what extent the NTA (IV) reflected in the stock price (DV). After testing Hypothesis 1, I replaced NTA with GDP to test Hypothesis 2. In Hypothesis 2, I empirically analyzed to what extent the GDP (IV) of the

United States reflected in the stock price (DV). In Hypothesis 3, I used NTA, GDP, and P/E as the three IVs to find their combined effect on stock price (DV) by using multiple regression analysis.

The NTA, the internal factor of a corporation that affects the future growth was the first IV in this study; I collected the data on NTA of 56 corporations from the SEC (SEC, 2018). As I mentioned in Chapter 1, the NTA in this study refers to the sum of total acquired IA and goodwill. In today's market economy, the monetary value of IA is enormous. The combined value of NTA of 56 corporations of the S&P 500 that listed on NYSE and NASDAQ for Q3 2018 was $2.74 trillion, and the extent to which it determines the stock price was the prime objective of this research and thereby to test the weak-form EMH.

The GDP of the U.S. was the next IV in this study; I collected GDP from the BEA for this study. The BEA uses GDP instead of GNP (BEA, 2017). The GNP includes the income earned by citizens and companies in foreign countries, and it does not include the income earned by foreigners within the country. The one who studies the reliability of this research should consider this fact while conducting the study in other countries. The GDP is an external factor that can be a threat or an opportunity for investors and corporate growth on which the corporations have no direct influence. A country with a healthy economic environment increases the consumer power and disposable income. The investors could explore wealth creation in the stock market. The higher demand increases the price and stock return. Using GDP as a factor in the analysis gives an opportunity to explore the economic feasibility of investing in many emerging markets and reducing the risk.

The third IV in this study was the price-earnings (P/E) ratio, called earnings multiplier which is the profitability ratio that most investors use for comparative analysis and investment purposes. However, the P/E had a more significant influence on investors for a long time, and it may reflect the health and ability of the corporation to meet the current and long-term liabilities. For that reason, I included P/E as an IV in this study. Both the value investors and growth investors use the total annual return including dividends of the S&P 500 as an easy benchmark to compare the value of a stock. The one who tests the validity of this research should take into consideration the accounting principles that will affect the P/E for evaluating the relative attractiveness of the stock of a corporation that operates in a different country.

Research Questions and Hypotheses

From the topic and problem statements, I formed three research questions and three hypotheses. Testing the hypothesis and trying to answer the research questions was the objective of this deductive mode of research (Creswell, 2013). Rudestam and Newton (2007) claimed that the research method describes the exact steps needed to address the research question and the research hypothesis. The nature of data that I used in the study was purely numerical, a secondary data which was not descriptive, the sources of data were the quarterly financials of corporations at the SEC and the economic parameters at BEA. I used descriptive statistics for correlational analysis and employed inferential statistics to study the population proportion. For this kind of correlational study, quantitative research was the most appropriate method. It was a correlational study in deductive mode, and hence I employed the quantitative research method. The three research questions and the respective hypotheses were:

Research Question 1 (RQ1): To what extent are NTA reflected in the stock price?

Null hypothesis ($H_0 1$): NTA is not a predictor of the stock price

Alternate hypothesis ($H_a 1$): NTA is a predictor of the stock price.

The stock price was the outcome or dependent variable (DV), and NTA was the predictor or independent variable (IV). To study the correlation between two variables, researchers widely use simple regression analysis (Bruce & Bruce, 2017; Cooper & Schindler, 2017). In this study, I employed simple linear regression analysis to quantify the correlation between NTA and the stock price.

Research Question 2 (RQ2): To what extent are the GDP reflected in the stock price?

Null hypothesis ($H_0 2$): GDP is not the predictor of the stock price

Alternate hypothesis ($H_a 2$): GDP is the predictor of the stock price.

The stock price was the outcome or dependent variable (DV). GDP was the predictor or independent variable (IV). To study the correlation between two variables, researchers widely use simple regression analysis (Bruce & Bruce, 2017). In this relational study, I used a simple regression analysis to quantify the correlation between GDP and the stock price.

Research Question 3 (RQ3): To what extent are the NTA, GDP, and P/E reflected in the stock price?

Null hypothesis ($H_0$3): The NTA, GDP, and P/E, are not predictors of the stock price

Alternate hypothesis (H_a3): The NTA, GDP, and P/E are predictors of the stock price.

The stock price was the DV in Hypothesis 3; NTA, GDP, and P/E were the IVs. This hypothesis testing involved a multiple regression analysis. In this hypothesis testing, I attempted to establish a linear relationship between the DV and IVs. Multiple regression is a useful tool to test the linear relationship between multiple variables (Koijen, Lustig & Van Niewerburg, 2015; Levine el al., 2011). I run the multiple regression analysis to quantify the empirical relationship between stock price and the three IVs, NTA, GDP, and P/E.

Data Collection

Population

The population of this study was the 500 large-cap corporations of the S&P 500. The NYSE and NASDAQ listed these corporations. The NYSE is the largest stock exchange in the world by market capitalization. 2,800 companies trade approximately 1.46 billion shares each day in NYSE and 3,100 companies trade approximately 2 billion shares daily on NASDAQ (NYSE, 2018).

In research, the results from the sample study are generalized for the target population (Singleton & Straints, 2005). The result from this study could generalize not only to 500 corporations of the S&P 500 from where I selected the samples but also to other stock indices around the world. As of 2017, all the stock exchanges around the world listed 46,583 companies (World Federation of Exchanges, 2018). The major ten stock exchanges whose market-cap was over $2 trillion are Japan Exchange Group, Shanghai Stock Exchange, Euronext, London Stock Exchange, Hong Kong Stock Exchange, Shenzhen Stock Exchange, TMX Group and the National Stock Exchange of India, Deutsche Borse, and Bombay Stock Exchange. This study did not include the corporations that deal with commodities and derivatives because the focus of this study was on a long-term stock investment. After tInternal Review Board's approval (Walden University IRB#: 08-29-018-0259837), I collected the required data for the quantitative research.

Sample, Sample Size, and Sampling Strategy

A sample was a subset of a population that may represent all the characteristics of the population (Nachmias & Nachmias, 2014). I used the GPower software, a statistical power analysis program for selecting the samples and used the SPSS, an analytical program for statistical analysis. As shown in Figure 8 and Figure 4, for multiple regression analysis with three predictors at 80% power, the required total sample size was 43, whereas, at 95% power, the required sample size was 74 (GPower, 2018). For the study, I chose 56 corporations which were at 88% power for statistical analysis (see Figure 2).

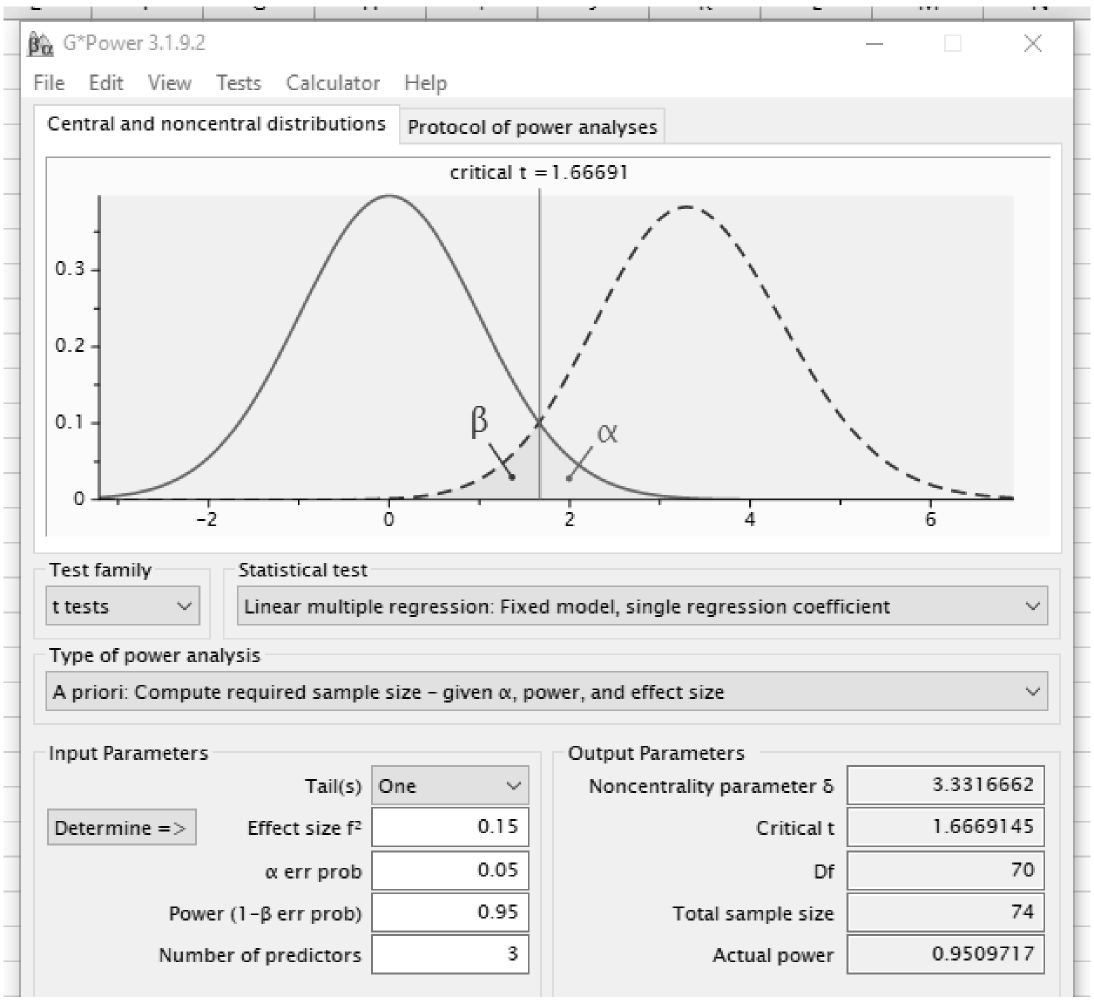


Figure 4. Sample size 74 at 95% power

The sampling frame was the set of all cases from which the researcher has selected the samples (Singleton & Straints, 2005). To select the sample, first I select a stratum, Global Industry Classification Standards (GICS sector) of the S&P 500 for the stratified random sampling (SRS). The global financial community use GICS, the industry taxonomy. The 11 GICS sectors are industrials, information technology, energy, utilities, telecommunication services, materials, health care, financials, real estate, consumer discretionary, and consumer staples. The SRS method allows each stratum (GICS sector) has the same probability of selection and ensures proportionate representation in the sample (Bruce & Bruce, 2017).

Stratified sampling was the process by which I divided the population into different sectors that are mutually exclusive. The disjunctive sectors of the population are called strata, and the samples selected from the strata are the best representatives of the population (Singleton & Straints, 2005). In this study, the strata and the GICS sector classification of the S&P 500 were the same. There were 11 GICS sector or strata in this study. Once I selected the strata (GICS sector), I used a simple random sampling method to select the samples for the study. The sample constituted about 11% of corporations from each stratum (GICS sector), and that represented all the characteristics of the population (see Table 4). For this research, by using a stratified random sampling method, I selected 56 corporations out of the possible 500 corporations of the S&P 500.

Table 4

Sample Selection from 11 Sectors of S&P 500

Sector	GICS	No. of Corp. S&P 500	Samples	% of Selection
1	I	67	7	10.45%
2	IT	75	8	10.67%
3	E	31	3	9.68%
4	U	29	3	10.34%
5	T	3	3	100.00%
6	M	24	4	16.67%
7	H	63	6	9.52%
8	F	68	7	10.29%
9	R	32	3	9.38%
10	CD	80	8	10.00%
11	CS	33	4	12.12%
Total		505	56	11.09%

Note: GICS = Global Industry Classification Standard. I = Industrial, IT = Information technology, E = Energy, U = Utilities, T = Telecommunications services, M = Materials, H = Healthcare, F = Financials, R = Real estate, CD = Consumer Discretionary, CS = Consumer Staples

In the recent time of the knowledge-based economy, there is a significant paradigm change from real assets to NTA since the human capital is the most precious resource than the real assets. Though the NTA is the significant portion of total assets for many companies, their influence on their stock performance was not extensively studied recently (Sherman, 2018). In this study, the stock performance was the dependent variable and NTA was one of the IVs. The other IVs were the GDP and P/E. The data covered 44 quarters of macroeconomic data and the financial data including IA, goodwill, P/E, and stock price of 56 corporations of S&P 500 from Q4 2007 to Q3 2018. In this study, I used 9900 data points for the correlational analysis and the runs test.

Data Analysis

The process of assigning a numerical value to the data is known as coding, and the level of measurement of each variable give values to each variable (Manheim, Rich, Willnat, & Brians, 2008). For this study, I used the secondary data collected from the government agencies SEC and BEA that was accurate and reliable. All the variables were continuous and in ratio scale. The data included 44 quarters' IA, goodwill, P/E, and stock price of 56 corporations that I select by stratified random sampling and 44 quarters' GDP from Q4 2007 to Q3 2018. Quantitatively analyzing all the 9900 data points in this study was an extensive statistical process.

Testing for Assumptions

After collecting the data such as NTA, GDP, P/E, and the stock price, I used the Excel program for the primary statistical analysis and used SPSS software program for robust statistical analysis. SPSS is a powerful analytical software program to run simple and complex statistical tests (IBM, 2018). The statistical analysis depends on many assumptions. Not meeting the assumptions could increase the chance of type 1 error and type 2 error (Pedhazur, 1997).

The data should meet all the statistical assumptions such as linearity, independence, normality, and heteroscedasticity to use the parametric statistics (Zheng, 2018: Bruce & Bruce, 2017). It was an extensive process to test the normality on all the residuals of IVs of 56 corporations from Q4 2007 to Q3 2018. The raw data was not sufficient to apply parametric tests and the required transformation. The results on the regression analysis do not change just because of transforming all the data (Black, 2006; He, Ganjam, Lee, Wang, Narasayya, Chaudhuri, Chu & Zheng, 2018). Visual analysis of data by using scatterplot, histogram, and P-P plots further led to use of Kolmogorov-Smirnov tests and Shapiro Wills tests. Then, I transformed the data, case by case to meet the statistical assumptions. I used many numerical expressions such as logarithms, square root, exponents, and inverse functions for transformation. As shown in Figure 12 through Figure 14, the change after the transformation was discernible. Finally, I employed the parametric statistics for correlational analysis.

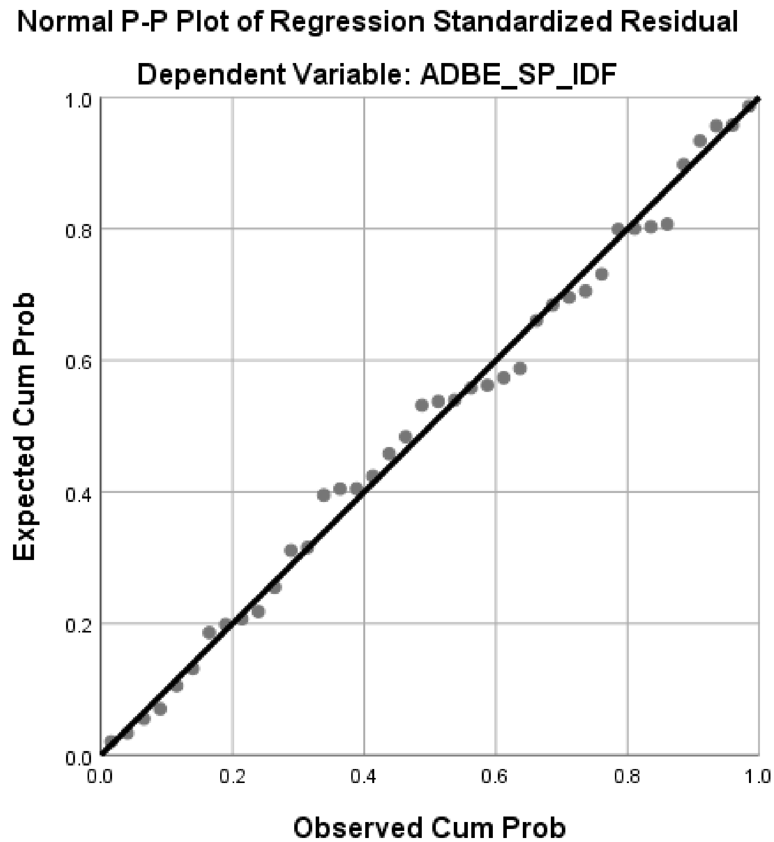


Figure 5. Normal P-P plot – Information technology sector S&P 500

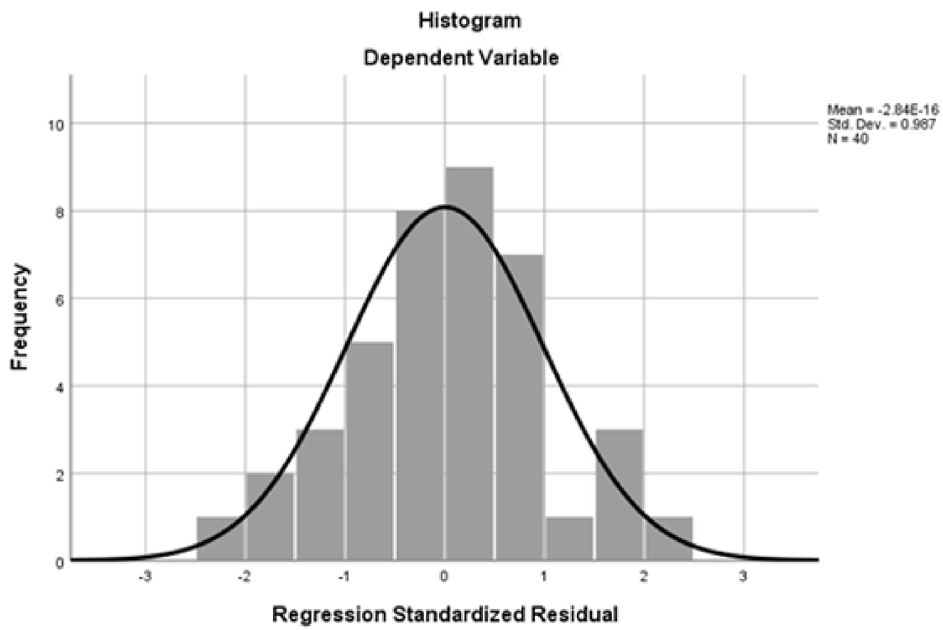


Figure 6. Normality test IT2 – Information technology sector S&P 500

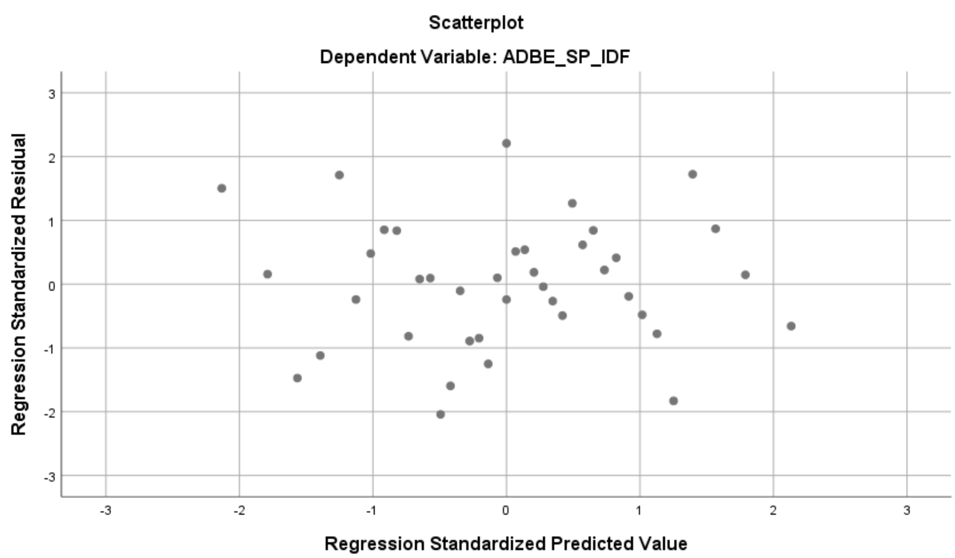


Figure 7. Residual scatterplot – Information technology sector S&P 500

Simple Regression Analysis

First, I tested the raw data and transformed case by case to meet all the assumptions of parametric statistics. Then, by using the simple regression analysis, I tested the Hypotheses 1, to study the extent to which NTA reflected in the stock price of 56 corporations. Subsequently, I tested Hypothesis 2 to study the correlation between the GDP and the stock price.

Multiple Regression Analysis

After eliminating the samples that have noncontributing variables and the redundant variables, I tested Hypothesis 3 to study the extent to which the three IVs such as NTA, GDP, and P/E reflected on the stock price by using multiple regression analysis. Then, I randomly selected eight corporations from the 11 sectors to create the best-fit regression model for predicting their stock prices. Finally, I use the regression model for predicting the stock price. The objective of multiple regression analysis is to produce better models for more accurate predictions. This model is useful in an inefficient market where the price depends on historical factors. The mathematical concept behind the regression model is the linear function.

Linear Relationship

The theoretical framework of this research was the arbitrage pricing theory in which the return of any stock represents a linear relationship of a set of indices. In this multifactor linear equation, there are three factors, NTA, GDP, and P/E to estimate the stock return. In this model, the expected stock return,

$$\hat{Y} = B_0 + B_1N + B_2G + B_3R + \varepsilon \quad (1)$$

where:

$\hat{Y}$ = predicted value on the outcome variable, the stock price

B_0 = predicted value on Y when all IVs = 0

B_1 = unstandardized regression coefficient for N associated with $\hat{Y}$

N = NTA that include IA and the goodwill

B_2 = unstandardized regression coefficient for G associated with $\hat{Y}$

G = GDP of the United States

B_3 = unstandardized regression coefficient associated with $\hat{Y}$

R = P/E

ε = model deviations called regression residual.

The factors in the model were stock price, NTA, GDP, and P/E. In the regression analysis, the errors of prediction are regression residuals, ε (Watson, Nelson & Cacioppi, 2013). The regression residual is not present in the next linear equation (Equation 2). The values of the coefficients (B_0, B_1, and B_2) are estimated such that the model yields optimal predictions.

- Minimize the residuals
- Minimize the sum of the squared (SS) residuals

- SS residual $= \sum(\hat{Y} - Y)2$

Then the predicted stock price,

$\hat{Y} = a + B_1N + B_2G + B_3R$ ………………………………………. (2)

Where:

$\hat{Y}$ = predicted value on the outcome variable, the stock price

B_0 = predicted value on Y when all IVs = 0

B_1 = unstandardized regression coefficient for N associated with $\hat{Y}$

N = nontangible assets that include IA and the goodwill

B_2 = unstandardized regression coefficient for G associated with $\hat{Y}$

G = GDP of the United States

B_3 = unstandardized regression coefficient associated with $\hat{Y}$

R = P/E

Runs Test

The next step was to test the weak-form EMH by employing the run test. When the random walk holds, the probability of increasing and decreasing the stock price must be the same, 50%. For 44 quarters (*N* = 44), the expected number of runs is 22. When the number of runs, r is between the lower limit and the upper limit, the market is weak-form efficient. Momentum investing rejects the random walk theory. The momentum investors assume a price increase implies a further price increase and vice versa (Brigham & Ehrhardt, 2016).

Reliability and Validity

Reliability

In this study, I used standard procedures for validity and reliability. Reliability is concerned with stability and consistency (Singleton & Straints, 2005). The sample, the data analysis, and the research design have sound reliability in this study, based on the theoretical framework. To select the sample, first I selected a stratum, GICS sector for the stratified random sampling (SRS). The 11 GICS sectors of the S&P 500 were industrials, information technology, energy, utilities, telecommunication services, materials, health care, financials, real estate, consumer discretionary, and consumer staples. This SRS method allows each stratum (GICS sector) has the same probability of selection and ensures proportionate representation in the sample (Bruce & Bruce, 2017). This method increased the representation of the sample to align with the characteristics of the population.

Stratified sampling is the process by which I divided the population into different sectors that are mutually exclusive and are called strata (Singleton & Straints, 2005). In this study, the strata and the GICS sector classification of the S&P 500 were the same; the GICS sector means the global industry classification standard. There were 11 GICS sector or strata in this study. After selecting the strata from various GICS sectors, I organized the list of corporations in alphabetic order in every sector and selected the corporations in a simple random method. Each stratum represented about 11% of the corporations from every GICS sector, and the total sample was 56. The GPower, the statistical power analysis program recommended minimum required sample size as 56

The GDP of the U.S. was one of the independent variables in this study. However, the U.S. Bureau of Economic Analysis uses GDP instead of GNP. The GNP includes the income earned by citizens and companies in foreign countries, and it does not include the income earned by foreigners within the country. A researcher who studies the reliability of this research should consider that fact while conducting the study in other countries. From the governmental agency, BEA, I collected the quarterly data on GDP and real GDP which is a reliable source. BEA is the "source of accurate and objective data" on the economy of the United States (United States Department of Commerce, 2015).

In this study, I calculated the total NTA that included IA and goodwill of corporations for each quarter from Q4 2007 to Q3 2018. Corporations publish IA and goodwill in their quarterly financial reports, and I collected both IA and goodwill from the financial reports of the corporations on the SEC website. The Sarbanes-Oxley Act of 2002 has many implications for minimizing the financial reporting abuses and restoring investor confidence in the financial reports (Christensen, Cottrell & Baker, 2013). The Securities Exchange Act of 1934 which created the SEC by the Congress has a primary purpose to ensuring "companies offering securities for sale to the public must tell the truth about their business, the securities they are selling, and the risks involved in investing those securities" (United States Securities Exchange Commission, 2018b). The

SEC, the government agency that oversees the financial market in the United States publishes the financial reports of corporations listed on the stock exchanges in the United States is a reliable source for this study.

Not only the data and data collection methods are reliable in this study, but also the statistical methods used for the correlational analysis and other statistical tests. Many data needed various transformations to meet statistical assumptions to employ parametric statistics efficiently. The industry standard statistical tools that I used for statistical analysis and the procedures are also reliable.

Validity

Measurement of validity is about the ‘goodness of fit’ between the operational definition, and the concept of the measure and an unreliable measure is not valid (Singleton & Straints, 2005). Using a stratified sampling method helps to avoid sampling error in data selection. The stratified sampling method increases the probability of the sample’s representation of the characteristics of the population, provide adequate data from different sectors, and increases the sample’s statistical efficiency (Cooper & Schindler, 2013). The accuracy and precision of data collection from governmental agencies increased validity. It is not only error-free in many ways but also less likely to have missing data.

All the data in this study was in the ratio scale. The data in ratio scale represents the actual amount of a variable that increases the power more than other scales such as nominal, ordinal, or interval scale (Goodwin, 2005). Unlike other scales, the ratio scale can have a meaningful ratio between two numbers, and this ratio allows all arithmetic operations (Watson, Nelson & Cacioppi, 2013). In a quantitative analysis based on financial and macroeconomic data, there is no part of sensitivity or responsiveness effects on data and no reactive measurement effect (Webb, Campbell, Schwartz, Sechrest, 1966).

The data for the study was financial data of 56 corporations from the governmental agency, namely SEC and the macroeconomic parameters from the BEA increases the validity of the data because the sources of the secondary data are governmental agencies. Each quarterly financial data from the SEC filings shows two consecutive quarters of data in adjacent columns that helps to compare and eliminate errors in data collection. The SEC is responsible for regulating the security market and the full and fair disclosure of financial information that enables investors to make informed decisions (Christensen, Cottrell & Baker, 2013).

The data from the SEC increased reliability and validity to answer the research questions in this study. Lincoln and Guba (1985) stated that there is no validity without reliability. A demonstration of validity is enough to support reliability. Bias due to unobservable elements is a threat to internal validity (Bruce & Bruce, 2017). On discarding the extreme values (outliers), there is a threat to external validity. However, in this study, all the sources of data were governmental agencies which are the reliable sources where the deliberate presence of the outliers to skew the investors' perspectives may be absent.

In this study, internal validity trade-off occurred for external validity. History, maturation, statistical regression, attrition, selection bias, and testing are a few of the internal validity threats. In this study, I assume that the samples I intended to study are an accurate representation of the entire population; if not, that is the threat to external validity. Pre-testing is an external threat upon considering an additional group, but that was not a possibility in this study.

One way to control the threat is to increase the sample size. GPower recommends 43 corporations at 80% power. However, I used the financial data on 56 corporations for statistical analysis. Since the samples are from different well-defined strata, I employ a stratified random sample method to select the samples with no preference or bias.

Since the internal validity is the credibility more than the external validity which is the transferability. The credibility depends on the methods used for data analysis and the richness of data. One of the issues around validity is the "conflation between method and interpretation" (Denzin & Lincoln, 2017).

By using proper statistics, I increased the statistical validity of this study. For hypothesis testing, I used simple regression analysis and multiple regression analysis. The reliability of statistical measures also increases the validity of this study. The results of this study can apply to other stock exchanges in different countries that increases external validity (Godwin, 2005). For increasing the internal validity, the measures of the dependent variable and the independent variables are directly associated and are not the result of some other uncontrolled factors (Smith, 2007). The outcome could be the result of the independent variable, the confounding variables or some combination of both (Godwin, 2005).

For any better research design, there are three major elements; they are: the design should answer the research question and test the hypothesis, there should be a control for extraneous variables, and the researchers could generalize the outcome in a different setting (Harkiolakis, 2017). In this quantitative study, the research design enabled to answer the RQs, GDP and P/E were the internal and external factors that controlled extraneous variables. The researchers could generalize the results of the three hypotheses testing on financial data of 56 corporations of the S&P 500 listed on NYSE and NASDAQ in other stock exchanges in various countries.

Ethical Concerns and Biases

As a responsible citizen of the United States, I have many ethical considerations regarding dealing with data from the government agencies' database. I have kept honesty and integrity to the highest standard when collecting and analyzing the corporate financial data and the macroeconomic data from the SEC and the BEA or other agencies. While studying the sensitive investment behaviors, I considered all the restrictions related to dealing with financial data of the corporations. I collected, and reasonably analyzed all the relevant data and will save them securely. As shown in Table 4, for anonymity, I renamed the samples according to the sectors when reporting the results. After a reasonable period, I will destroy the data though they are from the public domain.

Bias is always a negative aspect of interpreting or understanding truth correctly. By keeping all the records of the research process, data analysis and problems encountered will help to control bias. The researcher's values and beliefs are to be put on hold to understand the truth that the researcher is seeking. Involving colleagues and participants in research design and data analysis will also eliminate bias, but this is a quantitative study that does not involve any participants.

In this study, there is no "Ben Franklin effect" which means a person who receives favor from others may do a favor for them in return. Since I neither have any affiliation with any of the 56 corporations studied from the S&P 500 nor any intention to discredit any corporation other than searching the truth in a scholarly manner, bias is negligible in dealing with the secondary data from the governmental agencies. Being an academic scholar with integrity, I do not have any intention to represent any sector better or worse with the analyzed data or interpretation of the results, and that eliminates a significant amount of biases. There is no hindsight bias in this study because I did not have any experience with academic research with a vast number of data from governmental agencies other than being a long-time educator. In this study, there were 9900 data points that covered over 11 years (Q4 2007 - Q3 2018); the data included the macroeconomic data of the United States and the quarterly and annual financial data of 56 corporations listed on NYSE and NASDAQ which included IA, goodwill, P/E, and stock price and I dealt with the data diligently.

Summary

From the research questions, I developed the hypothesis and designed the research. In Chapter 3, I explained the research methods and research design as well as described the appropriate and proximate data selection and analysis. This study involved 9900 data points, the secondary data that I collected or calculated from the database of SEC and BEA, the governmental agencies. In this chapter, I explained validity, reliability, and ethical considerations in addition to describing the parametric tests used for the correlational study. Correlation does not mean or prove any causality which eliminates the inductive fallacy (Smaling, 2003). The Runs Test that I used to test the efficient market hypothesis was conceptually rigorous but at the same time powerful and useful for practical applications in finance. In Chapter 4, I present only the results on the three hypotheses tests and in Chapter 5, I present the key finding and their implications including recommendations and the significance to social change.

Chapter 4: Results and Analysis

Introduction

The prime objective of this quantitative study was to empirically analyze the correlation between NTA that included IA and goodwill, P/E (also called PE multiple), GDP of the United States and the stock price of 56 corporations of the S&P 500, listed on NYSE and NASDAQ. The other purpose of this research was to test the weak-form EMH. Fama (1965a) claimed that the stock price reflects all publicly available information. The IA, goodwill, P/E, the stock price of publicly traded corporations, and GDP were publicly available information. For the research, I collected the financial data of 56 corporations of the S&P 500 from the SEC and the economic parameter GDP of the United States from the BEA. In this study, I used 9900 data points that constituted 44 quarterly data on financial statements of 56 corporations and GDP of the United States from October 2007 (Q4 2007) to September 2018 (Q3 2018).

To statistically analyze the empirical relationship between the variables I employed many parametric tools to find the answer to the three research questions. After a brief overview of this chapter, in the next two sections, I discuss the data collection procedures, sample, sample size, and sampling strategies, and the transformation of data. In the third section, I dedicate the final sections of Chapter 4 to present the results of three hypothesis tests consistently and compile the results in 11 tables according to the 11 industry sectors (see Table 6 through Table 35). In addition to that, I present only three different figures related to the statistical tests that I conducted in each industry sector (see Figure 3 through Figure 86). However, for 9900 data points that involved in this study, the SPSS program produced 2016 figures while testing the assumptions that enabled to use the robust parametric statistics. Due to the constrained space, I present only a few relevant images from each sector and compiled the results in 30 tables.

Research Questions and Hypotheses

The IV in this study were NTA, GDP of the United States and P/E, and the DV was the stock price. This study constituted three research questions and three hypotheses.

Research Question 1 (RQ1): To what extent are NTA reflected in the stock price?

Null hypothesis ($H_0$1): NTA is not a predictor of the stock price

Alternate hypothesis (H_a1): NTA is a predictor of the stock price.

The stock price was the outcome or DV, and NTA was the predictor or IV. The Hypothesis test I involved a simple linear regression analysis because a relational study existed between the two variables. Simple regression analysis is the best choice for empirically analyzing the correlation between two variables (Bruce & Bruce, 2017; Levine et al., 2011).

Research Question 2 (RQ2): To what extent are the GDP reflected in the stock price?

Null hypothesis ($H_0$2): GDP is not the predictor of the stock price

Alternate hypothesis (H_a2): GDP is the predictor of the stock price.

The stock price was the outcome and GDP was the predictor. The hypothesis test 2 involved a simple linear regression analysis because a relational study existed between the two variables. Simple regression analysis is the best choice for empirically analyzing the correlation between two variables (Bruce & Bruce, 2017; Levine et al., 2011).

Research Question 3 (RQ3): To what extent are the NTA, GDP, and P/E reflected in the stock price?

Null hypothesis ($H_0$3): The NTA, GDP, and P/E are not predictors of the stock price

Alternate hypothesis (H_a3): The NTA, GDP, and P/E are predictors of the stock price.

In Hypothesis test 3, the stock price was the DV. The NTA, GDP, and P/E were the IVs. This test involved a multiple regression analysis with three IVs. In this hypothesis testing, I attempted to establish a linear relationship between the DV and IVs. Multiple regression analysis is the robust parametric statistical tool for empirically analyzing the correlation between multiple variables (Koijen, Lustig & Van Niewerburg, 2015; Levine et al., 2011).

Data Collection

Population

The population of this study was 500 large-cap corporations of the S&P 500 listed on NYSE and NASDAQ, but I selected 56 corporations (*n* = 56) as the sample for the study. A sample is a subset of a population that may represent all the characteristics of the population (Nachmias & Nachmias, 2014). To select the samples, 56 corporations of the S&P 500, I used 11 GICS sectors as strata for stratified random sampling so that the sample may represent all the characteristics of the S&P 500. The sample contained 56 corporations which were over 11% of corporations from each GICS sector of the S&P 500.

Sample, Sample Size and Sampling Strategy

For simple regression analysis and multiple regression analysis with three predictors at 80% power, the required total sample size was 43 (*n* = 43), whereas, at 95% power, the required sample size was 74 (*n* = 74) (GPower, 2018). Firstly, I employed the Excel software for generating random values for all the 500 corporations that constitute the S&P 500 and randomly selected 74 corporations from 11 different strata. The 11 GICS sectors of the S&P 500 (strata) were industrial, information technology, energy, utilities, telecommunication services, materials, health care, financials, real estate, consumer discretionary, and consumer staples. The first six sectors were in the industrial and technology group, and the last five sectors were in the service group. This stratified simple random sampling method allows each stratum (GICS sector) has the same probability of selection. The stratified random sampling method ensures proportionate representation in the sample (Bruce & Bruce, 2017). In Chapter 3, I explained the advantages of using stratified random sampling in detail.

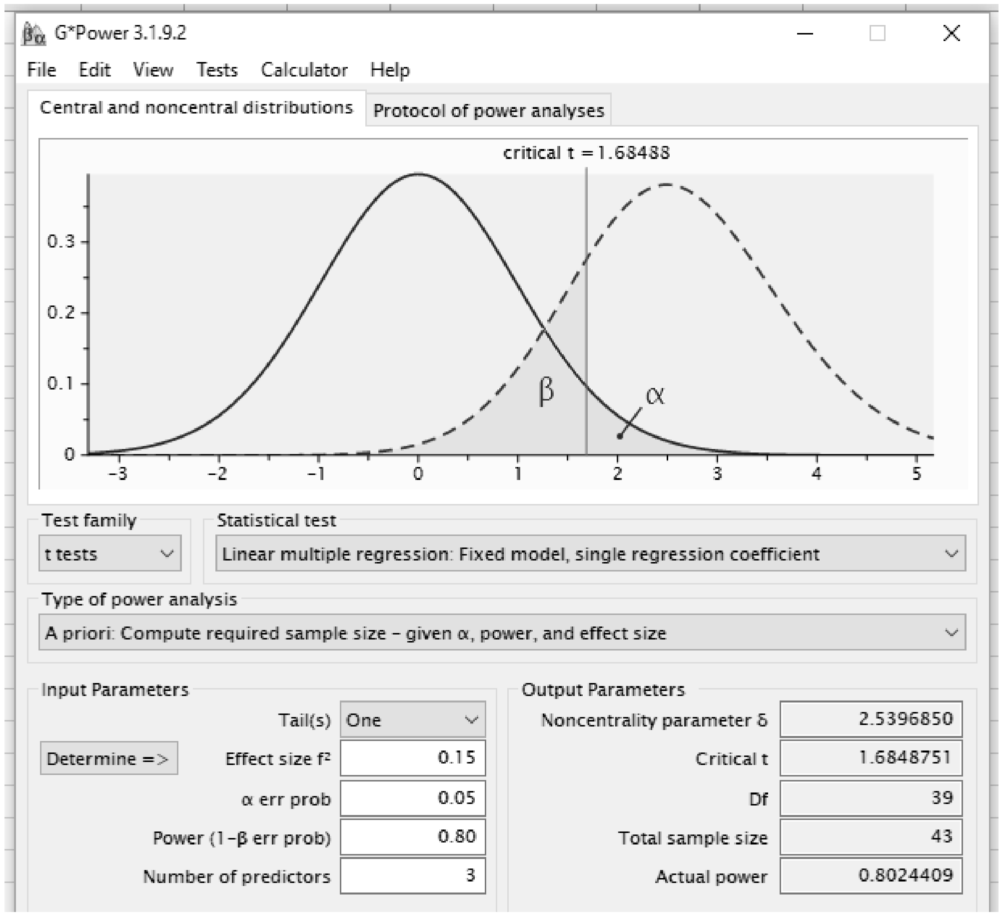


Figure 8. Sample size 43 at 80% power

In the initial 74 samples, 17 corporations including two recently listed corporations did not have enough data for this study and one corporation delisted during the research. Finally, I removed these 18 corporations from the initial selection of 74 and continued the study with the remaining 56 listed corporations which were a representative portion of the population. For the final study, I chose 56 corporations, over 11% of corporations from each GICS sector of the S&P 500 (see Table 4). Out of which 28 corporations were from the industrial and technology group and another 28 corporations from healthcare and service group. The 56 corporations listed on NYSE and NASDAQ that I used as samples are from 11 GICS sectors of S&P 500 (see Table 36).

To meet all the assumptions of regression analysis, all data except 30 required various transformations to apply parametric tools effectively. I used many functional groups including arithmetic and numeric expressions in SPSS for the transformation of data (SPSS, 2018). To meet the assumption to use parametric statistics, I conducted tests for linearity, independence, normality, and homoscedasticity on all the IVs (see Figure 3 through Figure 13). Then, I run the simple regression and multiple regression to quantify the correlation between the stock price and NTA, GDP, P/E. The sample was 56 corporations, and the target population were 500 corporations listed on NYSE and NASDAQ that constitute the S&P 500, for which I generalized the results from the sample study; as of April 2018, with the representation of 500 large corporations, the market cap of the S&P 500 was $23.7 trillion (S&P 500, 2018).

Statistical Tests and Decision Making

This empirical study comprised 44 quarters' IA, goodwill, and P/E and the stock price of 56 corporations, and the GDP of the United States. The NTA is the combined monetary value of IA and goodwill from the financial reports. In total, there were 9900 data points in this study. All the variables in this study were in a ratio scale. To understand the extent to which NTA and GDP reflected in the stock price I run simple regression and multiple regression. To analyze the random walk of stock price, I employed the runs test.

Dependent Variable

In this study, the stock price was the DV. There were 56 corporations in this study. The time frame of the data were 44 quarters, from Q4 2007 to Q3 2018. There were 44 different stock prices for each of the 56 corporations comprised in the analysis. All the values are continuous and in ratio scale.

Independent Variable

In this study, NTA, GDP, and P/E were the IVs. The time frame of the data were 44 quarters, from Q4 2007 to Q3 2018. In addition to 44 different GDPs, for each sample of 56 corporations, there were 44 different NTAs, IA, goodwill, P/Es, and stock prices. All the values were continuous and in ratio scale. To employ robust parametric statistical tools without violating the statistical assumptions, I transformed many raw data (only IVs) to make their residuals normally distributed to comply with normality, linearity, and heteroscedasticity.

Simple Regression Analysis

In this study, I employed simple regression analysis to test how the change in the predictor variable affect the level of change in the outcome variable. I employed a simple regression to test H_a1 and H_a2 but employed multiple regression analysis to test H_a3. In H_a1, the predictor variable was NTA, and the outcome variable was the stock price of 56 corporations, and in H_a2, the predictor variable was GDP, and the outcome variable was the stock price.

The objective of employing regression analysis was to empirically analyze if there was any statistically significant relationship between the variables, to quantify the strength of the correlation, and to develop the regression models for forecasting. Linear regression calculates an equation that minimizes the distance between the fitted line and all data points, and that model is a useful prediction (Levine et al., 2011). The variables in this study were continuous variables in ratio scale, and the predictor was also a continuous variable in ratio scale. The *R* statistics was used to measure the accuracy of the predictive power of the variable, but the ‘*R* squared’ and the ‘adjusted *R* squared’ was the measure of the goodness of fit of the model.

In Hypothesis 1, the simple linear equation to find the stock price from NTA was:

$\hat{Y} = B_0 + B_1 N$ ……………………………………………… (1)

where:

$\hat{Y}$ = predicted value on the outcome variable, the stock price

B_0 = predicted value on Y when all IVs = 0

B_1 = unstandardized regression coefficient for N associated with $\hat{Y}$

N = NTA that includes IA and the goodwill

In Hypothesis 2, the simple linear equation to find the stock price from GDP was:

$\hat{Y} = B_0 + B_1 G$ ……………………………………………… (2)

where:

$\hat{Y}$ = predicted value on the outcome variable, the stock price

B_0 = predicted value on Y when all IVs = 0

B_1 = unstandardized regression coefficient for N associated with $\hat{Y}$

G = GDP of the US

Multiple Regression Analysis

To empirically analyze the extent to which the change in the combination of two or more variables such as NTA, GDP, and P/E affect the level of change in the stock price, I engaged multiple regression analysis. To test H_a3, I used multiple regression where the predictors were NTA, GDP, and P/E, and the outcome variable was the stock price. There were few assumptions such as linearity, normality, and homoscedasticity to meet when I employed regression analysis and parametric statistics such as *t*-test and *F*-test.

In the regression model, there is an error term ε which is a random variable that has a mean of zero, normally distributed with the mean of zero and the variance of σ^2 and has a constant variance (σ^2) at every value of *X* which is called homoscedasticity (Carlberg, 2016). The outcome variable is normally distributed about the actual regression line for every predictor variable. In this instance, only the mean changes, but the variance is the same. In this multifactor linear model, there are three factors, NTA, GDP, and P/E to estimate the stock price. In this model, the expected stock price, In the regression analysis, the errors of prediction are regression residuals, ε (Watson, Nelson & Cacioppi, 2013). The regression residual was not present in this linear equation. I estimated the values of the coefficients (B_0, B_1, and B_2) such that the model yields optimal prediction.

- Minimize the residuals
- Minimize the sum of the squared (SS) residuals
- SS residual $= \sum(\hat{Y} - Y)2$

Then the predicted stock price,

$\hat{Y} = a + B_1N + B_2G + B_3R$ ………………………………………. (3)

Where,

$\hat{Y}$ = predicted value on the outcome variable, the stock price

B_0 = predicted value on Y when all IVs = 0

B_1 = unstandardized regression coefficient for N associated with $\hat{Y}$

N = NTA that include IA and the goodwill

B_2 = unstandardized regression coefficient for G associated with $\hat{Y}$

G = GDP of the United States

B_3 = unstandardized regression coefficient associated with $\hat{Y}$

R = P/E

In Chapter 3, I explained the statistical assumptions in detail. However, I dedicated the following section to explain few assumptions and statistical test results on the three hypotheses.

Testing Assumptions

Linearity

The theoretical framework of this research was the arbitrage pricing theory in which the return of any stock represents a linear relationship of a set of indices. In the first-degree linear equation, the IVs were NTA, GDP, and P/E, and the DV was the stock price. In H_a1 and H_a2, there were 56 linear equations each with NTA and stock price, and with GDP and stock price respectively. In H_a3, the permutation of at least one IV from NTA, GDP, P/E and stock price of 56 corporations yielded 392 various linear equations for the analysis. Altogether, the regression analysis involved 504 linear equations produced from 9900 data points in this study. Geometrically, the equation one and equation two mentioned above were straight lines, and equation 3 was a plane. The scatterplots and the regression equations, which were the first-degree linear equations showed that the method complied with the linearity assumption (see Figure 9).

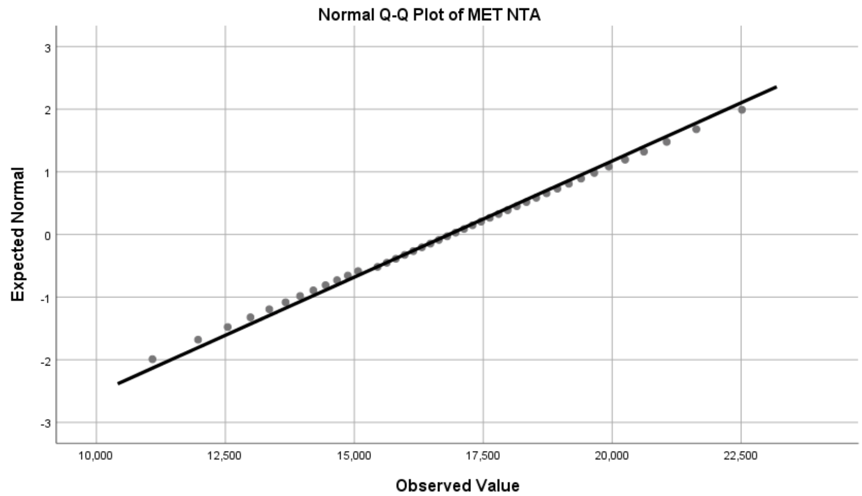


Figure 9. Linearity

Independence

The regression analysis uses the assumption of independence of predictor variables. Pearson correlation tests for the strength of the association between two continuous variables. In this study, all the variables are continuous and in ratio scale. The residual plot identifies independence property (Carlberg, 2016). I engaged SPSS to produce residual plots to test independence. One residual may sometimes be related to previous residual and if that relationship exists between consecutive residuals that show in the residual plot. For independence, the Durban -Watson values must be within one and three (Durban & Watson, 1971).

Normality

The histograms from the data prove the research compliance with the normality assumption (see Figure 10). Outliers are problematic, but in some cases, they are the characteristics of the data. Transformation of raw data was necessary to meet the assumption of normality. Some of the methods I used for transformation were logarithmic transformation, square roots, arithmetic moving average, exponential moving average, and inverse function that computed new variables. The population error term is independent of the explanatory variables and follows a normal distribution with mean 0 and variance σ^2. A *QQ*-plot was used to visually determine how a sample was close to a normal distribution. Bruce & Bruce (2017) claimed the robust parametric statistics is effective when the residuals of the IVs are normally distributed, but a perfectly normal distribution of the data is not necessary. The basic parameters of the normal distribution are:

- Mean = median = mode = μ
- Standard deviation = σ
- Skewness = kurtosis = 0

In this study, I considered all the data that have the values of skewness and kurtosis less than twice the standard error; the skewness's of all the IVs were between -1 and +1 and the kurtoses of data were between -1 and +1. I used various transformations to correct the non-normally distributed data in this study, except DV. Then, for more precise transformation, I used the Shapiro-Wills (W = 1) and Kolmogorov-Smirnov test.

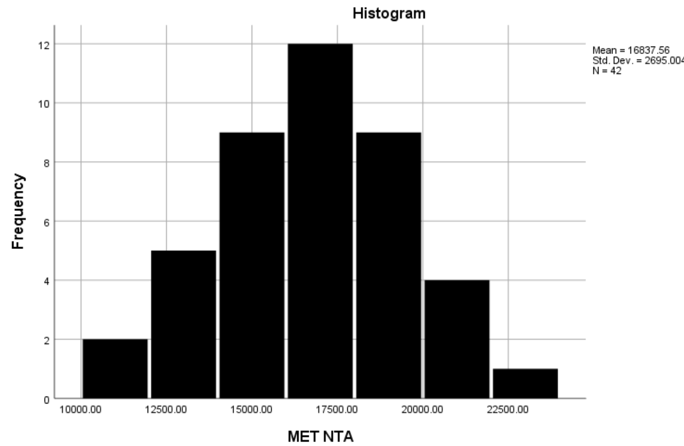


Figure 10. Normally distributed data

Homoscedasticity

Homoscedasticity is the equal variance assumption that I investigated with appropriate plots of the observed residuals (see Figure 11). Sum of all the residuals is equal to zero and plot the residuals against '*y* hat', plotting against *y* give the misleading outcome. In the residual plot, I expected a random scattering of points in the residual plot. In this study, I used data transformation to eliminate the unequal variances and to make the data homoscedastic; comply with homoscedasticity is one of the assumptions of regression analysis (see Figure 11).

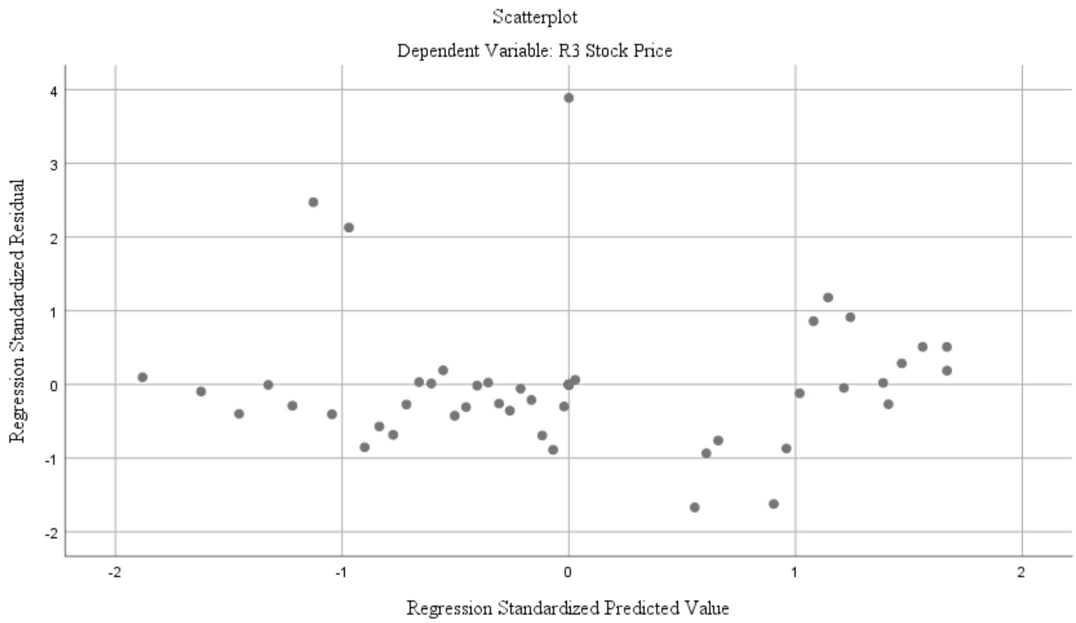


Figure 11. Homoscedasticity

Multicollinearity

All the predictors should not be significantly related to each other, the value of *R* should not be greater than .8, to employ the multiple regression analysis effectively; however, low levels of collinearity pose little threat to the model (Field, 2015). When the collinearity increases, the value of standard error increases and *R* is a measure of correlation between predicted values and the observed values, and *R*^2 is the variance in the outcome (Carlberg, 2016). The variance inflation factor (*VIF*) from the SPSS output indicates how the predictors are strongly related to other predictors, but the tolerance statistics is the reciprocal of *VIF*. If the largest *VIF* is higher than 10, then it is a concern, and the average *VIF* is greater than 1, then the regression may be biased (Bowerman & O'Connell, 1990).

Outliers

The outliers that are extreme values which are different from most of the data in the study are the threat to regression analysis. The visual tools such as the percentiles and boxplots assisted in sorting the outliers in this study (see Table 15). The standardized residuals also enabled to corrects the probable errors that can happen while including the outliers in the study (Bruce & Bruce, 2017).

F Statistics

The F statistics follows *F* distribution which is the ratio of the average variability in the data which is used to test the overall fit of the model. The higher the ratio, the more statistically significant the result and it is used for comparing the mean of the two groups. The SPSS output provides the *F*-values.

Reject H_0 if $F_{STAT} > F\alpha$,

Otherwise, do not reject H_0.

Where, $F\alpha = .05$ at a 95% confidence interval that I used in this study.

Test Statistics

The test statistics is a matric for the difference or effect of interest and *t*-statistics is a standard version of test statistics. Student's *t* distribution is a reference distribution to which compare the observed *t*-statistics. According to *t* distribution, if the random variable X is normally distributed, then the *t* statistics, $t = (\bar{x} - \mu)/(S/\sqrt{n})$, is *t*-distribution with (n-1) degrees of freedom (Levine et al., 2011; Pedhazur, 1997). When the sample size and the degree of freedom increase, the *t*-distribution gradually approaches the standard normal distribution until the two are identical and *S* becomes a better estimate of σ. I evaluated the assumption of normality by using the histogram and normal probability plot (see Figure 5 through Table 33). The SPSS output provides the *t*-values.

Reject H_0 if $t_{STAT} > F\alpha$,

Otherwise, do not reject H_0.

Where, $F\alpha = .05$ at a 95% CI that I used in this study.

Alpha

The discretion of the researcher to decide whether a result is “too unusual” to happen but he/she decides a threshold of 5% or 1% in advance and that is alpha (Bruce & Bruce, 2017). In this study, the alpha is 5% that translated a 95% CI. There is a 1-in-20 chance (5%) that the CI does not include the real mean.

***P*-value**

The decision on research can be either reject the null hypothesis or fail to reject the null hypothesis. The *p*-value determines the rejection region or significance of correlation according to the level of confidence. The level of confidence is the degree of certainty with which generalizing the results from a sample to a population, but it does not include the effect size (Bruce & Bruce, 2017). The conventions of *p*-value are:

$p > .1$ is a non-significant evidence against H_0

$.05 < p \leq .1$ is marginally significant evidence on H_0

$.01 < p \leq .05$ is significant evidence against H_0

$p \leq .01$ is highly significant evidence against H_0

In this study, the significance level is .05 (α) which is the probability of erroneously rejecting H_0, and the CI was 95%. Based on the value of p and the confidence interval, I decide the statistical significance. At 95% CI, I rejected H_0 when $p \leq .05$ and failed to reject H_0 when $p > .05$.

Two types of decision errors such as *Type 1 error* that is an erroneous rejection of true H_0 or *Type II error* which is erroneous retention of false H_0 can happen in hypotheses tests. Mistakenly concluding an effect is real when it is due to chance is *Type I error*. Mistakenly concluding an effect is due to chance when it is real is the *Type II error*.

For preserving the anonymity when reporting the results of the three hypotheses tests, I renamed the samples according to 11 strata as shown in Table 5. For instance, I1 represented the first sample from the industry (I) sector, IT2 represented the second sample from the information technology (IT) sector, CD3 represents the third sample from the consumer discretionary (CD) sector and so, on (see Table 5).

Table 5

Names Used for 56 Stratified Sample Corporations from the S&P 500

GICS Sector	Names Used for 56 Samples from the S&P 500							
Industrial	I1	I2	I3	I4	I5	I6	I7	
Information Technology	IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8
Energy	E1	E2	E3					
Utilities	U1	U2	U3					
Telecom. Services	TS1	TS2	TS3					
Materials	M1	M2	M3	M4				
Healthcare	H1	H2	H3	H4	H5	H6		
Financials	F1	F2	F3	F4	F5	F6	F7	
Real Estate	R1	R2	R3					
Consumer Discretionary	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8
Consumer Staples	CS1	CS2	CS3	CS4				

Note. GICS is the global industry classification sectors of the S&P 500. The samples from the first six sectors from the industrial and technology group constitute 28 corporations (I1 through M4) and the samples from the last five sectors from the healthcare and service group constitute 28 corporations (H1 through CS4).

Test Results: Hypothesis 1

According to the weak-form EMH, the stock price reflects all the relevant publicly available information (Fama, 1965a). Then, according to EMH, the stock price should reflect the changes in NTA as they are publicly available information; NTA is the sum of IA and goodwill of corporations. To test the weak-form EMH, I chose the predictor variable NTA and the outcome variable was the stock price in the hypothesis test 1. The purpose of hypothesis test 1 was to examine how well NTA could predict the stock price of corporations from the S&P 500.

To meet all the assumptions of regression analysis, most of the data required transformation to apply parametric statistical tools effectively to analyze the correlation between NTA and the stock price (see Figure 12 through Figure 14). To meet the assumption for using parametric statistics, I conducted various tests for linearity, independence, normality, and homoscedasticity (see Figure 9 through Figure 11). In the absence of outliers in the data, the standardized residuals are within +3.29 and -3.29 (Zimek & Filzmoser, 2018). For the transformed data that I used, the standard residuals were within +3.29 and -3.29 implied the absence of outliers in the data points. I also used the normal P-P plot to identify the outliers, skewness, and kurtosis. In the normal plot, the deviations from the straight line explain the violation of the normality assumption. In addition to that, I also conducted the Kolmogorov-Smirnov and Shapiro-Wilk tests on all the IVs to test the normality. The Shapiro Wilk test showed all the 2464 NTA data for 56 corporations for 44 quarters used in this study met the assumptions of normality (see Figure 3 through Figure 36). In the following section, I explain the results of simple regression (Hypothesis test 1) where the predictor was NTA, and the outcome variable was the stock price of 56 corporations.

To examine how well NTA could predict the stock price of corporations from the 11 GICS sectors of the S&P 500, I conducted a simple linear regression analysis. When visually analyzing the trends, the scatterplots showed that the relationship between NTA and the stock prices were either positive or negative, linear, and did not reveal any outliers. To employ parametric statistics effectively, I transformed the data on NTA to meet the assumptions of linearity, independence, normality, and homoscedasticity. The graphs before and after the transformation of data show a discernible difference (see Figure 12 through Figure 82).

Industrial Sector

The simple regression analysis on I1 from the industry sector showed the correlation between NTA and the stock price of I1 was statistically significant (as shown in Table 6, for I1, B = .054, $t(41) = 3.655$, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41) = 13.356$, $p < .05$). The regression equation for predicting the stock price was $\hat{Y}$ = -296.19 + .054*(NTA). The R^2, coefficient of determination for this equation is .246 which means NTA can predict 25% of the variance in the stock price of I1. At 95% CI, for the slope to predict stock price from NTA range from .024 to .084; thus, for each one million dollars increase of NTA, the stock price increases by about 2.4 cents to 8.4 cents (as shown in Table 6). The transformed data used for the parametric analysis shows the discernible difference (see Figure 12 though Figure 14).

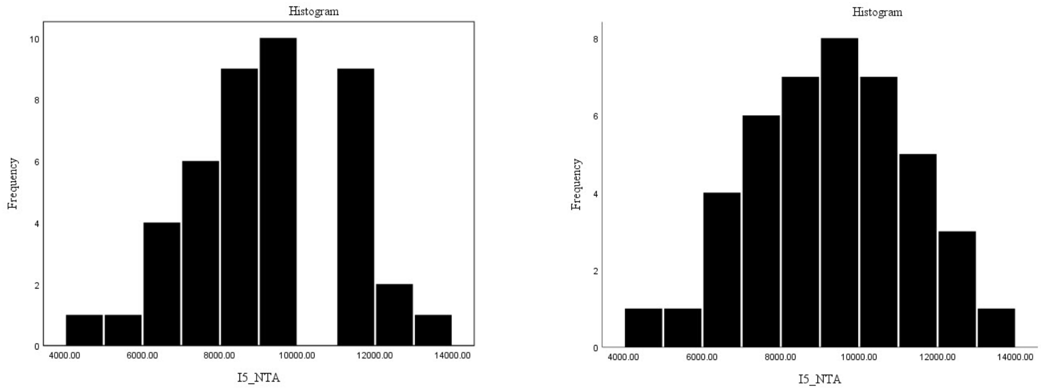


Figure 12. Raw data Vs. Transformed data

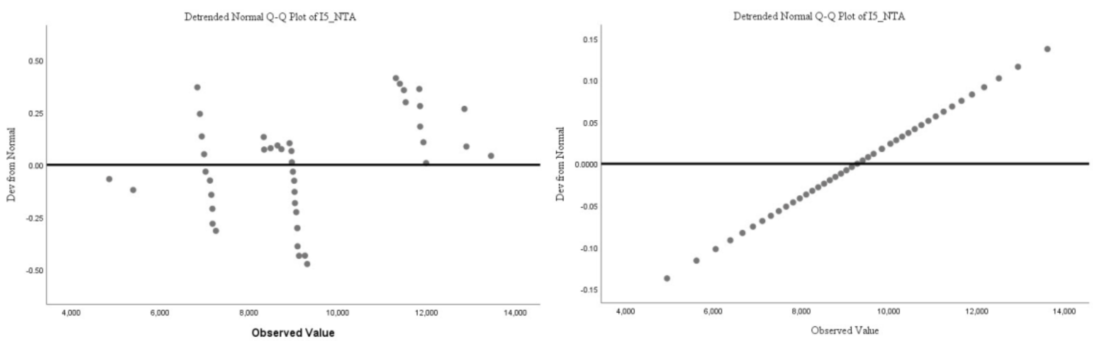


Figure 13. Raw data Vs. Transformed data

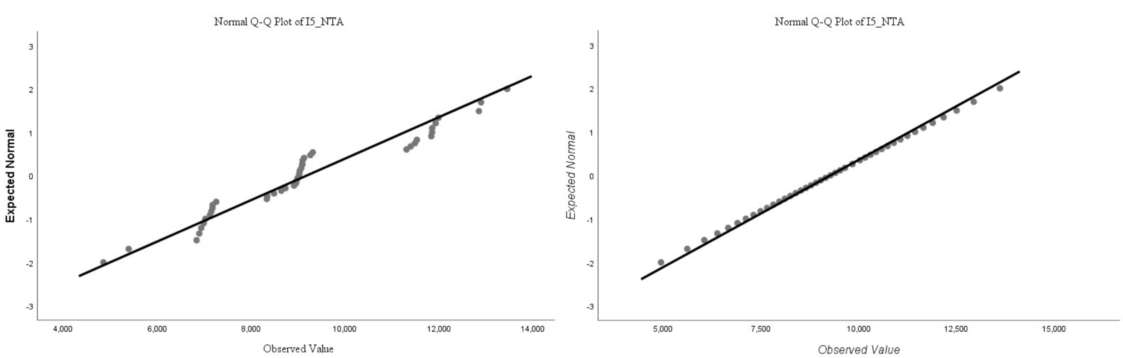


Figure 14. Raw data Vs. Transformed data

Similarly, the simple regression analysis for the other corporations I5, I6, and I7 from the Industrial sector showed the correlation between NTA and the stock prices were statistically significant (see Table 6, for I5, $b = .20$, $t(41) = 7.606$, $p < .05$; for I6, $b = .010$, $t(41) = 14.024$, $p < .05$; for I7, $b = .020$, $t(41) = 6.221$, $p < .05$). For corporation I5, the regression equation for predicting the stock price is $\hat{Y} = -77.22 + .02*(\text{NTA})$. The coefficient of determination R^2(41) for the equation is .585 which means NTA can predict about 59% of the variance in the stock price of I5. At 95% CI, for the slope to predict stock price from NTA range from .015 to .026; thus, for each one million dollars increase of NTA, the stock price increases by about 1.5 cents to 2.6 cents (as shown in Table 6).

For corporation I6, the regression equation for predicting the stock price is $\hat{Y} = -82.092 + .01*(\text{NTA})$. The coefficient of determination R^2(41), for the equation, is .828 which means NTA can predict about 83% of the variance in the stock price of I6. At 95% CI, for the slope to predict stock price from NTA range from .008 to .011; thus, for each one million dollars increase of NTA, the stock price increases by about .8 cents to 1.1 cents (as shown in Table 6).

For corporation I7, the regression equation for predicting the stock price is $\hat{Y} = -54.25 + .02*(\text{NTA})$. The coefficient of determination R^2(41) for the equation is .486 which means NTA can predict about 49% of the variance in the stock price of I7 (as shown in Table 6). At 95% CI, for the slope to predict the stock price of I7 from NTA range from .012 to .026; thus, for each one million dollars increase of NTA, the stock price increases by about 1.2 cents to 2.6 cents (as shown in Table 6).

However, the regression analysis for corporation I2 from the industrial sector showed the correlation between NTA and the stock price of I2 was not statistically significant. As shown in Table 6, for I2, $b = .003$, $t(41) = 1.838$, $p = .073$; $F(1,41) = 3.377$, $p = .073$. For I2, the regression equation for predicting the stock price was $\hat{Y} = 57.487 + .003*(NTA)$, but not a useful model. In this case, there was no significance between the NTA and the stock price and failed to reject the null hypothesis. The scatterplot of standardized predicted values and standardized residuals showed the data of corporations from the industry sector is normally distributed and met other assumptions of linearity, independence, normality, and homoscedasticity (see Figure 13).

Similarly, the regression analysis for corporation I3 and I4 from the industrial sector showed the correlation between NTA and their respective stock prices were also not statistically significant. As shown in Table 6, for I3, $b = .003$, $t(41) = 1.797$, $p = .080$; $F(1,41) = 3.228$, $p = .080$; for I4, $b = -7.031E-6$, $t(41) = -.063$, $p = .950$; $F(1,41) = .004$, $p = .950$ The regression equation for predicting the stock price of I3 was $\hat{Y} = -17.453 + .003*(NTA)$ and for I4 the equation was $\hat{Y} = 19.64 - 7.031E-6*(NTA)$, but these models were not useful. In these cases, the correlation between NTA and their stock prices were not statistically significant and failed to reject the null hypothesis. The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the industry sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 15). In Table 6, I presented the hypothesis 1 test results of seven samples that were about 11% of the corporations in the industrial sector of the S&P 500 (see Table 6).

Table 6

Hypothesis 1 - Test Results: Industrial Sector

Corp.	B	*t*	*p*	*F*	*p*	*R*^2	*LB*	*UB*
I1	.054	3.655	.001	*F*(1,41)= 13.356	.001	.246	.024	.084
I2	.003	1.838	.073	*F*(1,41)= 3.377	.073	.076	.000	.005
I3	.003	1.797	.080	*F*(1,41)= 3.228	.080	.073	.000	.006
I4	-7.031E-6	-.063	.950	*F*(1,42) = .004	.950	.001	.000	.000
I5	.02	7.606	.001	*F*(1,41)= 57.850	.001	.585	.015	.026
I6	.010	14.024	.001	*F*(1,41)= 196.684	.001	.823	.008	.011
I7	.020	6.221	.001	*F*(1,41) = 38.105	.001	.486	.012	.026

Note. The test results on hypothesis 1 from the seven corporations from the industrial sector of the S&P 500. The stratified samples are corporations (Corp.) I1 *through* I4, B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

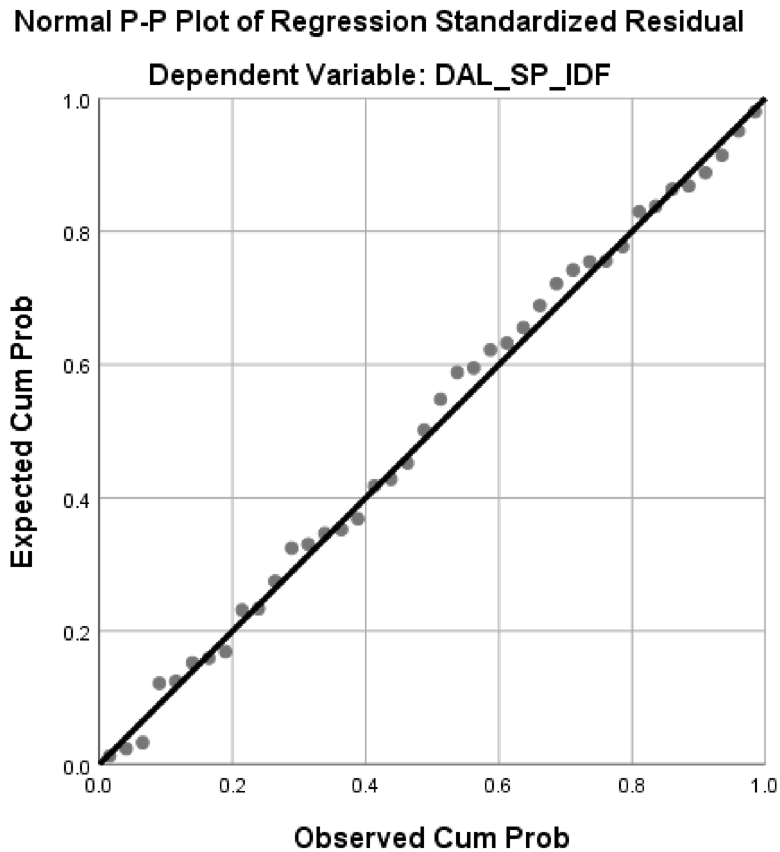


Figure 15. Normal P-P plot - Industrial sector S&P 500

Information Technology Sector

The simple regression analysis on IT1 from the information sector showed the correlation between NTA and the stock price of IT1 was statistically significant (as shown in Table 7, for IT1, b = .011, t(40) = 8.123, p < .05). An analysis of variance also showed that the correlation was significant (F(1,40) = 65.989, p < .05). The regression equation for predicting the stock price is $\hat{Y}$ = 18.422 + .011*(NTA). The coefficient of determination, R^2 for this equation is .623 which means NTA can predict about 62% of the variance in the stock price of IT1 was predictable. At 95% CI, for the slope to predict stock price from NTA range from .008 to .013; thus, for each one million dollars increase of NTA, the stock price increases by about 1 cent (as shown in Table 7). The transformed data used for the parametric analysis shows the discernible difference (see Figure 16).

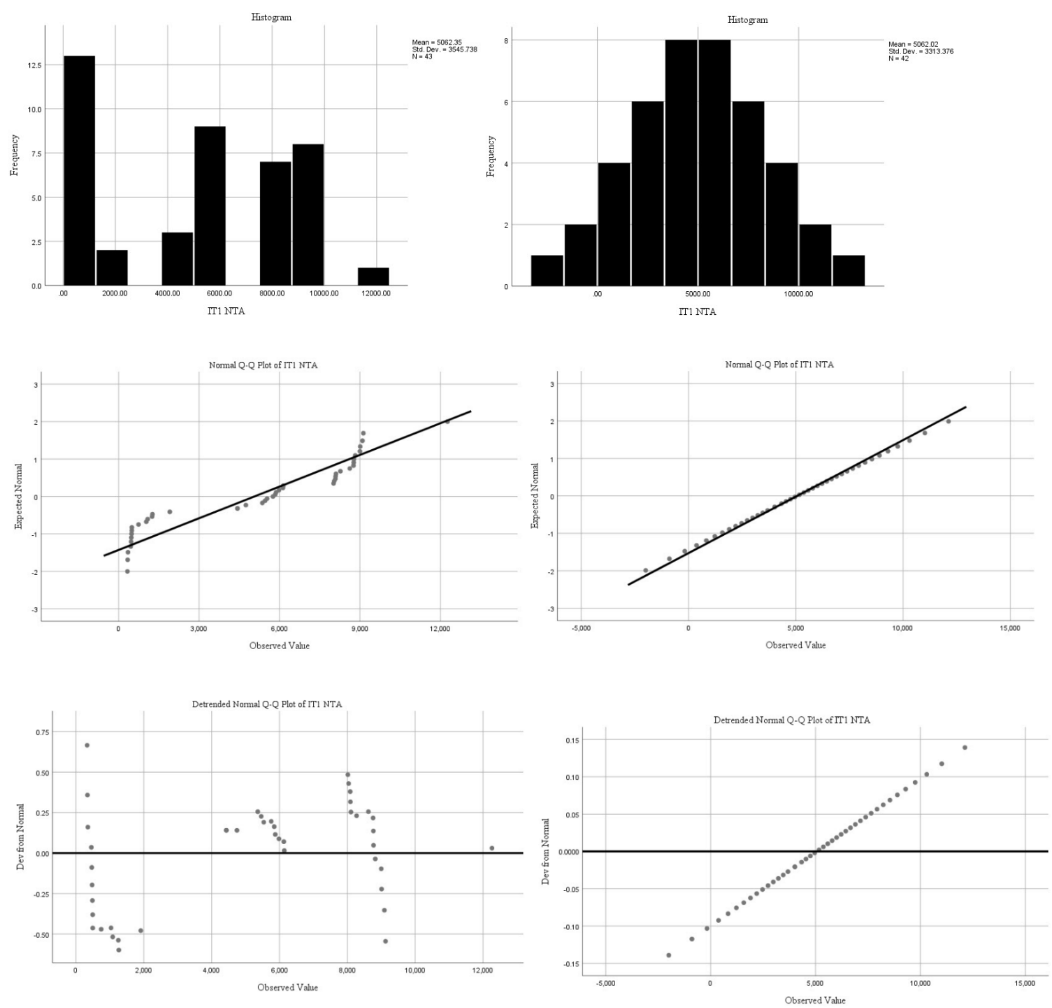


Figure 16. Information technology sector - Raw data Vs. Transformed data

Similarly, the simple regression analysis for the other seven corporations, IT2 through IT8, from the information technology sector also showed the correlation between NTA and the stock price were statistically significant (see Table 7). As shown in Table 7, for IT2, b = .031, t(42) = 6.855, p < .05. The regression equation for predicting the stock price of IT2 is $\hat{Y}$ = -75.062 + .031*(NTA). The coefficient of determination R^2(42) for the equation, is .528 that showed NTA could predict about 53% of the variance in the stock price of IT2. At 95% CI, for the slope to predict stock price from NTA range from .022 to .040; thus, for each one million dollars increase of NTA, the stock price increases between 2.2 cents to 4 cents (as shown in Table 7).

As shown in Table 7, the correlation between NTA and the stock price of IT3 were statistically significant (for IT3, b = .001, t(42) = 9.324, p < .05). The regression equation for predicting the stock price of IT3 is $\hat{Y}$ = -3.95 + .001*(NTA). The coefficient of determination R^2(41), for the equation, is .680 which means NTA can predict about 68% of the variance in the stock price of IT3. At 95% CI for the slope to predict stock price from NTA is .001; thus, for each one million dollars increase of NTA, the stock price increases by about one-tenth of a cent (as shown in Table 7).

As shown in Table 7, the correlation between NTA and the stock price of IT4 were statistically significant (for IT4, b = .002, t(41) = -2.882, p < .05). The regression equation for predicting the stock price of IT4 is $\hat{Y}$ = 36.041 + .002*(NTA). The coefficient of determination R^2(41), for the equation, is .168 which means NTA can predict about 17% of the variance in the stock price of IT4. At 95% CI, for the slope to predict stock price from NTA range from -.004 to -.001; thus, for each one million dollars increase of NTA, the stock price decreases by about one-tenth of a cent to .4 cents (as shown in Table 7). The transformed data used for the parametric analysis shows the discernible difference and met the assumption of homoscedasticity (see Figure 17).

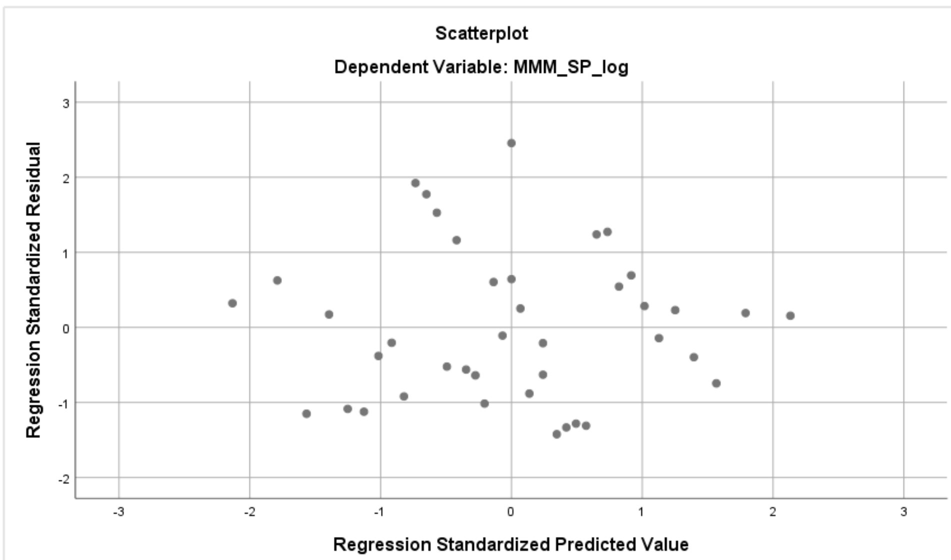


Figure 17. Residual scatterplot - Information technology S&P 500

As shown in Table 7, the correlation between NTA and the stock price of IT5 were statistically significant (for IT5, $b = .003$, $t(41) = 6.616$, $p < .05$). The regression equation for predicting the stock price of IT5 is $\hat{Y} = 29.67 + .003*(NTA)$. The coefficient of determination R^2(41) for the equation is .516 which means about 52% of the variance in the stock price of IT5 is predictable from the NTA. At 95% CI, for the slope to predict stock price from NTA range from .002 to .004; thus, for each one million dollars increase of NTA, the stock price increases by about one-third of a cent (as shown in Table 7).

As shown in Table 7, the correlation between NTA and the stock price of IT6 were statistically significant (for IT6, b = .001, $t(42)$ = 15.572, $p < .05$). The regression equation for predicting the stock price of IT6 is $\hat{Y}$ = -4.068 + .001*(NTA). The coefficient of determination R^2(42) for the equation is .855 which means NTA can predict about 86% of the variance in the stock price of IT6. At 95% CI, for the slope to predict stock price from NTA is .001; thus, for each one million dollars increase of NTA, the stock price increases by about one-tenth of a cent (as shown in Table 7).

As shown in Table 7, the correlation between NTA and the stock price of IT7 were statistically significant (for IT7, b = .01, $t(42)$ = 6.844, $p < .05$). The regression equation for predicting the stock price of IT7 is $\hat{Y}$ = 39.35 + .01*(NTA). The coefficient of determination R^2(42), for the equation is .527 which means NTA can predict about 53% of the variance in the stock price of IT7. At 95% CI, for the slope to predict stock price from NTA range from .007 to .013; thus, for each one million dollars increase of NTA, the stock price increases between .7 cents and 1.3 cents (as shown in Table 7).

As shown in Table 7, the correlation between NTA and the stock price of IT8 were statistically significant (for IT8, b = .002, $t(41)$ = 6.917, $p < .05$). The regression equation for predicting the stock price of IT3 is $\hat{Y}$ = .412 + .002*(NTA). The coefficient of determination R^2(41), for the equation is .567 which means NTA can predict about

57% of the variance in the stock price of IT3. At 95% CI, for the slope to predict stock price from NTA range from .001 to .002; thus, for each one million dollars increase of NTA, the stock price increases between .1 and .2 cents (as shown in Table 7). In Table 7, I present the test results of hypothesis 1 for eight samples that are about 11% of the corporations from the information technology sector of the S&P 500. The transformed data used for the parametric analysis shows the discernible difference and met the assumption of normality (see Figure 18), linearity and homoscedasticity (see Figure 19).

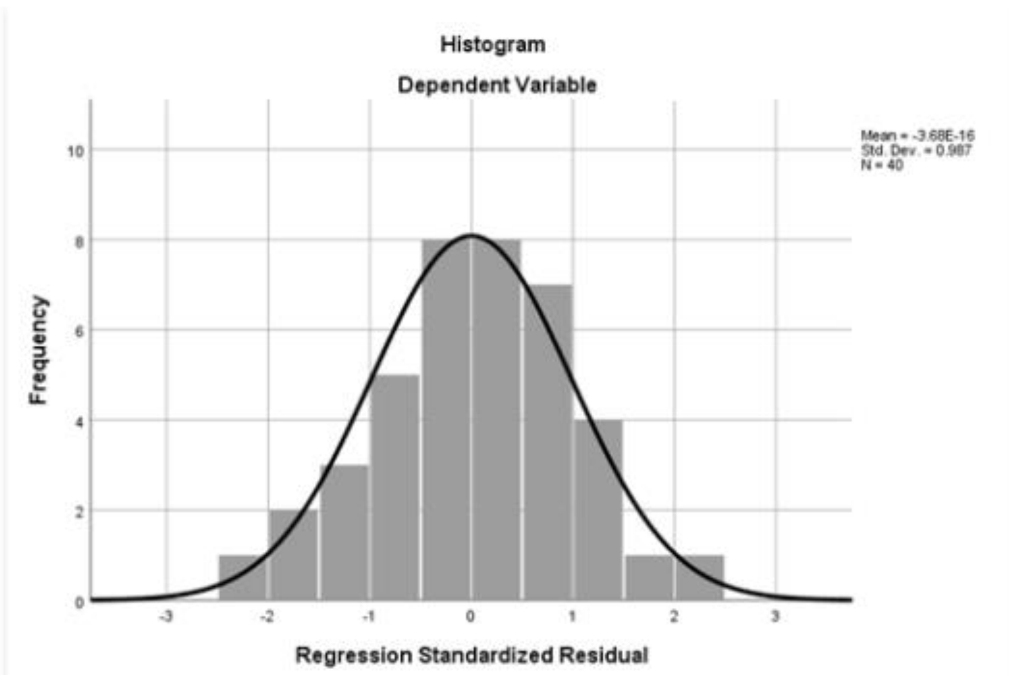


Figure 18. Normality test I3 - Information technology sector S&P 500

Table 7

Hypothesis 1 - Test Results: Information Technology Sector

Corp.	B	*t*	*p*	*F*	*p*	*R*^2	*LB*	*UB*
IT1	.011	8.123	.001	*F*(1,40) = 65.989	.001	.623	.008	.013
IT2	.031	6.855	.001	*F*(1,42) = 46.991	.001	.528	.022	.040
IT3	.001	9.324	.001	*F*(1,41) = 86.843	.001	.680	.001	.001
IT4	.002	-2.882	.006	*F*(1,41)= 8.306	.006	.168	-.004	-.001
IT5	.003	6.616	.001	*F*(1,41) = 43.769	.001	.516	.002	.004
IT6	.001	15.572	.001	*F*(1,41) = 242.477	.001	.855	.001	.001
IT7	.01	6.844	.001	*F*(1,42)= 46.838	.001	.527	.007	.013
IT8	.002	6.917	.001	*F*(1,41)= 47.851	.001	.539	.001	.002

Note. The test results on hypothesis 1 from the seven corporations from the sector of the S&P 500. The stratified samples are corporations (Corp.) IT1 *through* IT8, B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

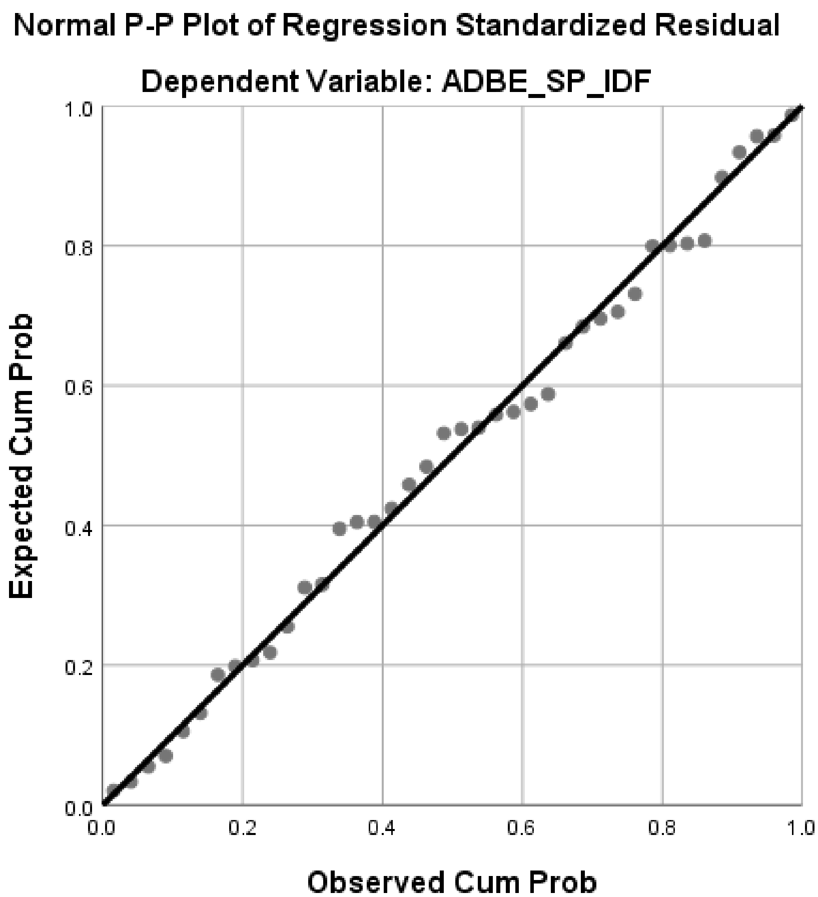


Figure 19. Normal P-P plot – Information technology sector S&P 500

Energy Sector

The simple regression analysis on E2 from the energy sector showed the correlation between NTA and the stock price of E2 was statistically significant (as shown in Table 8, for E2, b = -.227, t(42) = -2.515, p < .05). An analysis of variance also showed that the correlation was significant (F(1,42) = 6.324, p < .05). The regression equation for predicting the stock price is $\hat{Y}$ = 1130.27 -.227*(NTA). The R^2, coefficient of determination for this equation is .134 which means NTA can predict about 13% of the variance in the stock price of E2. At 95% CI, for the slope to predict stock price from NTA range from -.409 to -.045; thus, for each one million dollars increase of NTA, the stock price of E2 decreases between 4.5 cents to 41 cents (as shown in Table 8). The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 21). The data also met the assumptions and had no outliers (see Figure 20)

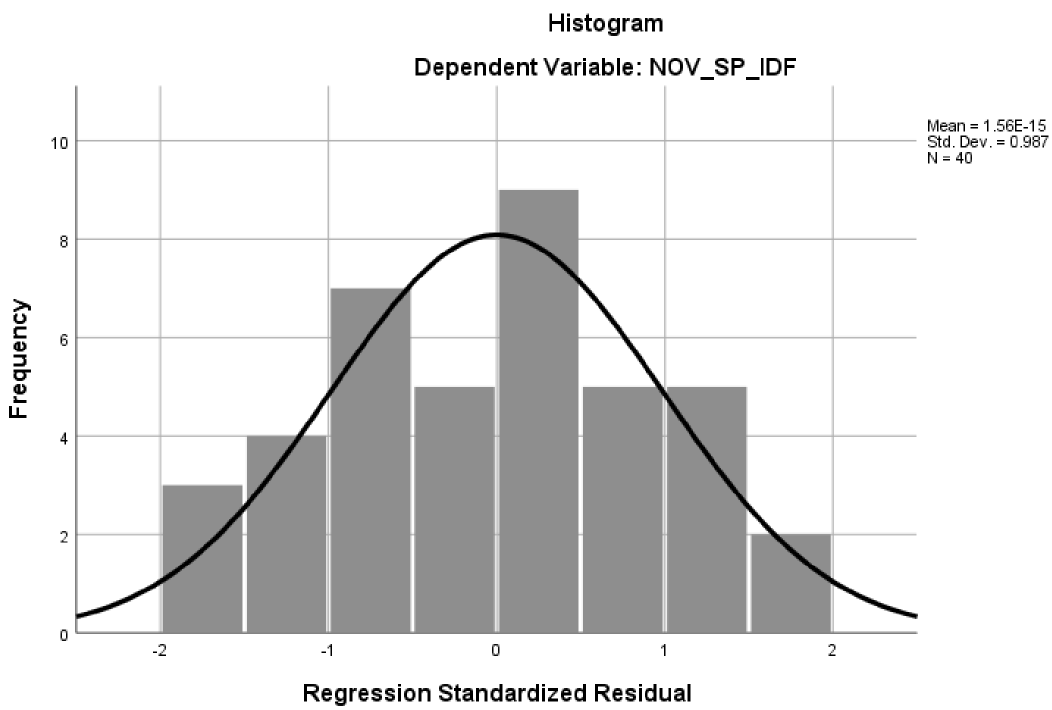


Figure 20. Normality test - Energy sector S&P 500

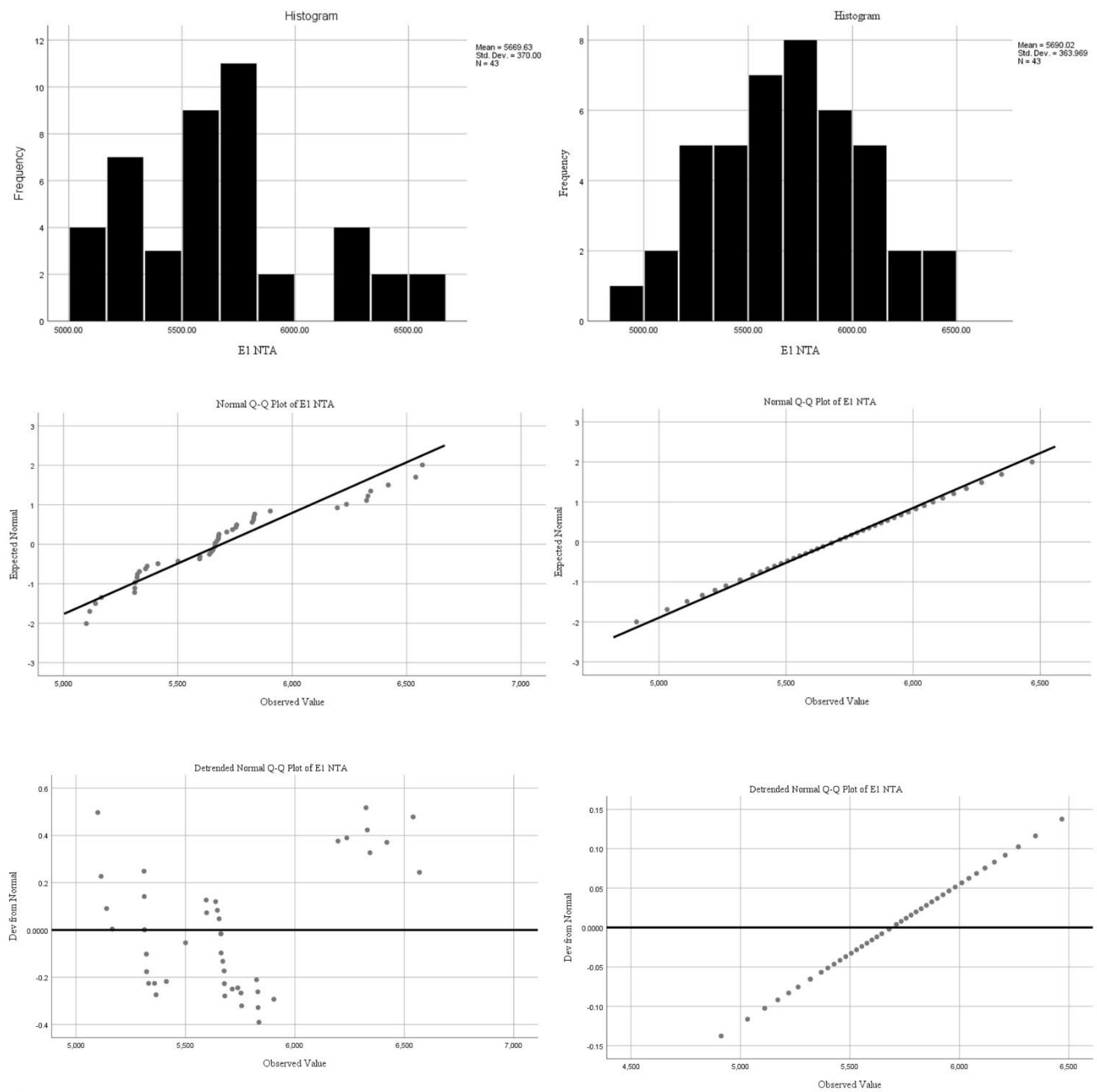


Figure 21. Energy sector - Raw data Vs. Transformed data

Similarly, the simple regression analysis for other corporation E3 from the energy sector shows the correlation between NTA and the stock price was statistically significant (see Table 8, for E3, b = .003, $t(41) = 3.329$, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41) = 11.082$, $p < .05$). For corporation

E3, the regression equation for predicting the stock price is $\hat{Y}$ = 16.34 + .003*(NTA). The coefficient of determination *R*^2(41) for the equation is .213 which means NTA can predict about 21% of the variance in the stock price of E3 (as shown in Table 8). At 95% CI, for the slope to predict stock price from NTA range from .001 to .005; thus, for each one million dollars increase of NTA, the stock price of E3 increases between .1 and .5 cents (as shown in Table 8).

However, the regression analysis for corporation E1 from the energy sector showed the correlation between NTA and the stock price of E1 was not statistically significant. As shown in Table 8, for E1, B = .006, $t(42) = .919$, $p = .636$; $F(1,42)=845$, $p = .636$. For E1, the regression equation for predicting the stock price was $\hat{Y}$ = 28.776 + .006*(NTA) but it was not a useful model. In this case, there was no significance between the NTA and the stock price and failed to reject the null hypothesis. The scatterplot of standardized predicted values and standardized residuals showed the data of corporations from the energy sector is normally distributed and met other assumptions of linearity, independence, and homoscedasticity (see Figure 27). In Table 8, I present the test results of hypothesis 1 for three samples that were about 10% of the corporations from the energy sector of the S&P 500.

The NTA data was transformed to meet the assumptions of linearity, independence, normality, and homoscedasticity to employ parametric statistics effectively. The graphs before and after the transformation of data showed a discernible difference (Figures 32 through Figure 35).

Table 8

Hypothesis 1 - Test Results: Energy Sector

Corp.	B	*t*	*p*	*F*	*p*	*R*^2	LB	UB
E1	.006	.919	.363	*F*(1,41) = 1.845	.363	.020	-.007	.020
E2	-.227	-2.515	.016	*F*(1,41) = 6.324	.016	.134	-.409	-.045
E3	.003	3.329	.002	*F*(1,41)= 11.082	.002	.213	.001	.005

Note. The test results on hypothesis 1 from the seven corporations from the sector of the S&P 500. The stratified samples are corporations (Corp.) E1, E2, *and* E3; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 23). The data also met other assumptions and shows the absence of outliers (see Figure 22). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

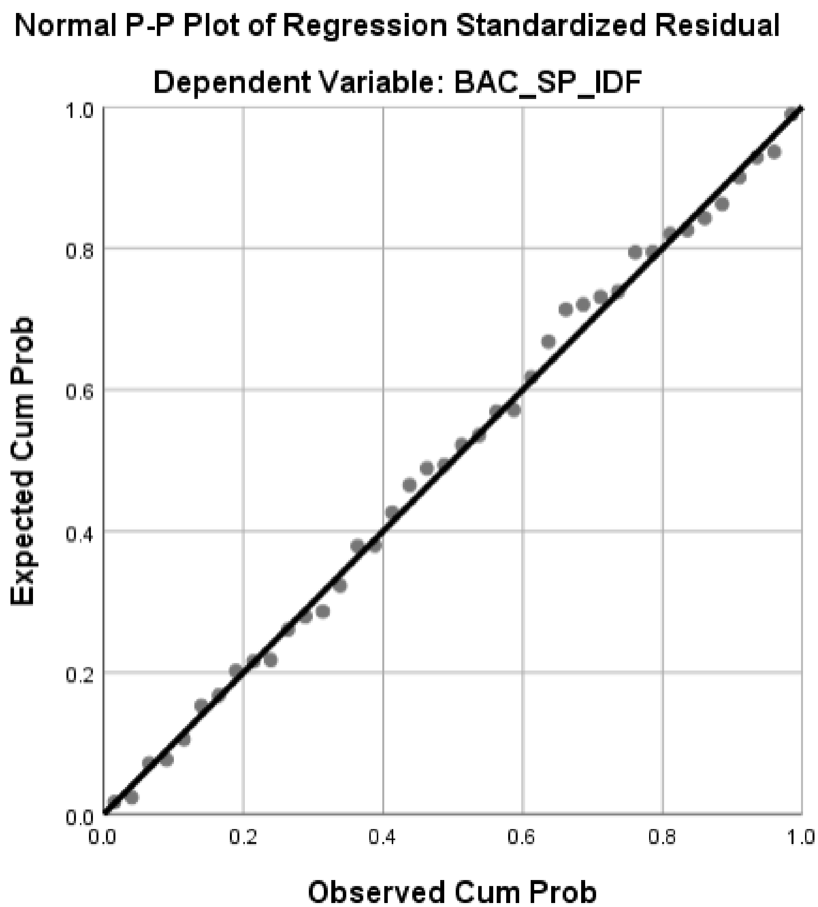


Figure 22. Normal P-P plot - Energy sector S&P 500

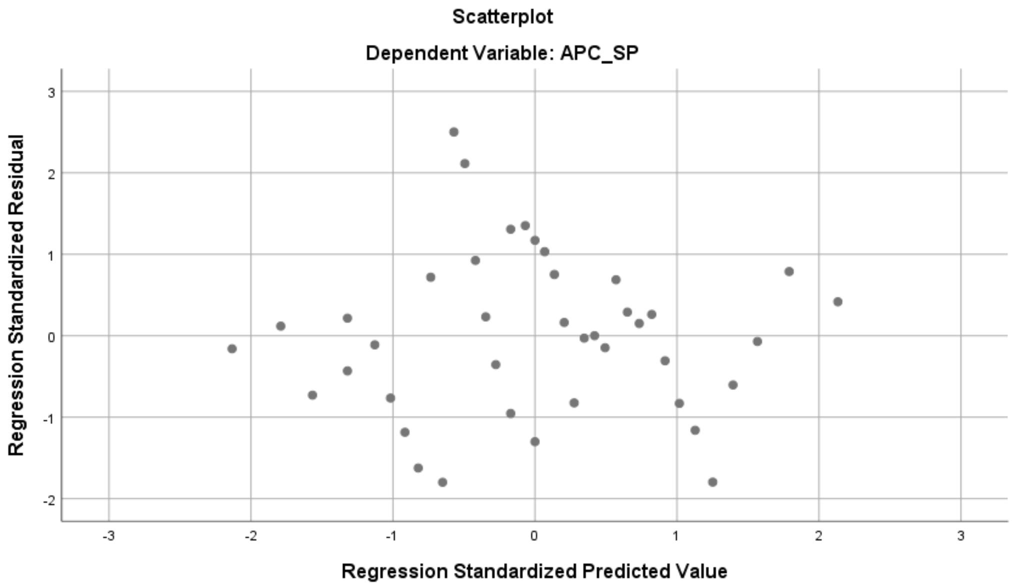


Figure 23. Residual scatterplot - Energy sector S&P 500

Utility sector

The simple regression analysis on U1 from the utility sector showed the correlation between NTA and the stock price of U1 was statistically significant (as shown in Table 9, for U1, b = .002, $t(42)$= 6.525, p < .05). An analysis of variance also showed that the correlation was significant (F(1,42) = 42.574, p < .05). The regression equation for predicting the stock price is $\hat{Y}$ = 30.22 + .002*(NTA). The R^2, coefficient of determination for this equation is .503 which means NTA can predict 50% of the variance in the stock price of U1. At 95% CI, for the slope to predict stock price from NTA range from .001 to .003; thus, for each one million dollars increase of NTA, the stock price increases about one-fifth of a cent (as shown in Table 9).

Similarly, the simple regression analysis for other corporations U3 from the utility sector showed the correlation between NTA and the stock price were statistically significant (see Table 9, for U3, b = -.081, $t(41)$ = -2.357, p < .05; For corporation U3, the regression equation for predicting the stock price is $\hat{Y}$ = -107.683 -.081*(NTA). The coefficient of determination R^2(41) for the equation is .119 which means NTA can predict about 12% of the variance in the stock price of U3. At 95% CI, for the slope to predict stock price from NTA range from -.15 to -.012; thus, for each one million dollars increase of NTA, the stock price decreases between 15 cents to 1.2 cents (as shown in Table 9).

However, the regression analysis for corporation U2 from the utility sector showed the correlation between NTA and the stock price of U2 was not statistically significant. As shown in Table 9, for U2, b = .088, $t(42)$ = 1.283, p = .207; $F(1,42)$= 1.646, p = .207. For U2, the regression equation for predicting the stock price was $\hat{Y}$ = 32.133 + .088*(NTA) but it was not a useful model. In this case, the correlation between NTA and the stock price was not statistically significant and failed to reject the null hypothesis. The scatterplot of standardized predicted values and standardized residuals showed the data of corporations from the industry sector was normally distributed and met other assumptions of linearity, independence, and homoscedasticity (see Figure 26). In Table 9, I present the test results of Hypothesis 1 for three samples that are about 10% of the corporations from the energy sector of the S&P 500.

Table 9

Hypothesis 1 - Test Results: Utility Sector

Corp.	B	*t*	*p*	*F*	*p*	*R*^2	*LB*	*UB*
U1	.002	6.525	.001	*F*(1,42) = 42.574	.001	.503	.001	.003
U2	.088	1.283	.207	*F*(1,41) = 1.646	.207	.039	-.051	.228
U3	-.081	-2.357	.023	*F*(1,41)= 5.554	.023	.119	-.150	-.012

Note. The test results on hypothesis 1 from the seven corporations from the sector of the S&P 500. The stratified samples are corporations (Corp.) U1, U2 *and* U3; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 26). The data also met other assumptions and shows the absence of outliers (see Figure 24 through Figure 27). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

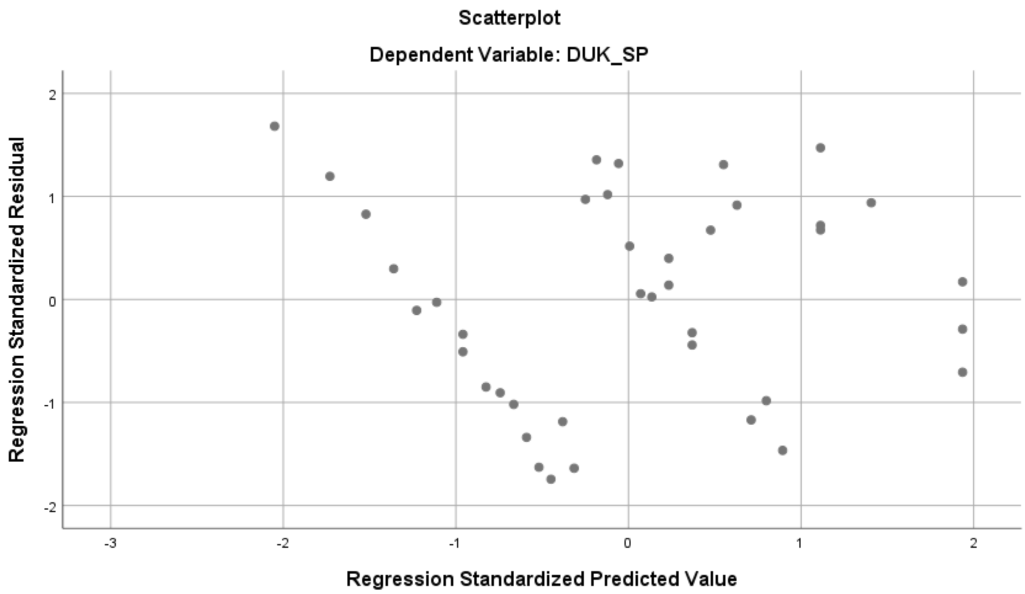


Figure 24. Residual scatterplot - Utility sector S&P 500

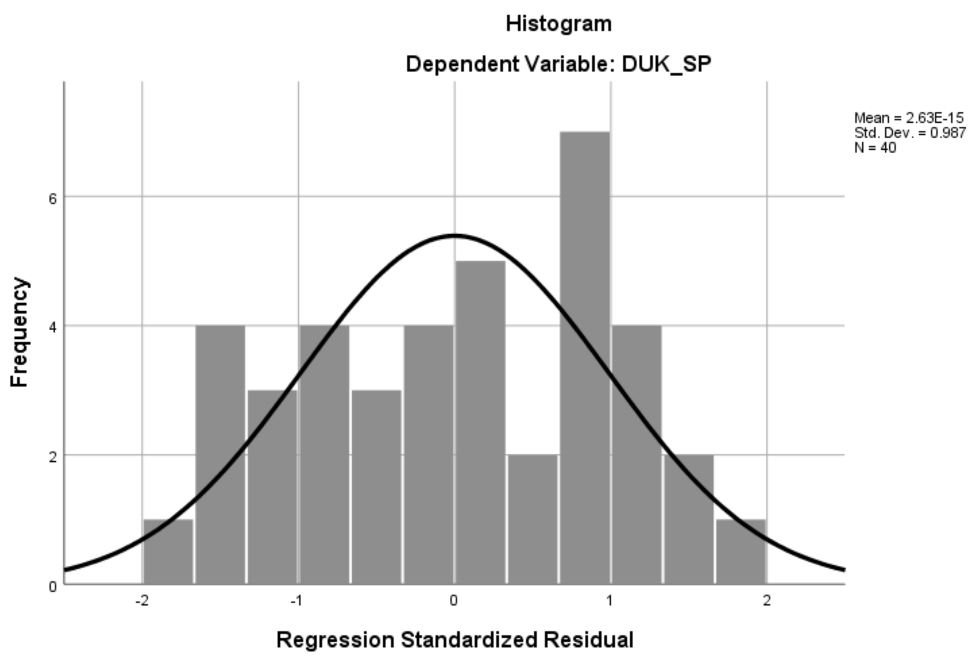


Figure 25. Normality test - Utility sector S&P 500

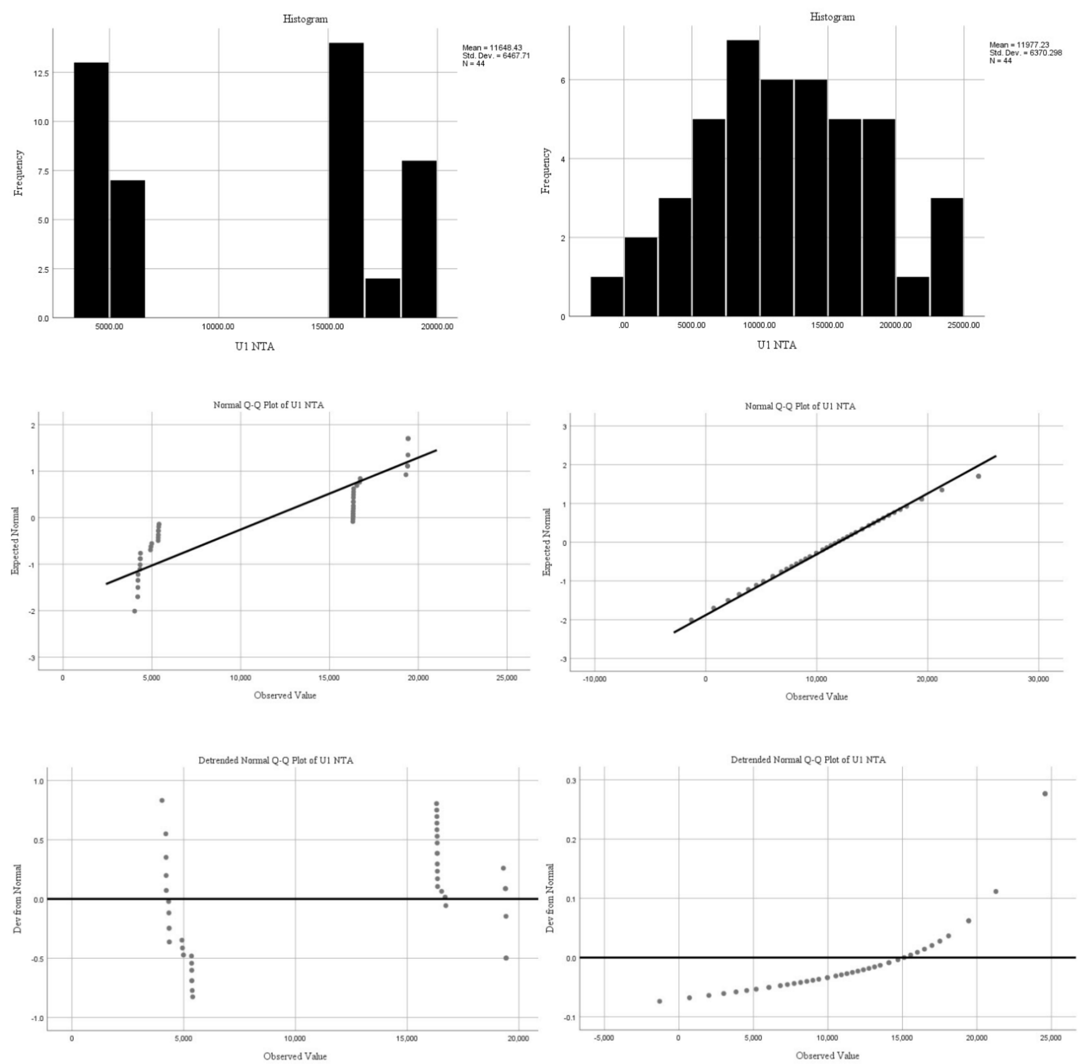


Figure 26. Utility sector - Raw data Vs. Transformed data

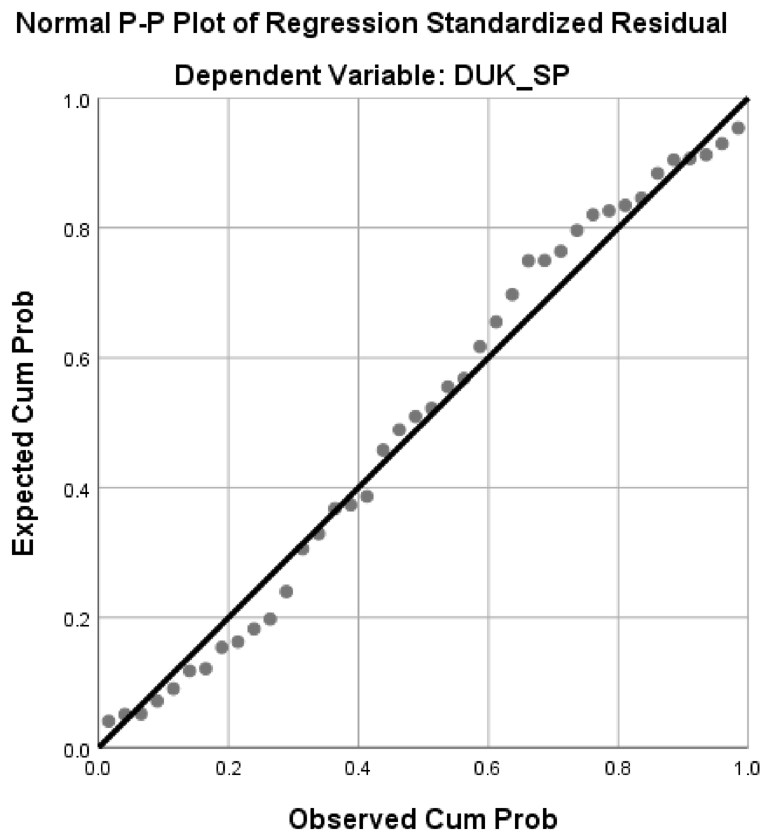


Figure 27. Normal P-P plot - Utility sector S&P 500

Telecommunication Services Sector

The simple regression analysis on TS1 from the telecommunication services sector showed the correlation between NTA and the stock price of TS1 was statistically significant (as shown in Table 10, for TS1, b = .001, $t(41) = 2.910$, $p < .05$). An analysis of variance also showed that the correlation is significant ($F(1,41) = 8.47$, $p < .05$). The regression equation for predicting the stock price is $\hat{Y} = 17.4 + .001*(\text{NTA})$. The R^2, coefficient of determination for this equation is .171 which means NTA can predict about 17% of the variance in the stock price of TS1 (as shown in Table 10). At 95% CI, for the slope to predict stock price from NTA was .001; thus, for each one million dollars increase of NTA, the stock price increases by one-tenth of a cent (as shown in Table 10).

As shown in Table 10, the simple regression analysis for other corporations TS2 from the telecommunication service sector showed the correlation between NTA and the stock price was statistically significant (see Table 10, for TS2, $b = .001$, $t(41) = 2.214$, $p < .05$). For corporation TS2, the regression equation for predicting the stock price is $\hat{Y} = 15.273 +.001*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .107 which means NTA can predict about 11% of the variance in the stock price of TS2. At 95% CI, for the slope to predict stock price from NTA is .001; thus, for each one million dollars increase of NTA, the stock price increases by one-tenth of a cent (as shown in Table 10).

Similarly, the simple regression analysis for other corporations TS3 from the telecommunication service sector showed the correlation between NTA and the stock price was statistically significant (see Table 10, for TS3, $b = .001$, $t(41) = 12.018$, $p < .05$). For corporation TS3, the regression equation for predicting the stock price is $\hat{Y} = -29.7 + .001*(\text{NTA})$. The coefficient of determination R^2(42), for the equation is .779 which means NTA can predict about 78% of the variance in the stock price of TS3 (as shown in Table 10). At 95% CI, for the slope to predict stock price from NTA is about

.001; thus, for each one million dollars increase of NTA, the stock price increases about one cent (as shown in Table 10). In Table 10, I presented the test results of hypothesis 1 for three samples from the telecommunication service sector of the S&P 500.

Table 10

Hypothesis 1 - Test Results: Telecommunication Sector

Corp.	B	*t*	*p*	*F*	*p*	*R*^2	LB	UB
TS1	.001	2.910	.006	*F*(1,41) = 8.470	.006	.171	.000	.000
TS2	.001	2.214	.032	*F*(1,41) = 4.904	.032	.107	.001	.001
TS3	.001	12.018	.001	*F*(1,41) = 144.469	.001	.774	.000	.001

Note. The test results on hypothesis 1 from the seven corporations from the sector of the S&P 500. The stratified samples are corporations (Corp.) TS1, TS2, and TS3; B means the unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 28). The data also met other assumptions and shows the absence of outliers (see Figure 29). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

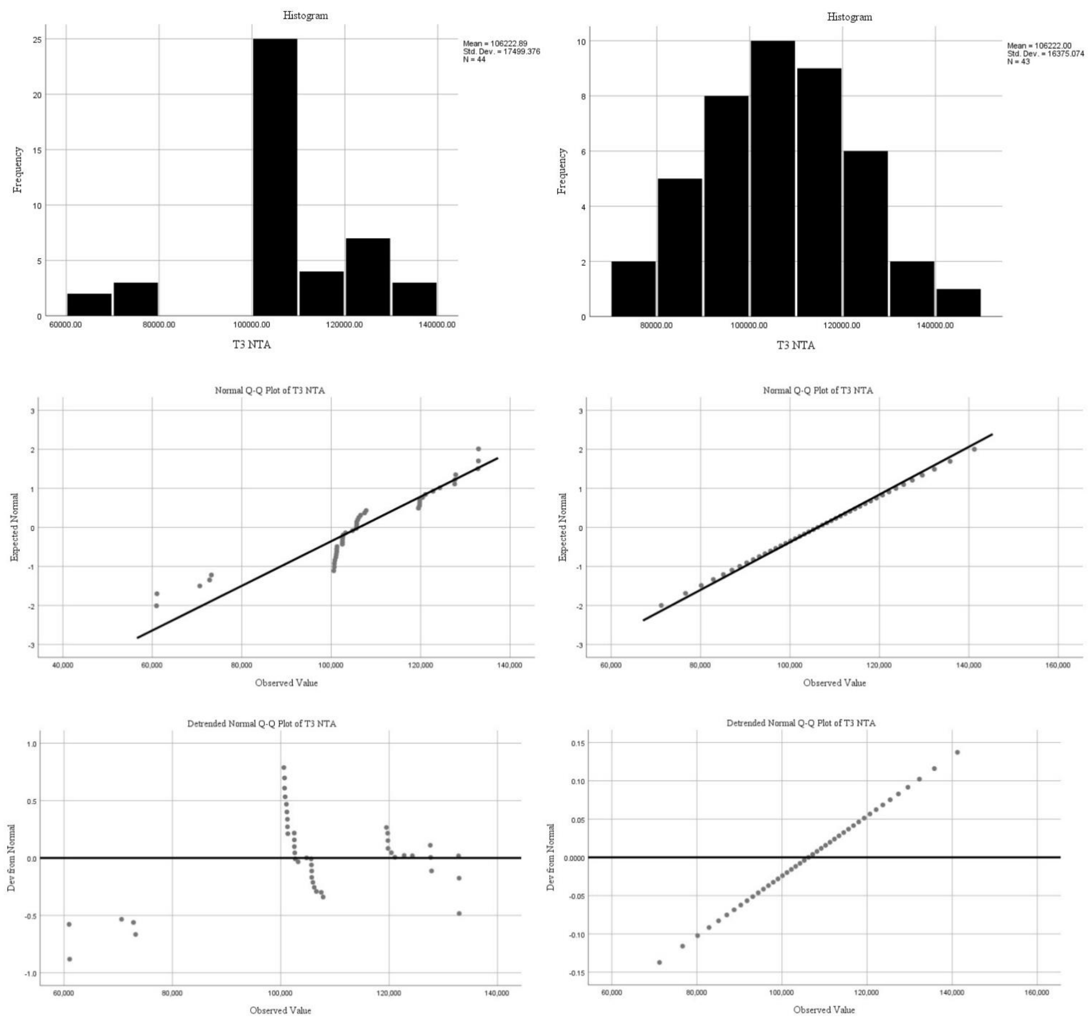


Figure 28. Telecommunications sector - Raw data Vs. Transformed data

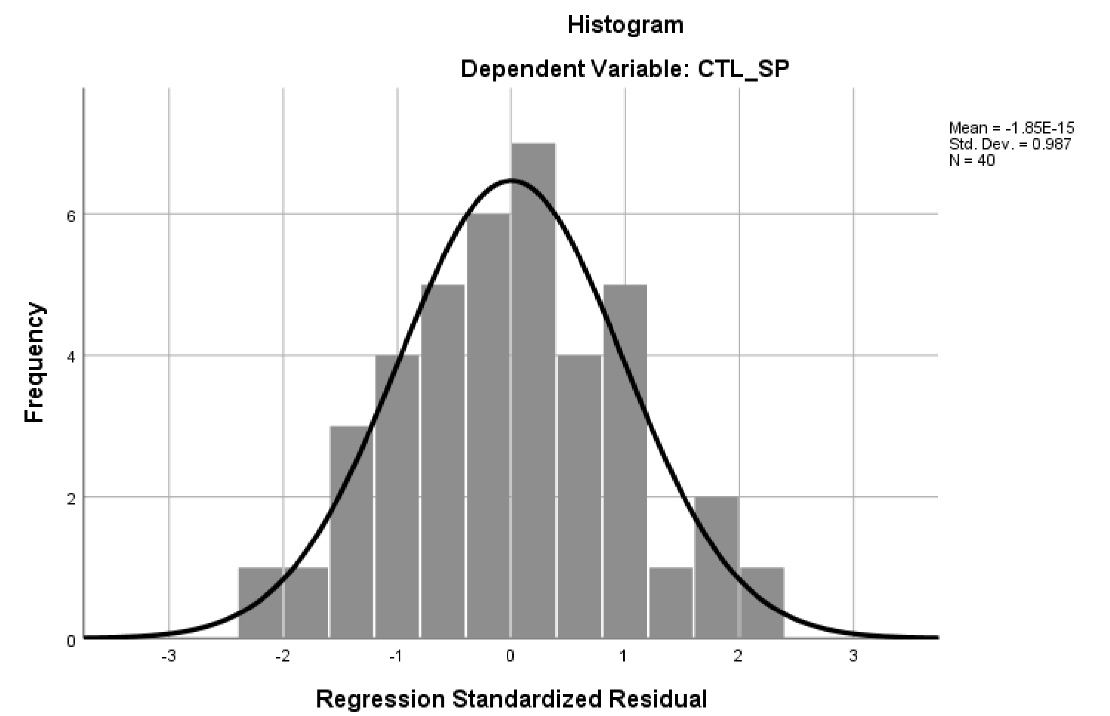


Figure 29. Normality test - Telecommunication service sector S&P 500

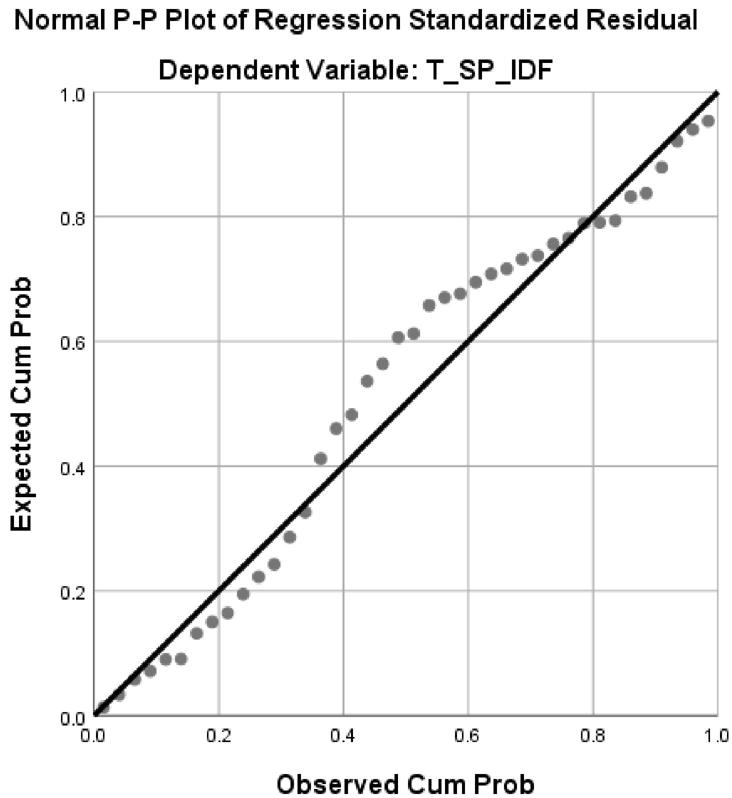


Figure 30. Normal P-P plot - Telecommunication service sector S&P 500

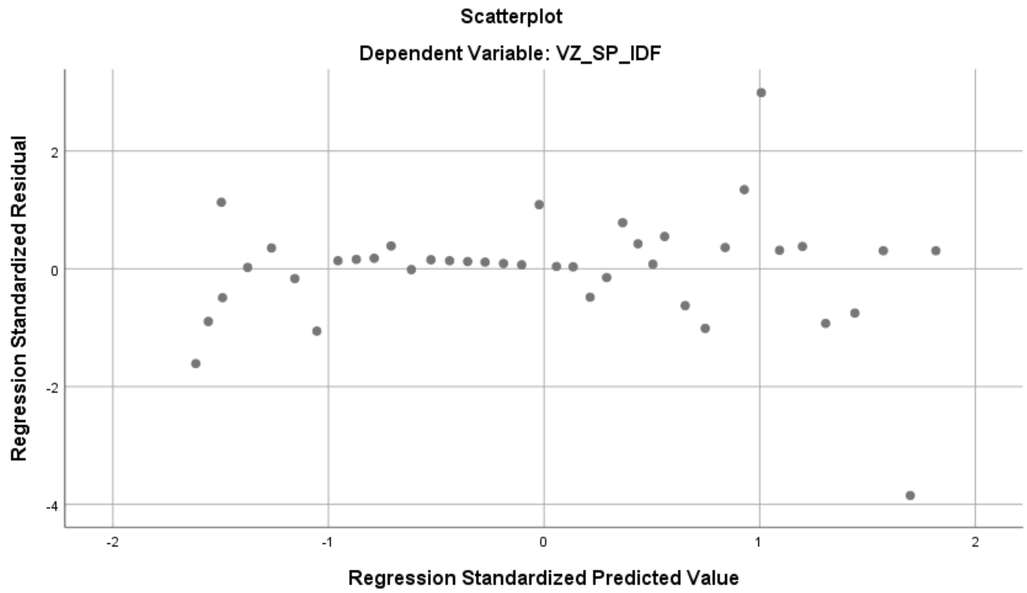


Figure 31. Residual scatterplot - Telecommunication services sector S&P 500

Materials Sector

The simple regression analysis on M2 from the materials sector showed the correlation between NTA and the stock price of M2 was statistically significant (as shown in Table 11, for M2, $b = .005$, $t(41) = 8.579$, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41) = 73.599$, $p < .05$). The regression equation for predicting the stock price is $\hat{Y} = 6.531 + .005*(\text{NTA})$. The R^2, coefficient of determination for this equation is .642 which means NTA can predict 64% of the variance in the stock price of M2. At 95% CI, for the slope to predict stock price from NTA range from .004 to .006; thus, for each one million dollars increase of NTA, the stock price increases between .4 and .6 cents (as shown in Table 11).

Similarly, the simple regression analysis for other corporations M3 and M4 from the material sector showed the correlation between NTA and the stock price were statistically significant (as shown in Table 11, for M3, b = -.033, $t(41)$ = 9.731, p < .05; for M4, B = .023, $t(41)$ = 6.232, p < .05). For corporation M3, the regression equation for predicting the stock price is $\hat{Y}$ = -2.748 -.033*(NTA). The coefficient of determination R^2(41), for the equation is .698 which means NTA can predict about 70% of the variance in the stock price of M3. At 95% CI, for the slope to predict stock price from NTA range from .026 to -.048; thus, for each one million dollars increase of NTA, the stock price may vary between 2.6 cents and -4.8 cents (as shown in Table 11).

For corporation M4, the regression equation for predicting the stock price is $\hat{Y}$ = -.353 +.023*(NTA). The coefficient of determination R^2(41), for the equation is .486 which means NTA can predict about 49% of the variance in the stock price of M4. At 95% confidence interval, for the slope to predict stock price from NTA range from .015 to -.030; thus, for each one million dollars increase of NTA, the stock price changes between 1.5 cents to -3 cents (see Table 11).

However, the regression analysis for corporation M1 from the materials sector showed the correlation between NTA and the stock price of M1 was not statistically significant. As shown in Table 11, for M1, b = .014, $t(40)$ = .167, p = .293; $F(1,40)$ = 1.137, p = .293. For M1, the regression equation for predicting the stock price was $\hat{Y}$ = 69.778 +.014*(NTA) but not a useful model. In this case, the correlation between NTA and the stock price was not statistically significant and failed to reject the null hypothesis (see Table 11). The scatterplot of standardized predicted values and standardized residuals showed the data of corporations from the industry sector is normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 34). In Table 11, I present the test results of hypothesis 1 for four samples that were about 17% of the corporations from the materials sector of the S&P 500.

Table 11

Hypothesis 1 - Test Results: Materials Sector

Corp.	B	*t*	*p*	*F*	*p*	*R*^2	LB	UB
M1	.014	.167	.293	*F*(1,40) = 1.137	.293	.028	-.013	.041
M2	.005	8.579	.001	*F*(1,41) = 73.599	.001	.642	.004	.006
M3	-.033	9.731	.001	*F*(1,41)= 94.701	.001	.698	.026	.040
M4	.023	6.232	.001	*F*(1,41)= 38.841	.001	.486	.015	.030

Note. The test results on hypothesis 1 from the seven corporations from the sector of the S&P 500. The stratified samples are corporations (Corp.) M1, M2, M3 and M4; B means the unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 35). The data also met other assumptions and shows the

absence of outliers (see Figure 37). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

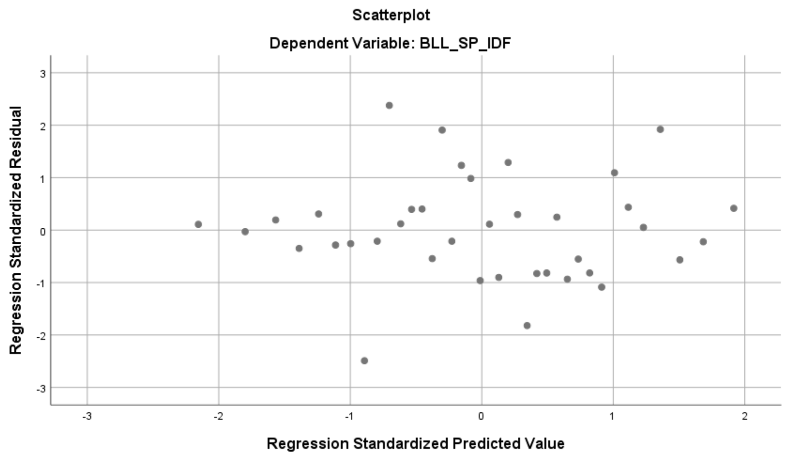


Figure 32. Residual scatterplot - Material sector S&P 500

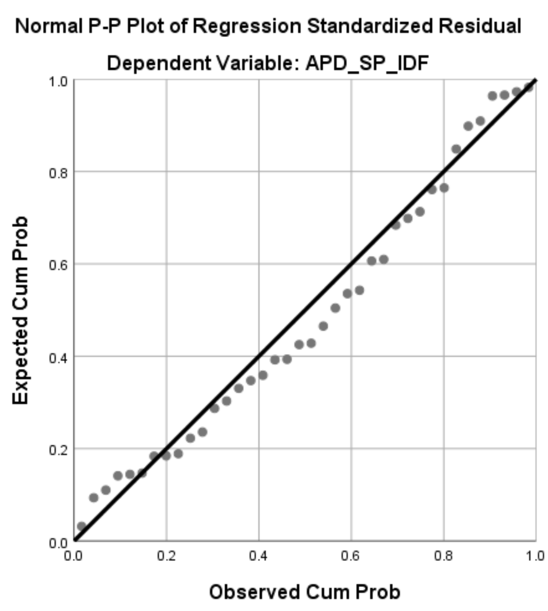


Figure 33. Normal P-P plot - Materials sector S&P 500

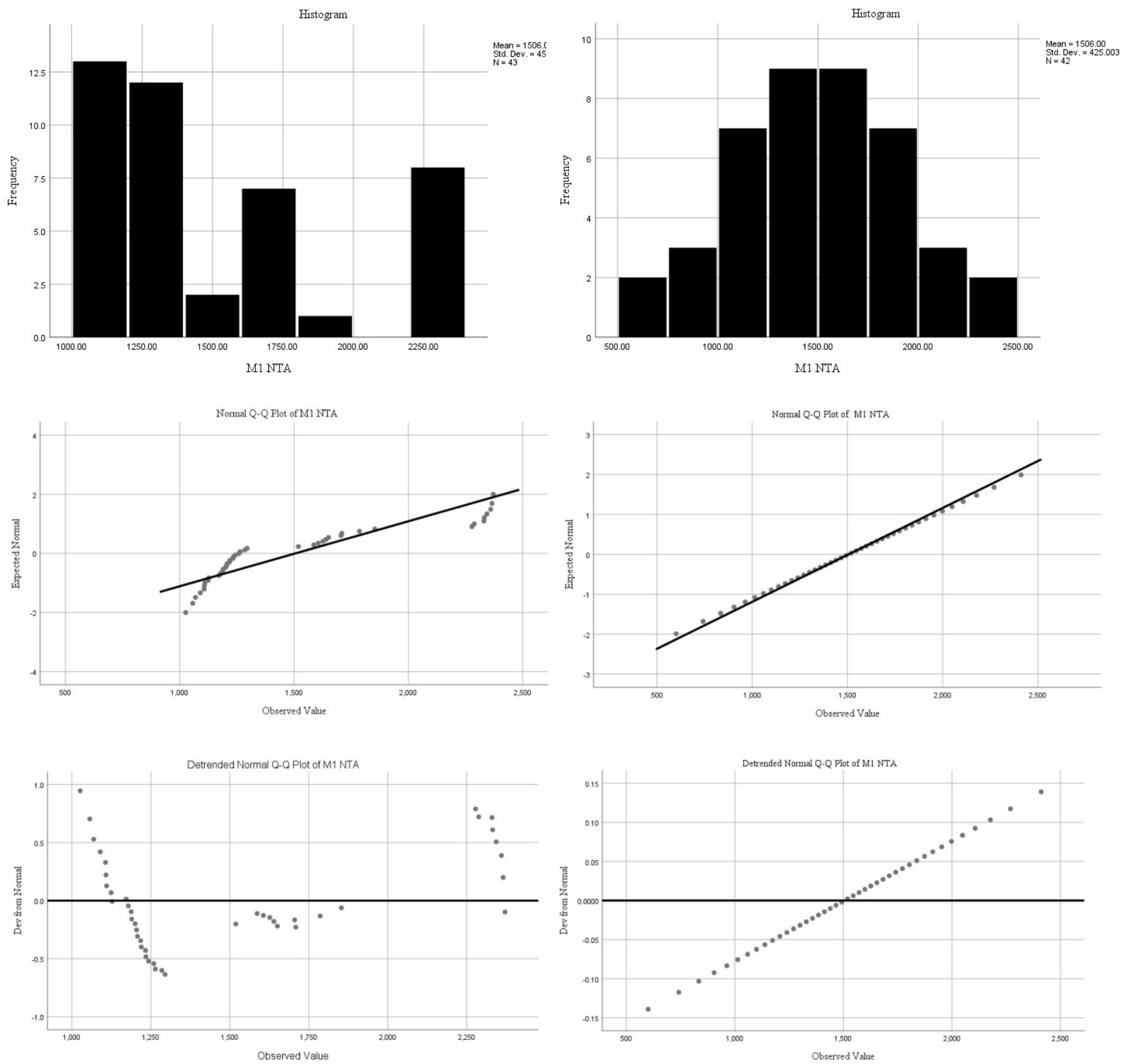


Figure 34. Materials sector - Raw data Vs. Transformed data

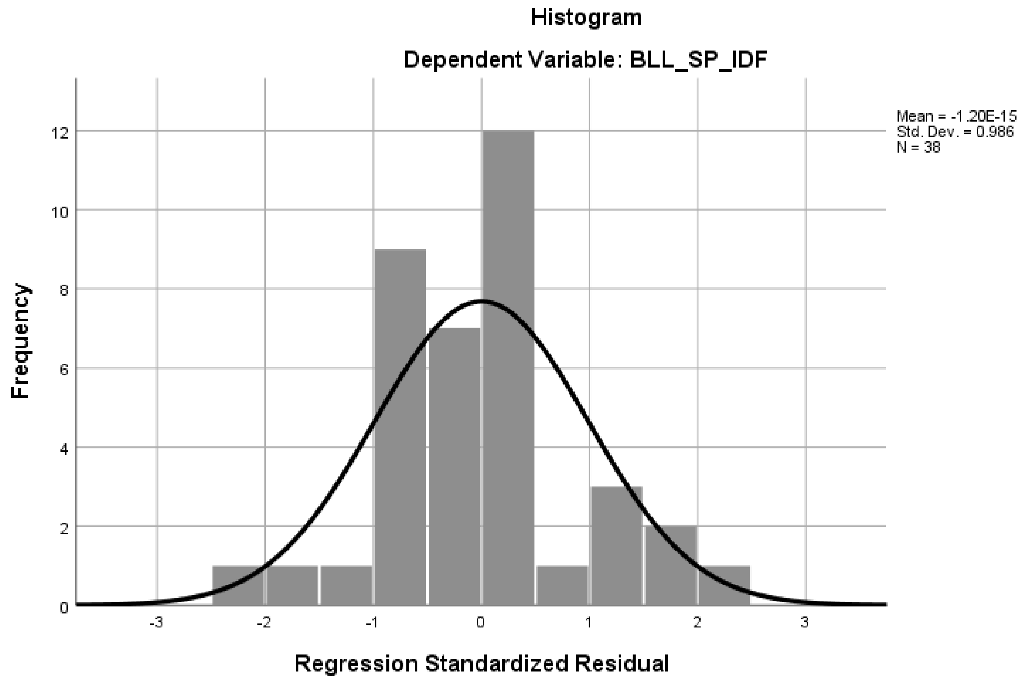


Figure 35. Normality test - Materials sector S&P 500

Healthcare Sector

The simple regression analysis on H1 from the healthcare sector showed the correlation between NTA and the stock price of H1 was statistically significant. As shown in Table 12, for H1, b = .007 t(41) = 6.362, p < .05). An analysis of variance also showed that the correlation was significant (F(1,41) = 40.47, p < .05). The regression equation for predicting the stock price is $\hat{Y}$ = 84.07+.007*(NTA). The R^2, coefficient of determination for this equation is .497 which means NTA can predict about 50% of the variance in the stock price of H1. At 95% CI, for the slope to predict stock price from

NTA range from .005 to .009; thus, for each one million dollars increase of NTA, the stock price increases by about .5 cents to .9 cents (see Table 12).

Similarly, the simple regression analysis for the other corporations H2, H3, and H4 from the information technology sector showed the correlation between the NTA and the stock price were statistically significant (as shown in Table 12, for H2, $b = .005$, $t(42) = 3.19$, $p < .05$; for H3, $b = .001$, $t(41) = 8.189$, $p < .05$; for H4, $b = .008$, $t(41) = 6.739$, $p < .05$). For corporation H2, the regression equation for predicting the stock price is $\hat{Y} = 18.33 +.005*(\text{NTA})$. The coefficient of determination R^2(42) for the equation is .195 which means NTA can predict about 20% of the variance in the stock price of H2. At 95% CI, for the slope to predict the stock price of H2 from NTA range from .002 to .007; thus, for each one million dollars increase of NTA, the stock price increases between .2 cents to .7 cents (as shown in Table 12).

For corporation H3, the regression equation for predicting the stock price is $\hat{Y} = 7.37 + .001*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .621 which means NTA can predict about 62% of the variance in the stock price of H3. At 95% CI, for the slope to predict the stock price of H3 from NTA range from .001 to .002; thus, for each one million dollars increase of NTA, the stock price increases between .1 cent to .2 cents (see Table 12).

For corporation H4, the regression equation for predicting the stock price is $\hat{Y} = 4.45 + .008*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .526

which means NTA can predict about 53% of the variance in the stock price of H4. At 95% CI, for the slope to predict the stock price of H4 from NTA range from .006 to .01; thus, for each one million dollars increase of NTA, the stock price increases between .6 cents to one cent (see Table 12).

However, the regression analysis for corporation H5 from the healthcare sector showed the correlation between NTA and the stock price of H5 was not statistically significant. As shown in Table 12, for H5, b = .001, $t(41)$ = 2.01, p = .051; $F(1,41)$ = 4.055, p = .051. For H5, the regression equation for predicting the stock price was $\hat{Y}$ = 11.9 + .001*(NTA) but not a useful model. In this case, the correlation between NTA and the stock price was not statistically significant and failed to reject the null hypothesis. The scatterplot of standardized predicted values and standardized residuals showed the data of corporations from the industry sector was normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 36).

Similarly, the regression analysis for corporation H6 from the healthcare sector showed the correlation between NTA and their stock prices was not statistically significant. As shown in Table 12, for H6, b = -8.623E-5, $t(41)$ = -.519, p = .607; $F(1,41)$= .269, p = .607. The regression equation for predicting the stock price of H6 was $\hat{Y}$ = 43.97 =8.623E-5*(NTA), but this model was not useful. In this case, the correlation between NTA and the stock price was not statistically significant and failed to reject the null hypothesis. The scatterplot of standardized predicted values and standardized residuals showed the data of H6 was normally distributed and met other assumptions of linearity, independence, normality, and homoscedasticity (see Figure 36). In Table 12, I present the test results of hypothesis 1 for six samples that were about 10% of the corporations from the healthcare sector of the S&P 500.

Table 12

Hypothesis 1 - Test Results: Healthcare Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2	*LB*	UB
H1	.007	6.362	.001	*F*(1,41)= 40.470	.001	.497	.005	.009
H2	.005	3.190	.003	*F*(1,42) = 10.178	.003	.195	.002	.007
H3	.001	8.189	.001	*F*(1,41)= 67.063	.001	.621	.001	.002
H4	.008	6.739	.001	*F*(1,41)= 45.412	.001	.526	.006	.010
H5	.001	2.014	.051	*F*(1,41) = 4.055	.051	.090	.001	.001
H6	-8.623E-5	-.519	.607	*F*(1,41)= .269	.607	.007	.001	.001

Note. The test results on hypothesis 1 from the seven corporations from the sector of the S&P 500. The stratified samples are corporations (Corp.) M1, M2, M3 and M4; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 36). The data also met other assumptions and shows the

absence of outliers (see Figure 39). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

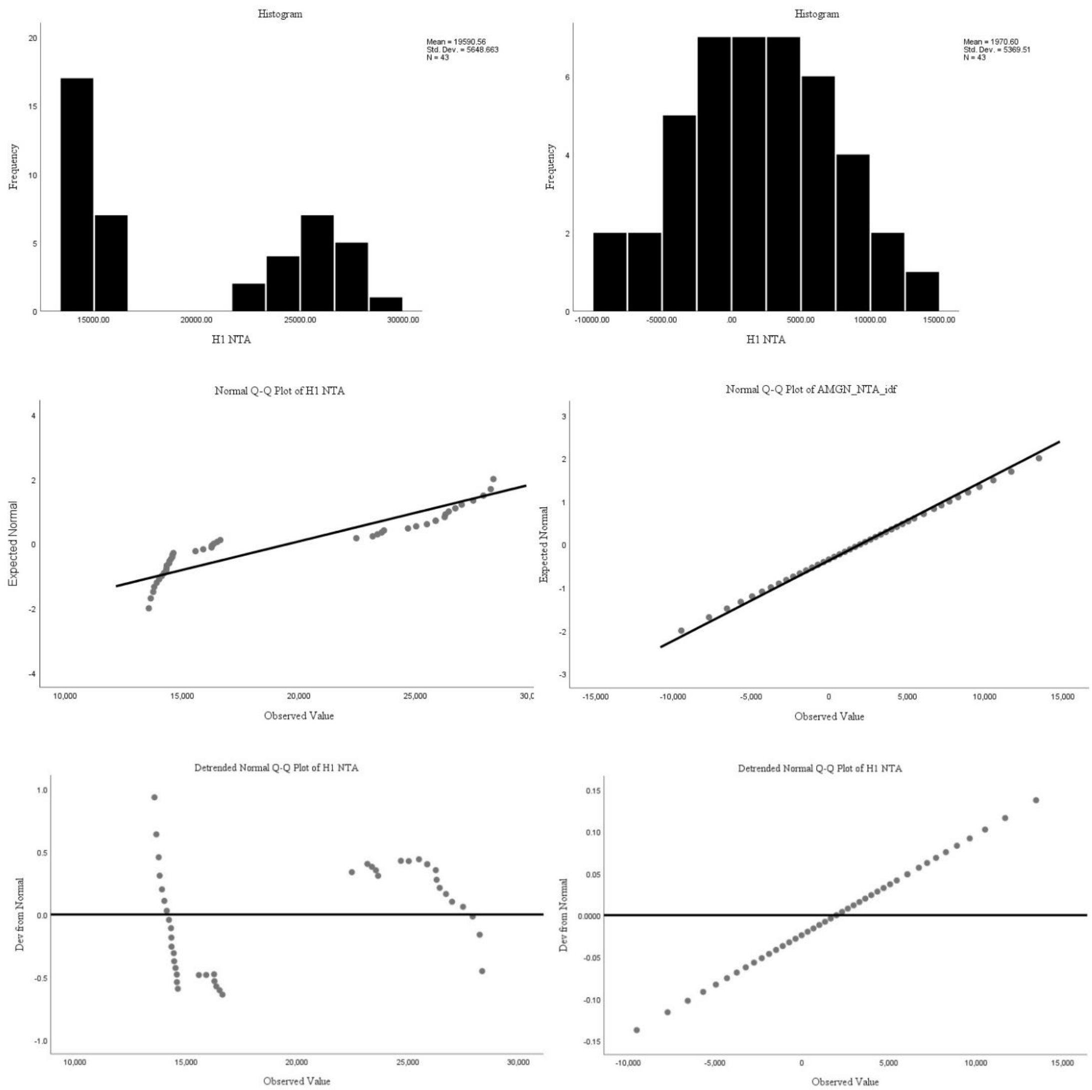


Figure 36. Healthcare sector - Raw data Vs. Transformed data

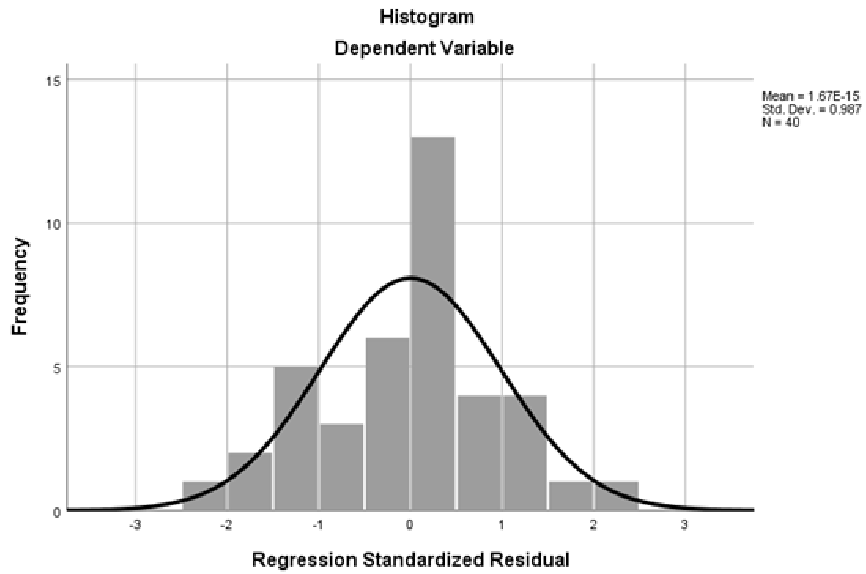


Figure 37. Normality test H1 – Healthcare sector S&P 500

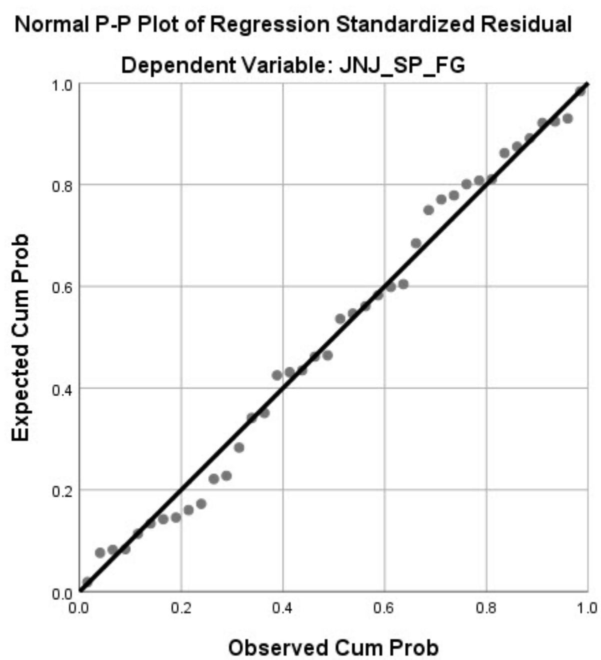


Figure 38. Normal P-P plot - Healthcare sector S&P 500

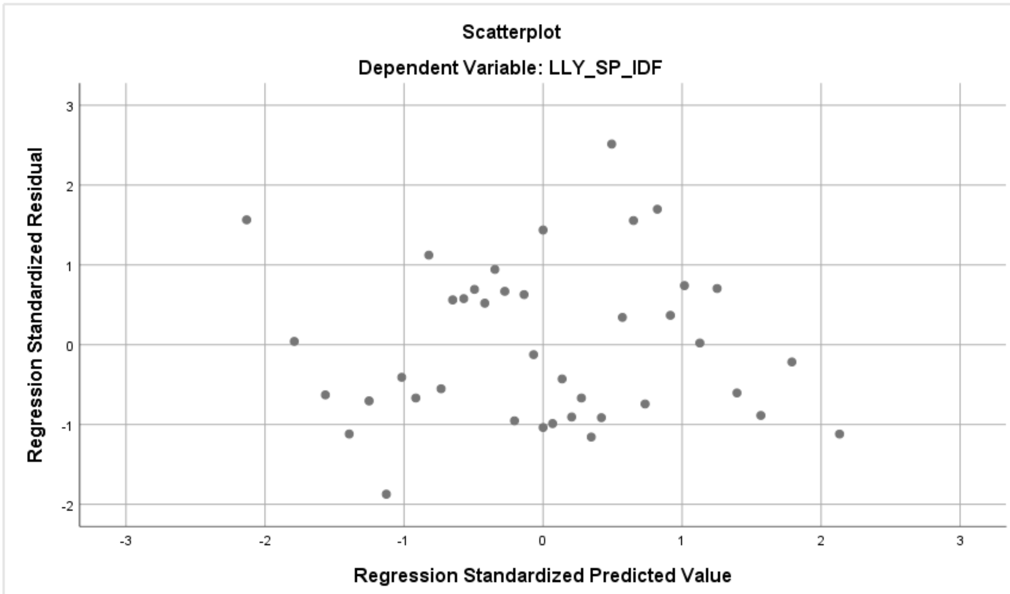


Figure 39. Residual scatterplot - Healthcare sector S&P 500

Financial Sector

The simple regression analysis on F1 from the financial sector showed the relationship between NTA and the stock price was positive and linear; did not reveal any outliers. The correlation between NTA and the stock price of F1 was statistically significant (as shown in Table 13, for F1, b = .001, $t(41)$ = -2.173, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41)$ = 4.724, $p < .05$). The regression equation for predicting the stock price is $\hat{Y}$ = 39.59+ .001*(NTA). The R^2, coefficient of determination for this equation is .103. That means NTA can predict about 10% of the variance in the stock price of F1. At 95% confidence interval, for the slope to predict stock price from NTA range from -.001 to .000; thus, for each one million dollars increase of NTA, the stock price decreases by one-tenth of a cent (see Table 13).

Similarly, the simple regression analysis for other corporations F2 and F3 from the financial sector showed the correlation between NTA and their respective stock prices were statistically significant (as shown in Table 13, for F2, $b = -.035$, $t(42) = -3.618$, $p < .05$; for F3, $b = -.701$, $t(42) = -6.378$, $p < .05$. For corporation F2, the regression equation for predicting the stock price is $\hat{Y} = 54.20 - .035*(\text{NTA})$. The coefficient of determination, R^2(41) for the equation is .238 which means NTA can predict about 24% of the variance in the stock price of F2. At 95% CI, for the slope to predict stock price of F2 from NTA range from -.055 to -.016; thus, for each one million dollars increase of NTA, the stock price decreases between 5.5 cents to 1.6 cents (as shown in Table 13).

For corporation F3, the regression equation for predicting the stock price is $\hat{Y} = 268.41 - .004*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .492 which means NTA can predict about 49% of the variance in the stock price of F3. At 95% CI, for the slope to predict stock price from NTA range from -.005 to -.002; thus, for each one million dollars increase of NTA, the stock price decreases by .5 to .2 cents (see Table 13).

Similarly, the simple regression analysis for other corporations F4 and F6 from the financial sector showed the correlation between NTA and their respective stock prices were statistically significant (as shown in Table 13, for F4, $b = -.028$, $t(42) = -4.425$, $p <$

.05; for F6, $b = 3.38$, $t(41) = 2.297$, $p < .05$). For corporation F4, the regression equation for predicting the stock price is $\hat{Y} = 64.066 - .028*(\text{NTA})$. The coefficient of determination R^2(42), for the equation is .323 which means NTA can predict about 32% of the variance in the stock price of F4. At 95% CI, for the slope to predict the stock price of F4 from NTA range from -.041 to -.015; thus, for each one million dollars increase of NTA, the stock price decreases by about 1.5 cents to 4 cents (see Table 13).

For corporation F6, the regression equation for predicting the stock price is $\hat{Y}$ = -13.26 .009*(NTA). The coefficient of determination R^2(41) for the equation is .114 which means NTA can predict about 11% of the variance in the stock price of F6. At 95% CI, for the slope to predict stock price from NTA range from .001 to .017; thus, for each one million dollars increase of NTA, the stock price of F6 increases by about .1 cent to 1.7 cents (see Table 13).

However, the regression analysis for corporation F5 and F7 from the financial sector showed the correlation between NTA and their stock prices were not statistically significant. As shown in Table 13, for F5, $b = -.003$, $t(41) = -1.26$, $p = .215$; $F(1,41) = 1.585$, $p = .215$; for F7, $b = .139$, $t(41) = .001$, $p = .373$; $F(1,41) = .813$, $p = .373$. The regression equation for predicting the stock price of F5 was $\hat{Y} = 43.956 - .003*(\text{NTA})$, and for F7, the regression equation was $\hat{Y} = 27.41 + .001*(\text{NTA})$, but these models were not useful. In these cases, the correlation between NTA and their respective stock prices were not statistically significant and failed to reject the null hypothesis. The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the financial sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 40). In Table 13, I present the hypothesis 1 test results of seven samples from the financial sector of the S&P 500 (see Table 13).

Table 13

Hypothesis 1 - Test Results: Financial Sector

Corp.	*B*	*t*	*p*	*F(*n1,n2)	*p*	*R*^2	*LB*	*UB*
F1	.001	-2.173	.036	*F*(1,41)= 4.724	.036	.103	.001	.000
F2	-.035	-3.618	.001	*F*(1,42) = 13.092	.001	.238	-.055	-.016
F3	-.004	-6.378	.001	*F*(1,42) = 40.680	.001	.492	-.005	-.002
F4	-.028	-4.425	.001	*F*(1,41) = 19.578	.001	.323	-.041	-.015
F5	-.003	-1.260	.215	*F*(1,41) = 1.585	.215	.037	-.007	.002
F6	.009	2.297	.027	*F*(1,41)= 5.276	.027	.114	.001	.017
F7	.001	.901	.373	*F*(1,41)= .813	.373	.019	.001	.002

Note. The test results on hypothesis 1 from the seven corporations from the financial sector of the S&P 500. The stratified samples are corporations (Corp.) F1 through F7; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 41). The data also met other assumptions and shows the absence of outliers (see Figure 40). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

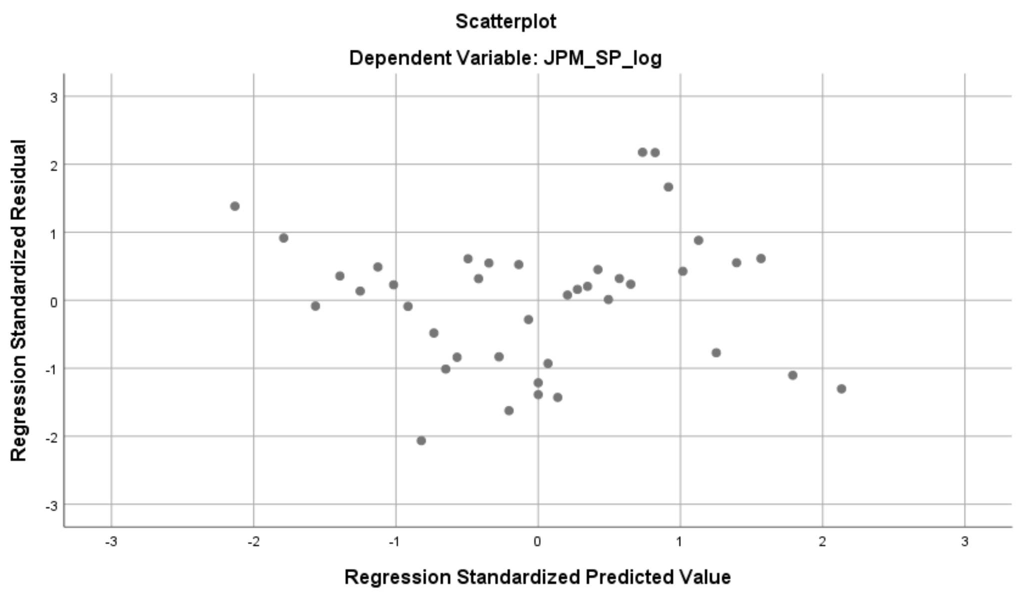


Figure 40. Residual scatterplot - Financial sector S&P 500

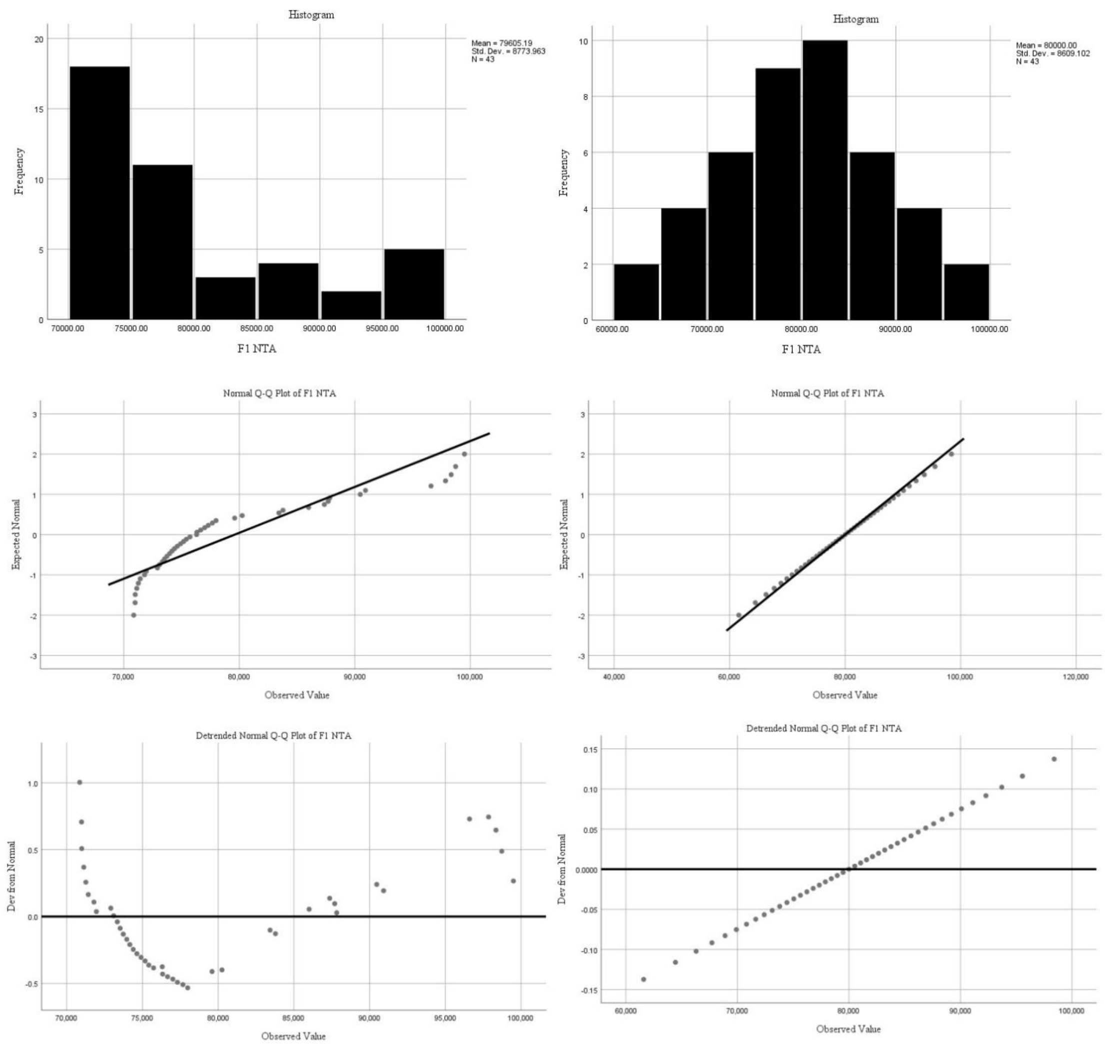


Figure 41. Financial sector - Raw data Vs. Transformed data

Real Estate Sector

To examine how well NTA could predict the stock price of corporation R1 from the real estate sector of the S&P 500, I conducted a simple regression analysis. A scatterplot showed that the relationship between NTA and the stock price was positive and linear and did not reveal any outliers. The correlation between NTA and the stock price of R1 was statistically significant (as shown in Table 14, for R1, $b = .007$ $t(41) = 20.927$, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41) = 437.93$, $p < .05$). The regression equation for predicting the stock price is $\hat{Y} = 11.54 + .007*(\text{NTA})$. The R^2, coefficient of determination for this equation is .914 which means NTA can predict 91% of the variance in the stock price of R1. At 95% CI, for the slope to predict stock price from NTA range from .006 to .007; thus, for each one million dollars increase of NTA, the stock price increases by about .6 cents to .7 cents (see Table 14).

Similarly, the simple regression analysis for other corporations R2, and R3 from the real estate sector showed the correlation between NTA and the stock price were statistically significant (as shown in Table 14, for R2, $b = .006$, $t(41) = 12.527$, $p < .05$; for R3, $b = -.873$, $t(41) = -10.721$, $p < .05$). For corporation R2, the regression equation for predicting the stock price is $\hat{Y} = 75.858 +.006*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .793 which means NTA can predict about 79% of the variance in the stock price of R2. At 95% CI, for the slope to predict stock price from NTA range from .005 to .007; thus, for each one million dollars increase of NTA, the stock price increases by about .5 cents to .7 cents (as shown in Table 14). For corporation R3, the regression equation for predicting the stock price is $\hat{Y} = 111.7 - .017*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .761 which means NTA can predict about 76% of the variance in the stock price of R3. At 95% CI, for the slope to predict stock price from NTA range from -.020 to -.013; thus, for each one million dollars increase of NTA, the stock price of R3 decreases by about 1.3 cents to 2 cents (see Table 14). In Table 14, I present the test results of hypothesis 1 for three samples that was about 10% of the corporations from the real estate sector of the S&P 500.

Table 14

Hypothesis 1 - Test Results: Real Estate Sector

Corp.	*B*	*t*(42)	*p*	*F*(42)	*p*	*R*^2	*LB*	*UB*
R1	.007	20.927	.001	*F*(1,41)= 437.927	.001	.914	.006	.007
R2	.006	12.527	.001	*F*(1,41) = 156.922	.001	.793	.005	.007
R3	-.017	-10.721	.001	*F*(1,36) = 114.931	.001	.761	-.020	-.013

Note. The test results on hypothesis 1 from the seven corporations from the real estate sector of the S&P 500. The stratified samples are corporations (Corp.) R1, R2, and R3; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 42). The data also met other assumptions and shows the absence of outliers (see Figure 45). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

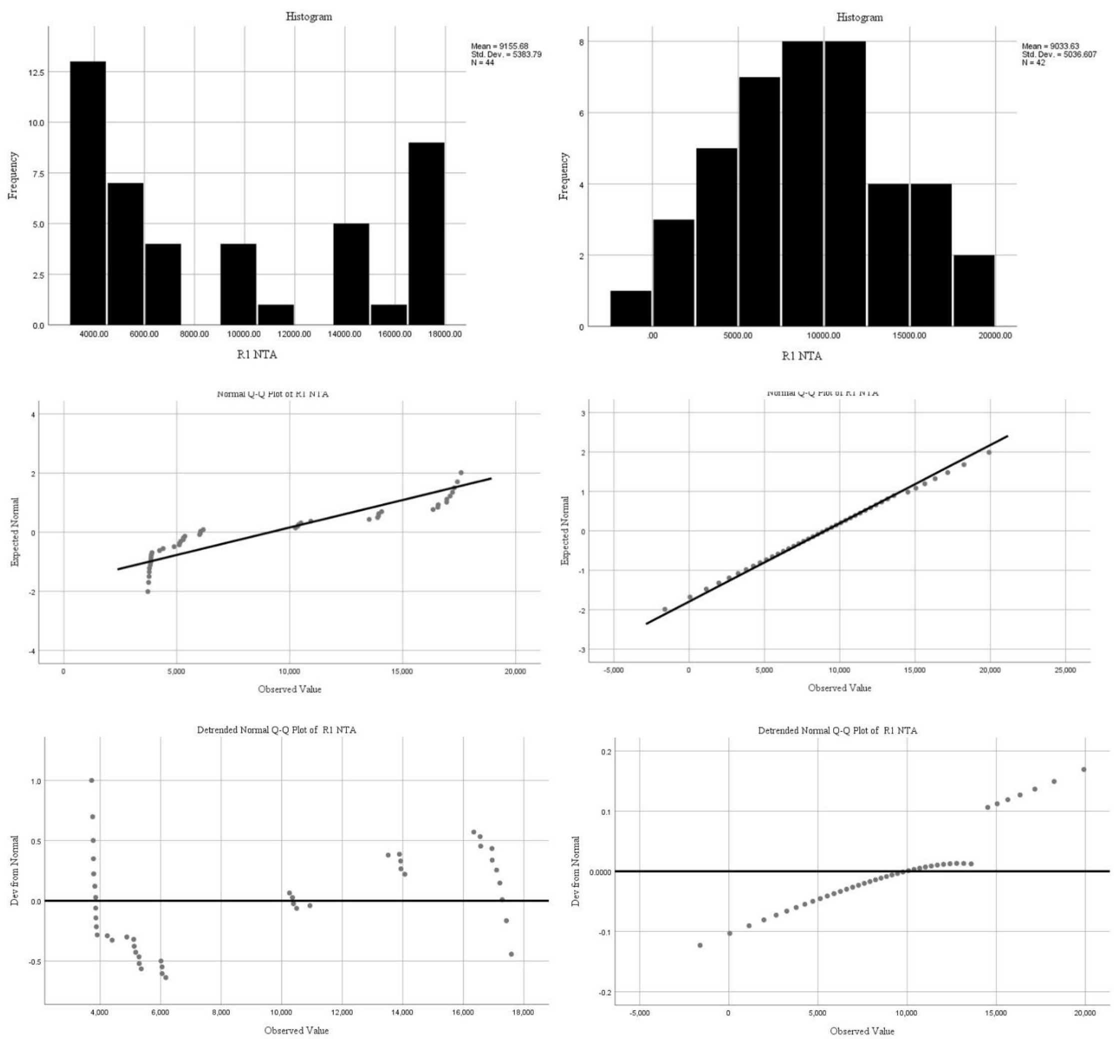


Figure 42. Real Estate sector - Raw data Vs. Transformed data

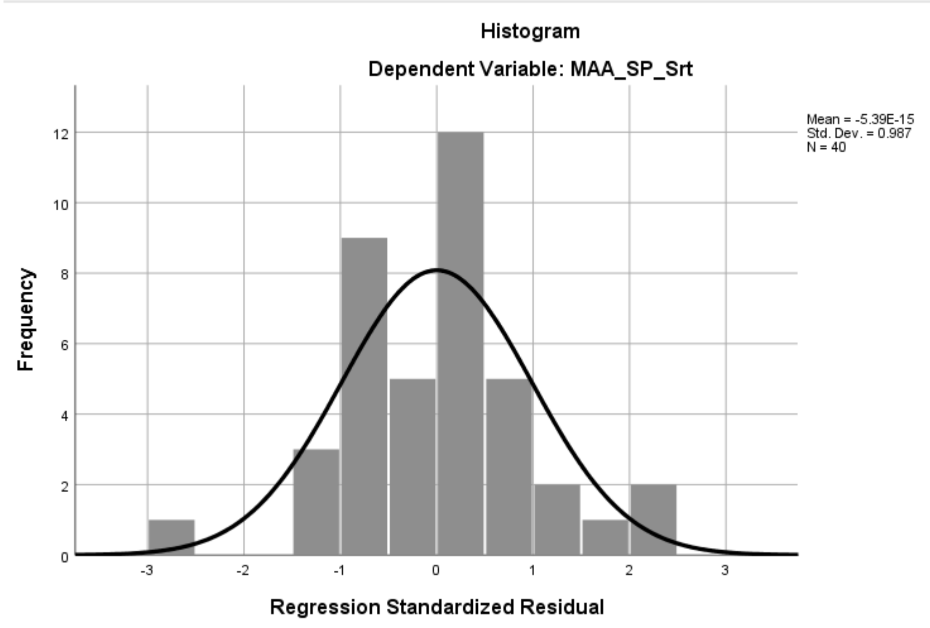


Figure 43. Normality test - Real estate sector S&P 500

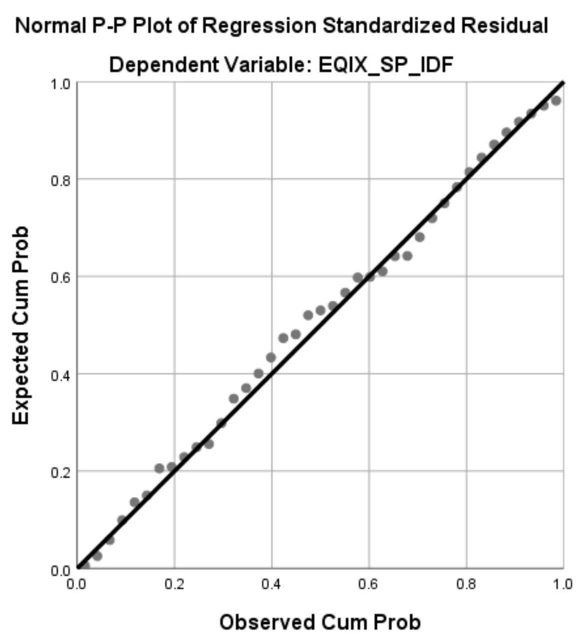


Figure 44. Normal P-P plot - Real estate sector S&P 500

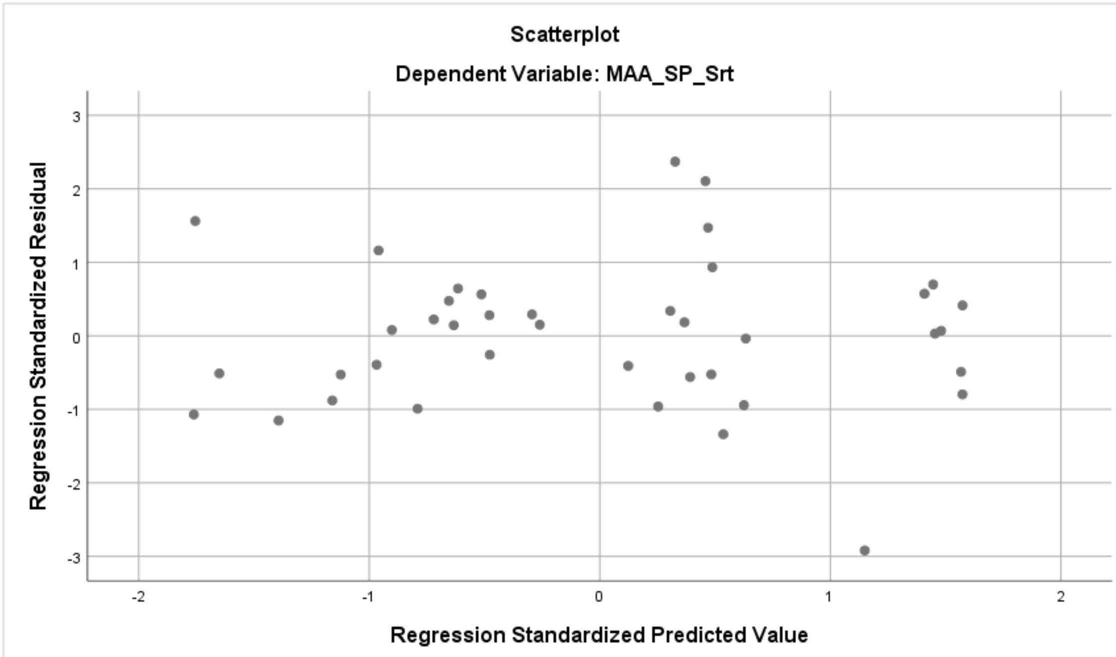


Figure 45. Residual scatterplot - Real estate sector S&P 500

Consumer Discretionary Sector

To examine how well NTA could predict the stock price of corporation CD1 from the consumer discretionary sector of the S&P 500, I run a simple regression. A scatterplot showed that the relationship between NTA and the stock price was positive and linear and did not reveal any outliers. The correlation between NTA and the stock price of CD1 was statistically significant (as shown in Table 15, for CD1, b = -.081, $t(41)$ = -2.357, p < .05). An analysis of variance also showed that the correlation was significant ($F(1,41)$ = 5.554, p < .05). The regression equation for predicting the stock price is $\hat{Y}$ = 107.68 - .08*(NTA). The R^2, coefficient of determination for this equation is .781 which means

NTA can predict 78% of the variance in the stock price of R1 is predictable. At 95% CI, for the slope to predict stock price from NTA range from .079 to .110; thus, for each one million dollars increase of NTA, the stock price of R1 increases by about 8 cents to 11 cents (see Table 15).

Similarly, the simple regression analysis for other three corporations CD2, CD3, and CD4 from the consumer discretionary sector also showed the correlation between NTA and the stock price were statistically significant (as shown in Table 15, for CD2, b = -.009, $t(41)$ = -2.76, p < .05; for CD3, b = - .004, $t(41)$ = -10.95, p < .05; for CD4, b = .87, $t(41)$ = 11.07, p < .05). For corporation CD2, the regression equation for predicting the stock price is $\hat{Y}$ = 43.938 - .009*(NTA). The coefficient of determination R^2(41) for the equation is .156 which means NTA can predict about 16% of the variance in the stock price of CD2. At 95% CI, for the slope to predict stock price from NTA range from -.015 to -.002; thus, for each one million dollars increase of NTA, the stock price of CD2 decreases by about .2 cents to 1.5 cents (as shown in Table 15).

For corporation CD3, the regression equation for predicting the stock price is $\hat{Y}$ = 89.65 - .004*(NTA). The coefficient of determination R^2(41), for the equation is .745 which means NTA could explain about 75% of the variance in the stock price of CD3. At 95% CI, for the slope to predict stock price from NTA range from -.004 to .002; thus, for each one million dollars increase of NTA, the stock price changes by .2 cents increment or .4 cents decrement (see Table 15). For corporation CD4, the regression equation for predicting the stock price is $\hat{Y}$ = -154.58 +.007*(NTA). The coefficient of determination R^2(41), for the equation is .749 which means NTA can predict about 75% of the variance in the stock price of CD4. At 95% CI, for the slope to predict stock price from NTA range from .006 to .008; thus, for each one million dollars increase of NTA, the stock price of CD4 increases by about .6 cents to .8 cents (see Table 15).

Similarly, the simple regression analysis for other corporations CD5, CD6, and CD7 from the consumer discretionary sector showed the correlation between NTA and the stock price were statistically significant (as shown in Table 15, for CD5, b = .104, $t(41) = 8.99$, $p < .05$; for CD6, b = -.083, $t(41) = -6.898$, $p < .05$; for CD7, b = .074, $t(41) = 7.467$, $p < .05$). For corporation CD5, the regression equation for predicting the stock price is $\hat{Y}$ = -79.92 +.104*(NTA). The coefficient of determination R^2(41) for the equation is .669 which means NTA could explain about 67% of the variance in the stock price of CD5. At 95% CI, for the slope to predict stock price from NTA range from .081 to .127; thus, for each one million dollars increase of NTA, the stock price increases by about 8 cents to 13 cents (as shown in Table 15). For corporation CD6, the regression equation for predicting the stock price is $\hat{Y}$ = 83.793 - .083*(NTA). The coefficient of determination R^2(41) for the equation is .543 which means NTA could explain about 54% of the variance in the stock price of CD6. At 95% confidence interval, for the slope to predict stock price from NTA range from -.108 to -.059; thus, for each one million dollars increase of NTA, the stock price decreases by about 6 cents to 11 cents (see Table 15).

For corporation CD7, the regression equation for predicting the stock price is $\hat{Y}$ = -228.026 +.074*(NTA). The coefficient of determination *R*^2(41), for the equation is .570 which means NTA could explain 57% of the variance in the stock price of CD7. At 95% confidence interval, for the slope to predict stock price from NTA range from -.218 to .018; thus, for each one million dollars increase of NTA, the stock price varies by about 2 cents increment and 21 cents decrement (see Table 15).

However, the regression analysis for corporation CD8 from the consumer discretionary sector showed the correlation between NTA and the stock price of CD8 was not statistically significant. As shown in Table 15, for CD8, b = -.019, $t(41)$ = .176, p = .771; $F(1,41)$ = .086, p = .771. For CD8, the regression equation for predicting the stock price was $\hat{Y}$ = 129.006 -.019*(NTA) but that was not a useful model. In this case, there was no significant correlation between NTA and the stock price and failed to reject the null hypothesis. The scatterplot of standardized predicted values and standardized residuals showed the data of corporations from the consumer discretionary sector was normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 49). In Table 15, I presented the test results of hypothesis 1 for eight samples that was 10% of the corporations from the consumer discretionary sector of the S&P 500.

Table 15

Hypothesis 1 - Test Results: Consumer Discretionary Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2	LB	UB
CD1	.095	12.103	.001	*F*(1,41)= 146.474	.001	.781	.079	.110
CD2	-.009	-2.757	.009	*F*(1,41)= 7.602	.009	.156	-.015	-.002
CD3	-.004	-10.947	.001	*F*(1,41)= 119.843	.001	.745	-.004	.002
CD4	.007	11.067	.001	*F*(1,41)= 122.481	.001	.749	.006	.008
CD5	.104	8.99	.001	*F*(1,41) = 80.843	.001	.669	.081	.127
CD6	-.083	-6.898	.001	*F*(1,40)= 47.577	.001	.543	-.108	-.059
CD7	.074	7.467	.001	*F*(1,42) = 55.751	.001	.570	.054	.094
CD8	-.019	.176	.771	*F*(1,41) = .086	.771	.771	-.151	.113

Note. The test results on hypothesis 1 from the seven corporations from the consumer discretionary sector of the S&P 500. The stratified samples are corporations (Corp.) CD1 *through* CD8; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 49). The data also met other assumptions and shows the absence of outliers (see Figure 46). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

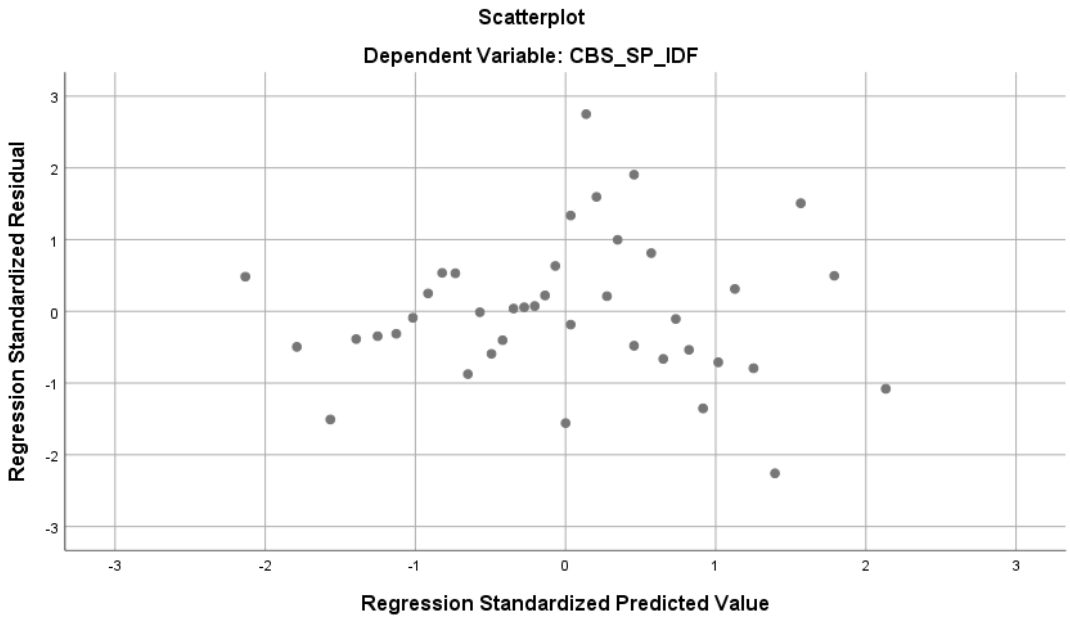


Figure 46. Residual scatterplot - Consumer discretionary sector S&P 500

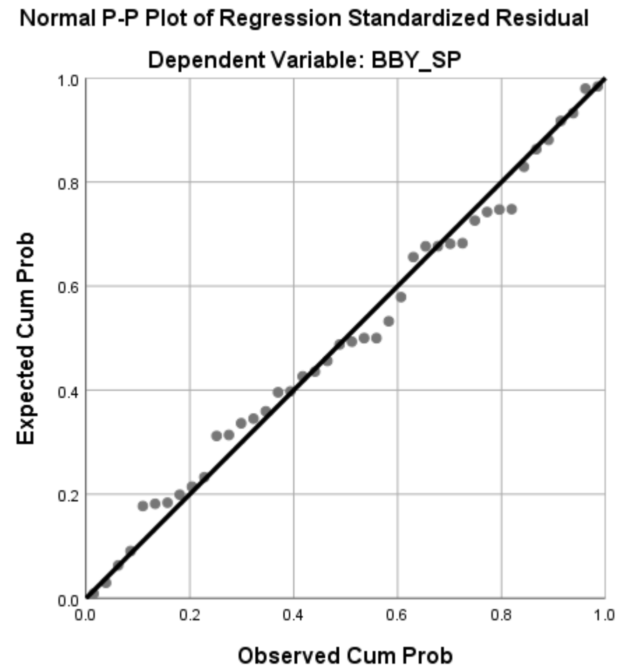


Figure 47. Normal P-P plot - Consumer discretionary sector S&P 500

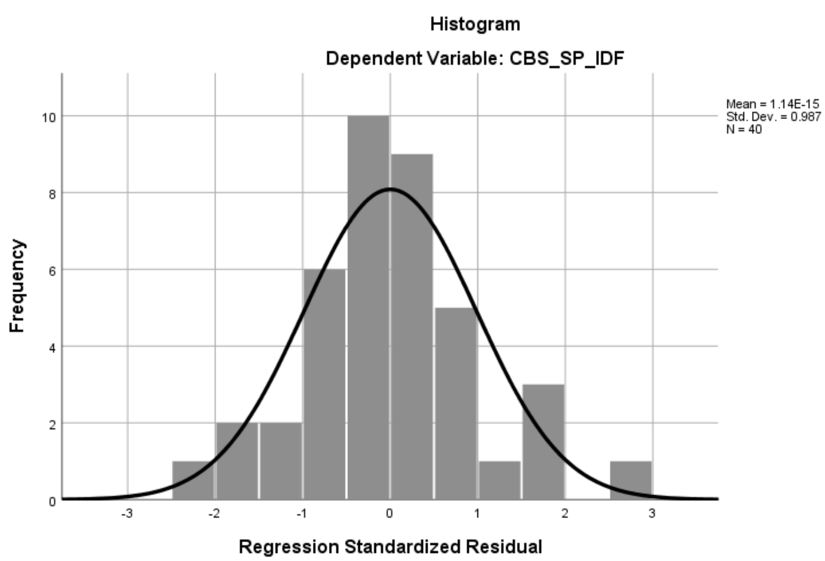


Figure 48. Normality test - Consumer discretionary sector S&P 500

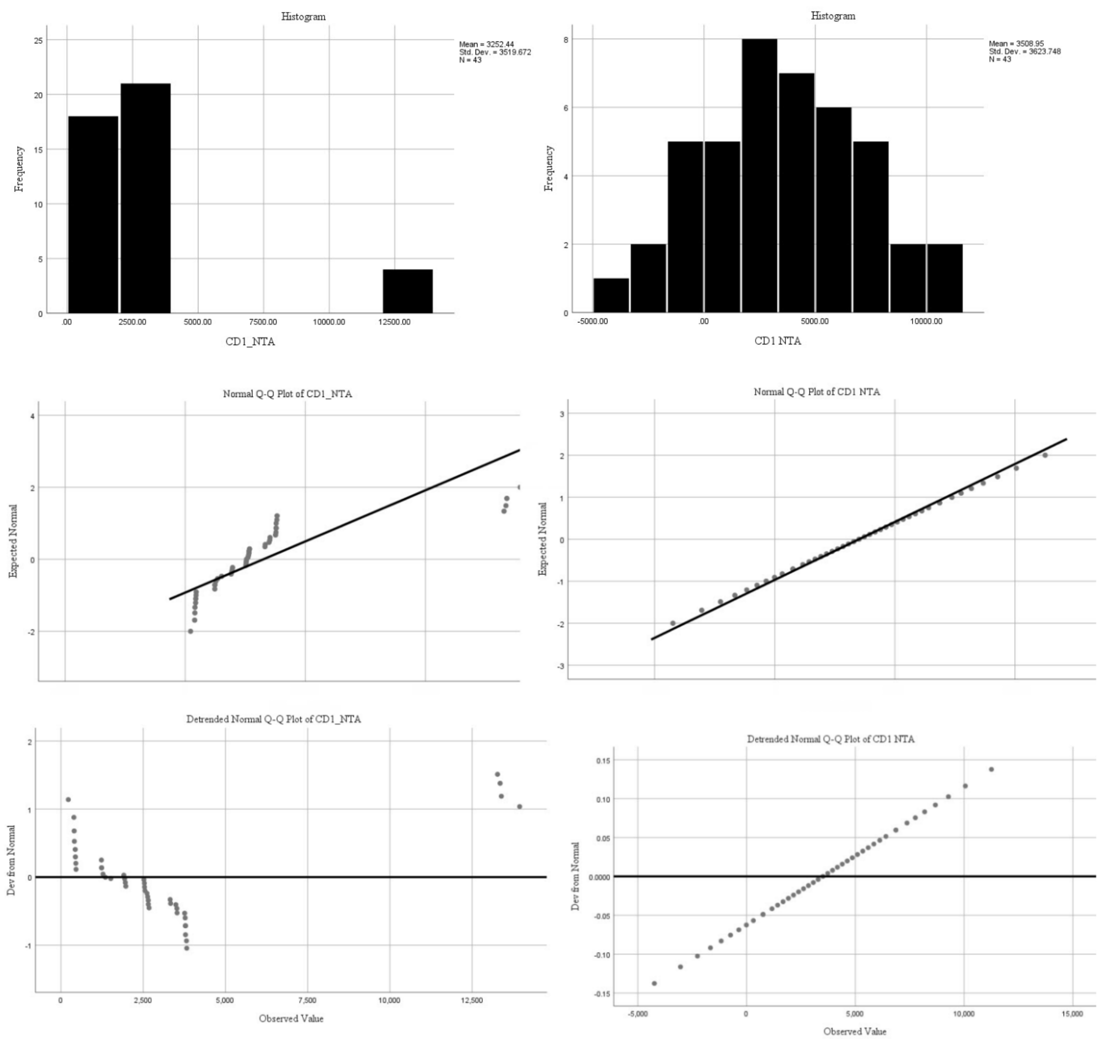


Figure 49. Consumer discretionary sector - Raw data Vs. Transformed data

Consumer Staples Sector

The simple regression analysis on CS1 from the consumer staples sector showed the correlation between NTA and the stock price of CS1 was statistically significant (as shown in Table 16, for CS1, $b = .047$, $t(41) = 8.028$, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41) = 64.445$, $p < .05$). The regression equation for predicting the stock price is $\hat{Y} = 20.275 + .047*(\text{NTA})$. The R^2, coefficient of determination for this equation is .611 which means NTA could explain about 61% of the variance in the stock price of CS1. At 95% CI, for the slope to predict stock price from NTA range from .035 to .059; thus, for each one million dollars increase of NTA, the stock price increases by about 3.5 cents to 6 cents (see Table 16).

Similarly, the simple regression analysis for other corporations CS2, CS3, and CS4 from the consumer staples sector showed the correlation between NTA and the stock price were statistically significant (as shown in Table 16, for CS2, $b = .001$, $t(41) = 2.602$, $p < .05$; for CS3, $b = -.001$, $t(41) = -8.218$, $p < .05$; for CS4, $b = .003$, $t(41) = 2.963$, $p < .05$). For corporation CS2, the regression equation for predicting the stock price is $\hat{Y} = 20.05 + .001*(\text{NTA})$. The coefficient of determination R^2(41), for the equation is .142 which means NTA could explain about 14% of the variance in the stock price of CS2. At 95% CI, for the slope to predict stock price from NTA range from .00 to .001; thus, for each one million dollars increase of NTA, the stock price increases by about one-tenth of a cent (as shown in Table 16).

For corporation CS3, the regression equation for predicting the stock price is $\hat{Y} = 175.534 -.001*(\text{NTA})$. The coefficient of determination R^2(41) for the equation is .622 which means about 62% of the variance in the stock price of CS3 is predictable from the NTA. At 95% CI, for the slope to predict stock price from NTA range from -.002 to -

.001; thus, for each one million dollars increase of NTA, the stock price decreases by about .2 cents and .1 cent (see Table 16). For corporation CS4, the regression equation for predicting the stock price is $\hat{Y}$ = 9.558 +.003*(NTA). The coefficient of determination *R*^2(41), for the equation is .176 which means NTA could explain about 18% of the variance in the stock price of CS4. At 95% CI, for the slope to predict stock price from NTA range from .001 to .005; thus, for each one million dollars increase of NTA, the stock price increases by about .1 cent to .5 cents (see Table 16). In Table 16, I present the test results of hypothesis 1 for four samples that was about 12% of the corporations from the consumer staples sector of the S&P 500.

Table 16

Hypothesis 1 - Test Results: Consumer Staples Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2	LB	UB
CS1	.047	8.028	.001	*F*(1,41) = 64.445	.001	.611	.035	.059
CS2	.001	2.602	.013	*F*(1,41) = 6.771	.013	.142	.000	.001
CS3	-.001	-8.218	.001	*F*(1,41) = 67.535	.001	.622	-.002	-.001
CS4	.003	2.963	.005	*F*(1,41) = 8.777	.005	.176	.001	.005

Note. The test results on hypothesis 1 from the seven corporations from the consumer discretionary sector of the S&P 500. The stratified samples are corporations (Corp.) CD1 *through* CD8; B = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression, *LB* is the lower bound, and *UB* is the upper bound at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 51). The data also met other assumptions and shows the absence of outliers (see Figure 51). With the transformed data that met all the parametric assumptions, I run the regression to test hypothesis 1.

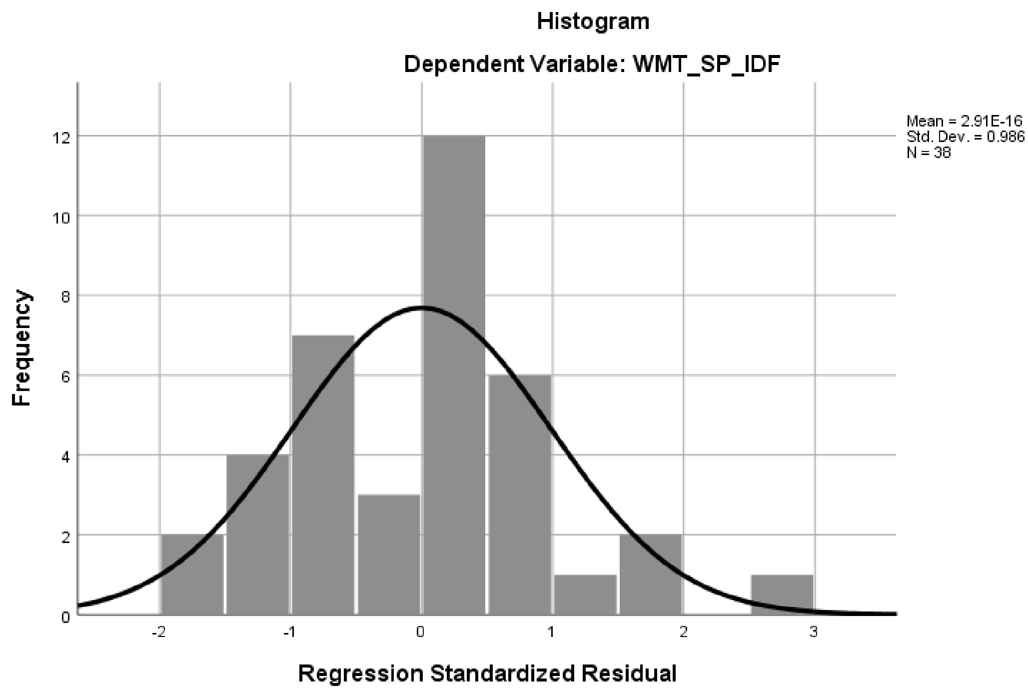


Figure 50. Normality test - Consumer staples sector S&P 500

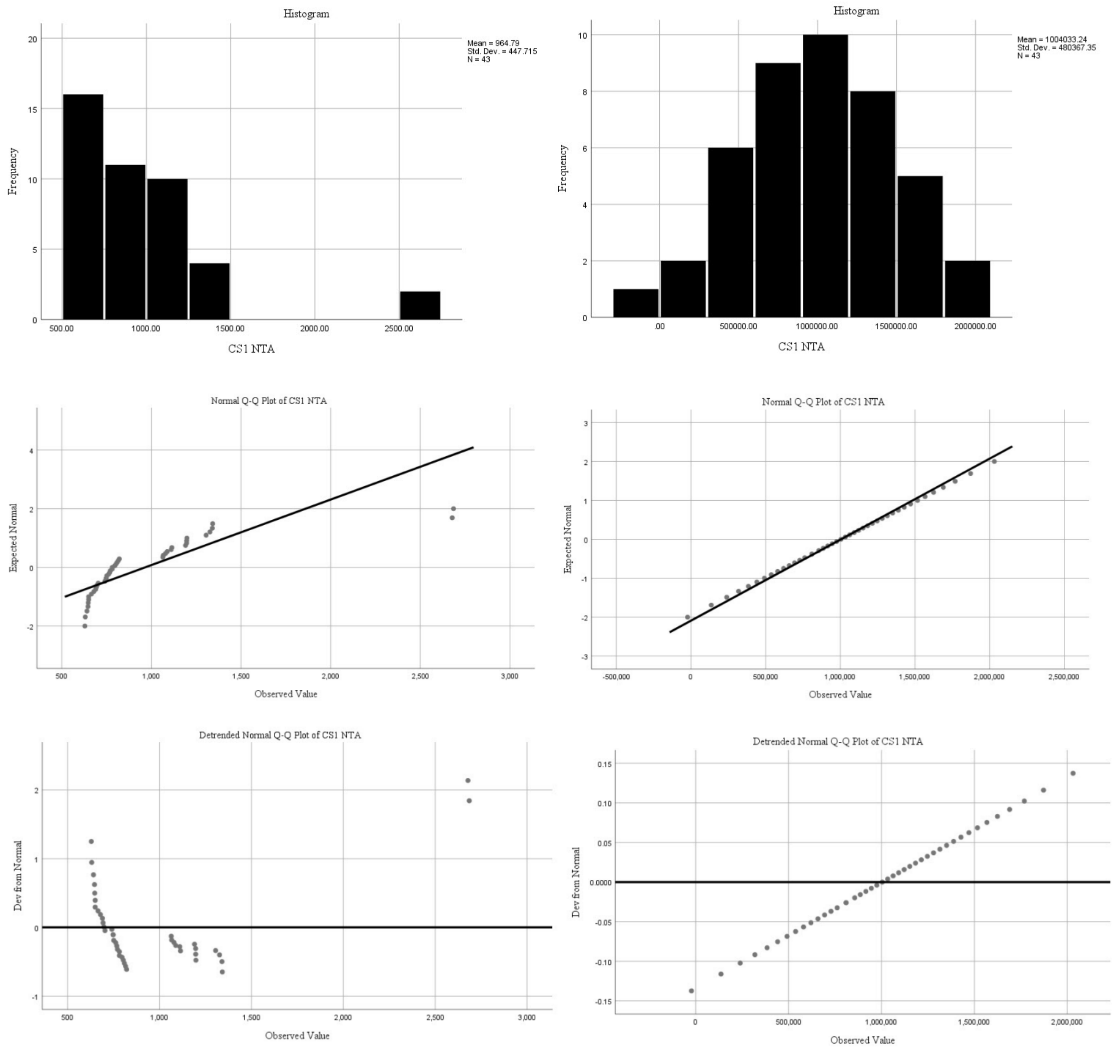


Figure 51. Consumer staples sector - Raw data Vs. Transformed data

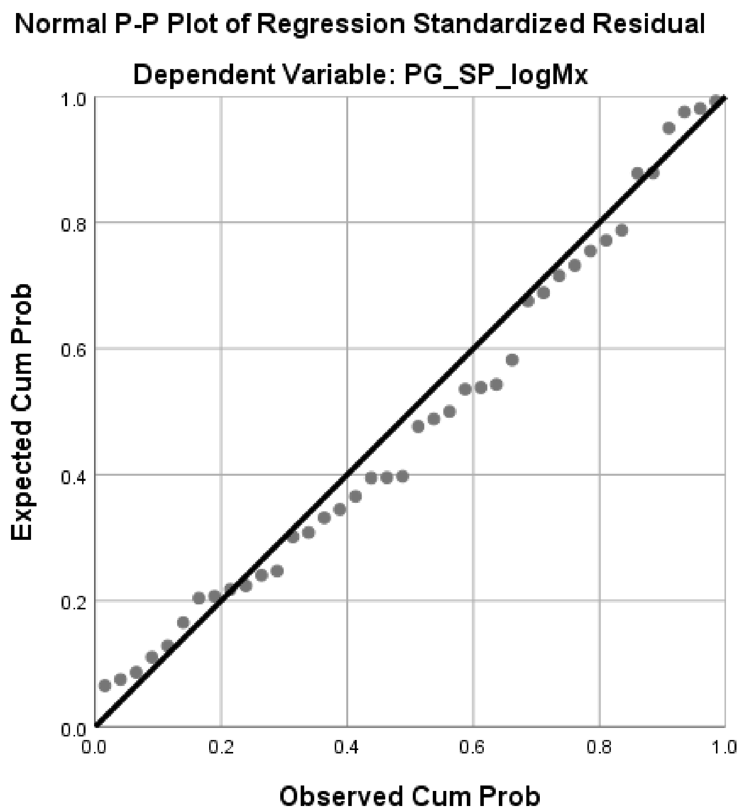


Figure 52. Normal P-P plot - Consumer staples sector S&P 500

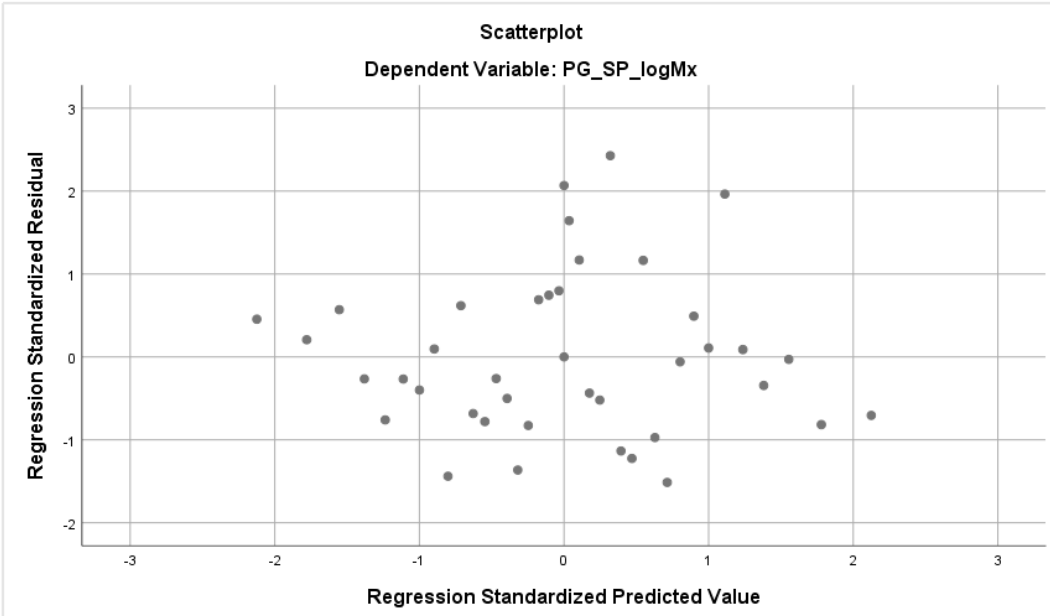


Figure 53. Residual scatterplot - Consume staples sector S&P 500

Summary: Hypothesis Test 1

In this study, I empirically analyzed the extent to which the stock price reflected NTA of the 56 corporations. The predictor variable in this hypothesis test was NTA that include IA and goodwill, and the outcome variable was the stock price. For this study, the sample size was 56 corporations which were over 11% of the corporations that constituted the S&P 500 and selected by using the stratified random sampling method. This hypothesis test 1 involved 9900 various data on IA, goodwill, and stock price. I have collected the required data from the SEC. To employ the robust statistical methods, the raw data in ratio scale required various transformations such as logarithm, square root, inverse functions, and other numeric expressions. I conducted many statistical tests to meet statistical assumptions such as linearity, independence, normality, and equal variance. The simple regression analysis showed that the correlation between the stock price and the NTA was statistically significant in 45 cases. For three corporations, NTA can predict above 80% of the variance in stock price. For 14 corporations, NTA can predict between 60% to 80% of the variance in stock price; for 14 corporations, NTA can predict between 30% to 60% of the variance in stock price, and for another 14 corporations, NTA can predict only less than 30% of the variance in stock price. The correlation was not statistically significant for the remaining 11 cases. NTA of six corporations from the information technology and technology group and five corporations from the healthcare and service group did not have a statistically significant correlation with their stock prices. According to the weak form EMH, all the publicly available information should reflect in the stock price. 11 corporations whose NTA of was not statistically correlated to their respective stock prices is a concern. In the hypothesis 1 test, I failed to reject about 20% of the samples used in this study. For the next hypothesis test, I replaced NTA with the quarterly GDP as the predictor and the stock price as the outcome variable to analyze how the weak form EMH was true in today’s sophisticated market conditions.

Test Results: Hypothesis 2

In hypothesis test 2, I analyze to what extent GDP can explain the variance in stock price. According to the EMH, the stock price changes only due to the new information and all the relevant publicly available information reflected in the stock price (Fama, 1965a). Then, according to the weak form EMH, the stock price should reflect GDP which is publicly available information. In the following section, I explain the results of hypothesis test 2 for which the predictor was GDP and the outcome variable was the stock price of 56 corporations from 11 strata from the industrial sector to consumer staples sector which is similar to the 11 GCIS sectors of the S&P 500. I run the simple regression; both GDP and the stock price were in ratio scale for the analysis.

To examine how well the GDP of the United States could predict the stock price of corporations from the 11 GCIS sectors of the S&P 500, I conducted a simple linear regression analysis. A scatterplot showed that the relationship between GDP and the stock price was linear and did not reveal any outliers (see Figure 20). To employ parametric statistics effectively, I transformed the data to meet the assumptions of linearity, independence, normality, and homoscedasticity. The graphs before and after the transformation of data show a discernible difference (Figures 12).

Industrial Sector

The correlation between GDP and the stock price of I1 was statistically significant (as shown in Table 17, for I1, $b = .035$, $t(41) = 11.84$, $p < .05$). An analysis of variance also showed that the correlation was significant ($F(1,41) = 140.18$, $p < .05$). The regression equation for predicting the stock price is $\hat{Y} = -490.09 + .035 * (\text{GDP})$. The R^2, coefficient of determination for this equation is .774 which means GDP explained about

77% of the variance in the stock price of I1. At 95% CI, for the slope to predict stock price from GDP was .035 thus, for each one billion dollars increase of GDP of the United States, the stock price of I1 increases by about 3.5 cents (see Table 17).

Similarly, the regression analysis on I2 and other corporations from the industrial sector showed the statistically significant correlation between GDP and the stock price ($b = .013$, $t(41) = 10.284$, $p = .001$). As shown in Table 17, the analysis of variance also showed that the correlation was significant ($F(1, 41) = 105.75$, $p = .001$). The regression equation for predicting the stock price is $\hat{Y} = -141.805 +.013 *(\text{GDP})$. The R^2, coefficient of determination for this equation is .721 which means the GDP explains about 72% of the variance in the stock price of I1. The coefficients, p-values and other statistical measures for other corporations from the industrial sector showed a statistically significant correlation between GDP and the stock price (see Table 17).

Table 17

Hypothesis 2 - Test Results: Industrial Sector

Corp.	*b*	*t*	*p*	*F*	*p*	*R*^2
I1	.035	11.840	.001	*F*(1,41)= 140.180	.001	.774
I2	.013	10.284	.001	*F*(1,41)= 105.75	.001	.721
I3	.008	12.099	.001	*F*(1,40) = 146.392	.001	.785
I4	.002	4.274	.001	*F*(1,41)= 18.266	.001	.308
I5	.027	18.496	.001	*F*(1,41)= 342.092	.001	.893
I6	.020	22.901	.001	*F*(1,41)= 524.458	.001	.927
I7	.009	17.078	.001	*F*(1,41)= 291.667	.001	.877

Note. The test results on hypothesis 2 from the seven corporations from the Industrial sector of the S&P 500. The stratified samples are corporations (Corp.) I1 *through* I7; *b* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Information Technology Sector

The simple regression analysis on IT1 from the information technology sector showed the correlation between GDP and the stock price was statistically significant (*b* = .023, *t*(41) = 21.285, *p* = .001). As shown in Table 18, the analysis of variance also showed that the correlation was significant (*F*(1, 41) = 453.469, *p* = .001). The regression equation for predicting the stock price is $\hat{Y}$ = -141.805 +.013 *(GDP). The *R*^2, coefficient of determination for this equation is .721 which means the GDP explained about 72% of the variance in the stock price of IT1. The coefficients, *p*-values and other statistical measures for other corporations from the information technology sector showed a statistically significant correlation between GDP and the stock price (see Table 18).

Table 18

Hypothesis 2 - Test Results: Information Technology Sector

Corp.	*b*	*t*	*p*	*F*	*p*	*R*^2
IT1	.024	21.295	.001	*F*(1,41)= 453.469	.001	.917
IT2	.024	10.535	.001	*F*(1,41)= 110.994	.001	.730
IT3	.003	9.586	.001	*F*(1,41)= 91.888	.001	.691
IT4	.005	20.690	.001	*F*(1,41)= 428.081	.001	.913
IT5	.011	5.959	.001	*F*(1,41)= 35.514	.001	.464
IT6	.005	19.665	.001	*F*(1,41)= 386.719	.001	.904
IT7	.010	13.766	.001	*F*(1,41)= 189.506	.001	.822
IT8	.010	13.193	.001	*F*(1,41)= 174.063	.001	.809

Note. The test results on hypothesis 2 from the eight corporations from the Information technology (IT) sector of the S&P 500. The stratified samples are corporations (Corp.) IT1 *through* IT8; *b* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Energy Sector

The simple regression analysis on E2 from the energy sector showed the correlation between GDP and the stock price was statistically significant (*b* = .010, *t*(41)

= 151.923, *p* = .001). As shown in Table 19, the analysis of variance also showed that the correlation was significant (F(1, 41) = 151.92, *p* = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -90.216 +.01*(GDP). The *R*^2, coefficient of determination for this equation is .787 which the GDP explained about 79% of the variance in the stock price of E2.

However, the regression analysis on E1 from the energy sector showed the correlation between GDP and the stock price was not statistically significant (As shown in Table 19, for E1, *b* = .002, *t*(41) = 1.577, *p* = .122). The analysis of variance also showed that the correlation was not significant (*F*(1, 41) = 2.488, *p* = .122). As shown in Table 19, the correlation between GDP and the stock price of E3 was not statistically significant (*b* = .001, *t*(41) = .407, *p* = .686; *F*(1,41) = .686, *p* = .686).

Table 19

Hypothesis 2 - Test Results: Energy Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2
E1	.002	1.577	.122	*F*(1,41)= 2.488	.122	.057
E2	.010	12.326	.001	*F*(1,41)= 151.923	.001	.787
E3	.001	.407	.686	*F*(1,41)= .166	.686	.004

Note. The test results on hypothesis 2 from the three corporations from the Energy sector of the S&P 500. The stratified samples are corporations (Corp.) E1 *through* E3; *b* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Utility sector

The simple regression analysis on U1 from the utility sector showed the correlation between GDP and the stock price was statistically significant (b = .009, t(41) = 21.76, p = .001). As shown in Table 20, the analysis of variance also showed that the correlation was significant (F(1, 41) = 473.54, p = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -98.38 +.009*(GDP). The R^2, coefficient of determination for this equation was .920 which means the GDP explained about 92% of the variance in the stock price of U1. Similarly, the coefficients, p-values and other statistical measures for other corporations from the utility sector showed a statistically significant correlation between GDP and the stock price (see Table 20).

Table 20

Hypothesis 2 - Test Results: Utility Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2
U1	.009	21.761	.001	*F*(1,41)= 473.541	.001	.920
U2	.011	21.515	.001	*F*(1,41)= 462.910	.001	.919
U3	.009	20.577	.001	*F*(1,41)= 423.410	.001	.912

Note. The test results on hypothesis 2 from three corporations from the Industrial sector of the S&P 500. The stratified samples are corporations (Corp.) U1 *through* U3; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Telecommunication Services Sector

The simple regression analysis on TS1 from the telecommunication sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 21, for TS1, *b* = .001, *t*(41) = 2.099, *p* = .042). The regression equation for predicting the stock price was $\hat{Y}$ = 9.46+.001*(GDP). The *R*^2, coefficient of determination for this equation was .097 which means the GDP explained about 10% of the variance in the stock price.

Similarly, the regression analysis on TS2 from the telecommunication sector showed the correlation between GDP and the stock price was statistically significant (*b* = .004, *t*(41) = 14.08, *p* = .001). As shown in Table 21, the analysis of variance also showed that the correlation was significant (*F*(1, 41) = 198.23, *p* = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -90.216 +.01*(GDP). The *R*^2, coefficient of determination for this equation was .829 which means GDP explained about 83% of the variance in the stock price of TS2.

The regression analysis on TS3 from the telecommunication sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 21, for TS3, b = .006, *t*(41) = 17.079, *p* = .001). As shown in Table 18, the analysis of variance also showed that the correlation was significant (*F*(1, 41) = 296.86, *p* = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -60.27 +.006*(GDP). The *R*^2, coefficient of determination for this equation was .879 which means GDP explained about 88% of the variance in the stock price of TS2.

Table 21

Hypothesis 2 - Test Results: Telecommunications Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2
T1	.001	2.099	.042	*F*(1,41) = 4.408	.042	.097
T2	.004	14.079	.001	*F*(1,41) = 198.226	.001	.829
T3	.006	17.230	.001	*F*(1,41) = 296.860	.001	.879

Note. The test results on hypothesis 2 from three corporations from the telecommunications Services sector of the S&P 500. The stratified samples are corporations (Corp.) *T1 through T3*; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Materials Sector

In the material sector, I conducted a simple linear regression analysis to examine to what extent the GDP of the United States explained the stock price of corporation M1 from the materials sector of the S&P 500. A scatterplot showed that the relationship between GDP and the stock price was positive and linear and did not reveal any outliers. The correlation between GDP and the stock price of M1 was statistically significant (as shown in Table 22, for M1, b = .018, t(41) = 17.93, p < .001). An analysis of variance also showed that the correlation was significant (F(1,41) = 321.09, p < .001). The regression equation for predicting the stock price was $\hat{Y}$ = -215.28 +.018 *(GDP). The *R*^2, coefficient of determination for this equation is .887 which means GDP explained about 89% of the variance in the stock price of I1. At 95% CI, for the slope to predict stock price from GDP was .018 thus, for each one billion dollars increase of GDP of the United States, the stock price of I1 increases by about two cents (see Table 22). Similarly, the regression analysis on the other three corporations from the materials sector showed a statistically significant correlation between GDP and the stock price (see Table 22).

Table 22

Hypothesis 2 - Test Results: Material Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2
M1	.018	17.926	.001	*F*(1,41)= 321.341	.001	.887
M2	.005	17.495	.001	*F*(1,41)= 306.089	.001	.882
M3	.013	18.261	.001	*F*(1,41)= 333.447	.001	.891
M4	.058	19.231	.001	*F*(1,41)= 369.823	.001	.900

Note. The test results on hypothesis 2 from four corporations from the materials sector of the S&P 500. The stratified samples are corporations (Corp.) M1 *through* M4; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Healthcare Sector

The simple regression analysis on H1 from the healthcare sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 23, for H1, b = .024, $t(41)$ = 15.35, p = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -3.16.69+.024*(GDP). The *R*^2, coefficient of determination for this equation was .852 which means GDP explained about 85% of the variance in the stock price of TS2. Similarly, the regression analysis on the other five corporations from the healthcare sector showed the correlation between GDP and the stock price was statistically significant (see Table 23).

Table 23

Hypothesis 2 - Test Results: Healthcare Sector

Corp.	*B*	*t*	*p*	*F*	*p*	*R*^2
H1	.024	15.346	.001	*F*(1,41)= 235.507	.001	.852
H2	.006	11.643	.001	*F*(1,41)= 135.559	.001	.768
H3	.015	16.628	.001	*F*(1,41)= 276.481	.001	.871
H4	.011	14.465	.001	*F*(1,41)= 209.245	.001	.836
H5	.004	19.650	.001	*F*(1,41)= 386.138	.001	.904
H6	.007	15.423	.001	*F*(1,41)= 237.878	.001	.853

Note. The test results on hypothesis 2 from six corporations from the healthcare sector of the S&P 500. The stratified samples are corporations (Corp.) H1 *through T3*; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Financial Sector

The simple regression analysis on F2 from the financial sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 24, for H1, b = .003, $t(41)$ = 6.645, p = .001). The regression equation for predicting the stock price was $\hat{Y}$ = --26.68 +.003*(GDP). The *R*^2, coefficient of determination for this equation was .519 which means GDP explained about 52% of the variance in the stock price of F2. Similarly, the regression analysis of other corporations, F3 through F7 from the financial sector showed the correlation between GDP and the stock price was statistically significant (see Table 24).

However, the regression analysis for corporation F1 from the financial sector showed the correlation between GDP and the stock price of F1 was not statistically significant. As shown in Table 24, for F1, $b = .001$, $t(41) = 1.96$, $p = .057$; $F(1,41) = 3.84$, $p = .057$. For F1, the regression equation for predicting the stock price was $\hat{Y} = -3.47 + .001*(GDP)$ but not a useful model. In this case, the correlation between GDP and the stock price was not statistically significant and failed to reject the null hypothesis (see Table 24).

Table 24

Hypothesis 2 - Test Results: Financial Sector

Corp.	*b*	*t*	*p*	*F*	*p*	*R*^2
F1	.001	1.958	.057	*F*(1,41)= 3.835	.057	.086
F2	.003	6.645	.001	*F*(1,41)= 44.161	.001	.519
F3	.011	13.067	.001	*F*(1,41)= 170.746	.001	.806
F4	.005	9.353	.001	*F*(1,41)= 87.469	.001	.681
F5	.005	4.539	.001	*F*(1,41)= 20.583	.001	.334
F6	.003	12.659	.001	*F*(1,41)= 160.263	.001	.796
F7	.003	6.472	.001	*F*(1,41)= 41.883	.001	.505

Note. The test results on hypothesis 2 from seven corporations from the financial sector of the S&P 500. The stratified samples are corporations (Corp.) F1 *through* F3; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Real Estate Sector

The simple regression analysis on R1 from the financial sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 25, for R1, *b* = .018, *t*(41) = 25.04, *p* = .001). The regression equation for predicting the stock price was $\hat{Y}$ = --26.68 +.003*(GDP). The *R*^2, coefficient of determination for this equation was .939 which means GDP explained about 94% of the variance in the stock price of R1. Similarly, the regression analysis on other corporations, R2 and R3 from the real estate sector showed the correlation between GDP and the stock price was statistically significant (see Table 25).

Table 25

Hypothesis 2 - Test Results: Real Estate Sector

Corp.	*b*	*t*	*p*	*F*	*p*	*R*^2
R1	.018	25.038	.001	*F*(1,41)= 626.889	.001	.939
R2	.062	15.919	.001	*F*(1,41)= 253.423	.001	.861
R3	.012	18.999	.001	*F*(1,39) = 360.960	.001	.902

Note. The test results on hypothesis 2 from three corporations from the real estate sector of the S&P 500. The stratified samples are corporations (Corp.) R1 *through* R3; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Consumer Discretionary Sector

The simple regression analysis on CD1 from the consumer discretionary sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 26, for CD1, b = .184, $t(41)$ = 12.44, p = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -2709.49 + .184*(GDP). The *R*^2, coefficient of determination for this equation was .790 which means GDP explained about 79% of the variance in the stock price of CD1. At 95% CI, for the slope to predict stock price from GDP was thus, for each one billion dollars increase of GDP of the United States, the stock price of CD1 increases by about 18 cents. Similarly, the regression analysis of other corporations, CD2 through CD8, from the consumer discretionary sector showed the correlation between GDP and the stock price was statistically significant (see Table 26).

Table 26

Hypothesis 2 - Test Results: Consumer Discretionary Sector

Corp.	*b*	*t*	*p*	*F*	*p*	*R*^2
CD1	.184	12.437	.001	*F*(1,41)= 154.681	.001	.790
CD2	.005	5.368	.001	*F*(1,41)= 28.812	.001	.413
CD3	.009	12.50	.001	*F*(1,41)= 156.24	.001	.792
CD4	.016	15.22	.001	*F*(1,41)= 231.652	.001	.850
CD5	.027	18.322	.001	*F*(1,41)= 335.70	.001	.891
CD6	.010	18.248	.001	*F*(1,41)= 332.978	.001	.890
CD7	.018	18.631	.001	*F*(1,41)= 347.115	.001	.894
CD8	.009	3.165	.003	*F*(1,41)= 10.016	.003	.196

Note. The test results on hypothesis 2 from eight corporations from the consumer discretionary sector of the S&P 500. The stratified samples are corporations (Corp.) CD1 *through* CD8; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Consumer Staples Sector

The simple regression analysis on CS1 from the consumer staples sector showed the correlation between GDP and the stock price was statistically significant (As shown in Table 27, for CS1, *b* = .014, *t*(41) = 15.46, *p* = .001). The regression equation for predicting the stock price was $\hat{Y}$ = -172.89 +.001*(GDP). The *R*^2, coefficient of determination for this equation was .854 which means GDP explained about 85% of the variance in the stock price of CS1. Similarly, the regression analysis on other corporations, CS2, CS3, and CS4 from the consumer staples sector showed the correlation between GDP and the stock price was statistically significant (see Table 27).

Table 27

Hypothesis 2 - Test Results: Consumer Staples Sector

Corp.	*b*	*t*	*p*	*F*	*p*	*R*^2
CS1	.014	15.459	.001	*F*(1,41)= 238.968	.001	.854
CS2	.004	22.863	.001	*F*(1,41)= 522.733	.001	.927
CS3	.007	15.226	.001	*F*(1,41)= 231.835	.001	.850
CS4	.008	12.874	.001	*F*(1,41)= 165.749	.001	.802

Note. The test results on hypothesis 2 from three corporations from consumer staples sector of the S&P 500. The stratified samples are corporations (Corp.) CS1 *through* CS4; *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Summary: Hypothesis Test 2

In hypothesis test 2, I empirically analyzed how much variance in GDP of the United States can predict the stock prices of 56 corporations listed on NYSE and NASDAQ. I presented the hypothesis 2 test results in tables (see Table 17 through Table

27). The predictor variables in this test were GDP, and the stock price was the outcome variable. To meet the assumptions such as linearity, normality, equal variance, the predictor variable required various transformations such as logarithm, square root, nth root, and inverse function. The statistical results showed that for 33 corporations, GDP can predict over 80% of variance in stock price, for 12 corporations, GDP could predict between 60% to 80% of the variance in stock price, and for six corporations, GDP can predict between 30% to 60% variance in stock price, and for two corporations GDP can predict less than 30% of the variance in stock price. However, for three corporations the correlation between GDP and the stock price was not statistically significant. This hypothesis test revealed that the stock price of 53 corporations out of 56 samples have a significant correlation with the GDP of the United States. In the next hypothesis test, there were predictor variables such as NTA, GDP, and the P/E.

Test Results: Hypothesis 3

According to the weak-form EMH, the stock price should reflect the changes in NTA, GDP, and P/E as they are publicly available information. In this study, to test the weak-form EMH, I chose three IVs such as NTA, GDP, and P/E, and stock price as DV. The multiple linear regression was used to understand the significant effect between multiple variables. In the following section, I explain the results of multiple regression on the data of 56 corporations from 11 GICS sectors of the S&P 500.

As shown in Table 28 through Table 35, I summarized the regression analysis results and other statistical test results. Many statistical test results and images showed the data met the assumptions such as linearity, independence, normality, and homoscedasticity (see Figure 2 through Figure 66). Pedhazur (1997) claimed that the standard multiple regression could use optimally only if the data met the parametric statistical assumptions. Many visual aids such as histogram, standardized residual scatterplot, and P-P plots provided information to test the statistical assumptions. Furthermore, the Kolmogorov-Smirnov tests and Shapiro-Wills tests assisted in selecting the normalized data for robust parametric statistical analysis. With various tests, I selected the data that complied with the required assumptions. Afterward I run multiple regression to find the extent to which NTA, GDP, and P/E reflected in the stock price. In the following sections, I present the results from the multiple regression analyses on the data of GDP of the united states and financial data of 56 corporations listed on NYSE and NASDAQ.

Industrial Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of I4 from the industrial sector, I run the multiple regression analysis. I4 had two models in this case (see Table 29); the Model 1 had only one predictor, GDP that had statistically significant correlation with the stock price (As shown in Table 28, for NTA, adj$R$^2 (42) = .28, b = .002, t(42) = 4.209, p = .001).

However, Model 2 had two predictors, GDP and the P/E but excluded NTA (see Table 29). Both predictors were significantly correlated with the stock price (as shown in Table 28, for P/E, $b = .294$, $t(41) = 3.412$, $p < .001$; for GDP, $b = .002$, $t(41) = 3.939$, $p = .001$). The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the industry sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity, multicollinearity (see Figure 54). Model 1 was better than Model 2. The coefficient of determination was 28% at 95% CI. The regression equation for predicting the stock price of I4 was $\hat{Y} = -12.026$ +002*(GDP).

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 54). The data also met other assumptions and shows the absence of outliers. With the transformed data that met all the parametric assumptions, I run the multiple regression.

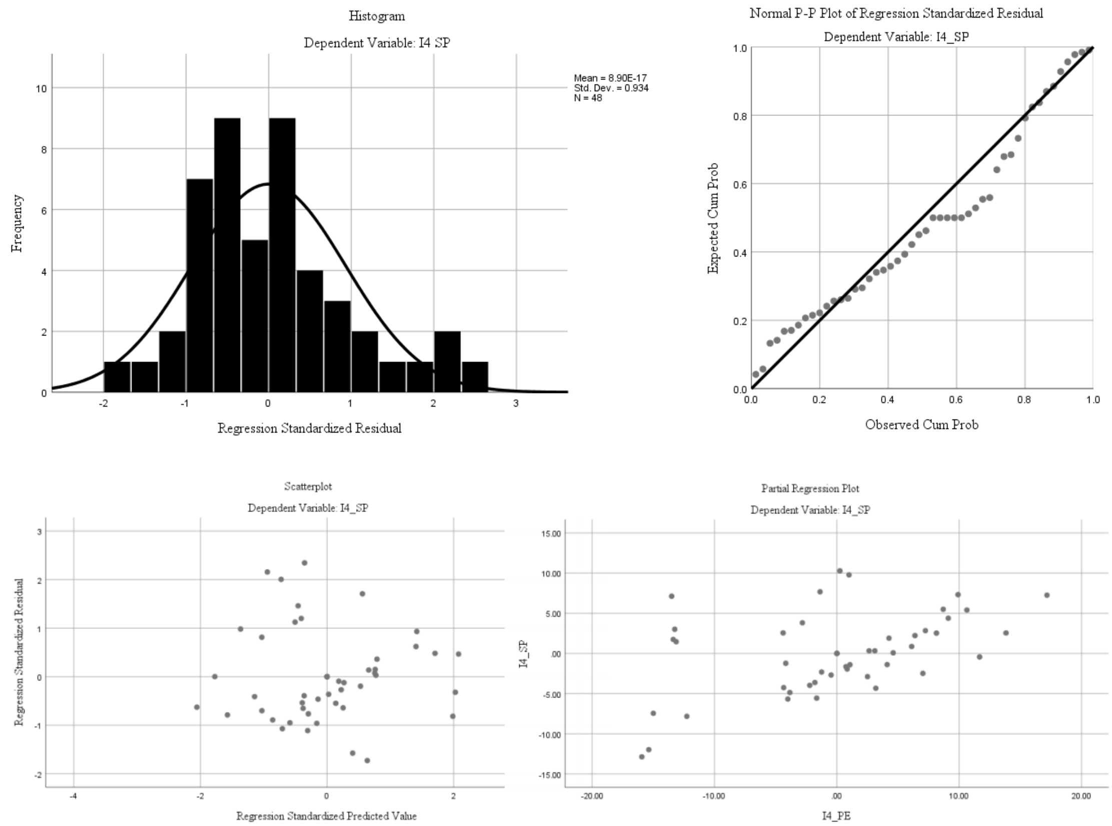


Figure 54. Multiple Regression: Stock price, NTA, GDP & P/E – Industrial

Information Technology Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of IT6 from the information technology sector, I run the multiple regression analysis. In this case, I considered three models (see Table 28). Model 1 had only one predictor, GDP; Model 2 had two predictors, NTA and GDP; and the Model 3 had three predictors, NTA, GDP, and P/E.

For Model 1, as shown in Table 28, adj*R*^2 = .845, for GDP, b = .005, $t(42)$ = 15.316 , p = .001 .

For Model 2, as shown in Table 28, for NTA, b = .001, $t(41)$ = 3.403, $p < .001$; for GDP, b = .003, $t(41)$ = 5.274, p = .001.

For Model 3, as shown in Table 28, for NTA, b = .001, $t(40)$ = 3.752, $p < .001$; for GDP, b = .003, $t(40)$ = 4.89, p = .001; for P/E Multiple, b = .174, $t(40)$ = 3.154, p = .003.

All three models were significant. Model 1 had the highest t value for GDP ($t(42)$ = 15.316). However, the highest variability was explained by Model 3, and I chose Model 3 for predicting the stock price.

The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the information technology sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity, multicollinearity (see Figure 55). I chose Model 3 for predicting the stock price. The regression equation for predicting the stock price of IT6 was $\hat{Y}$ = -35.683 + .001*(NTA) +.003*(GDP) + .174*(P/E). The coefficient of determination was .898 means the NTA, GDP, and P/E could explain that 90% of the variance in stock price (see Table 28). The model is useful.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 55). The data also met other assumptions and shows the absence of outliers. With the transformed data that met all the parametric assumptions, I run the multiple regression.

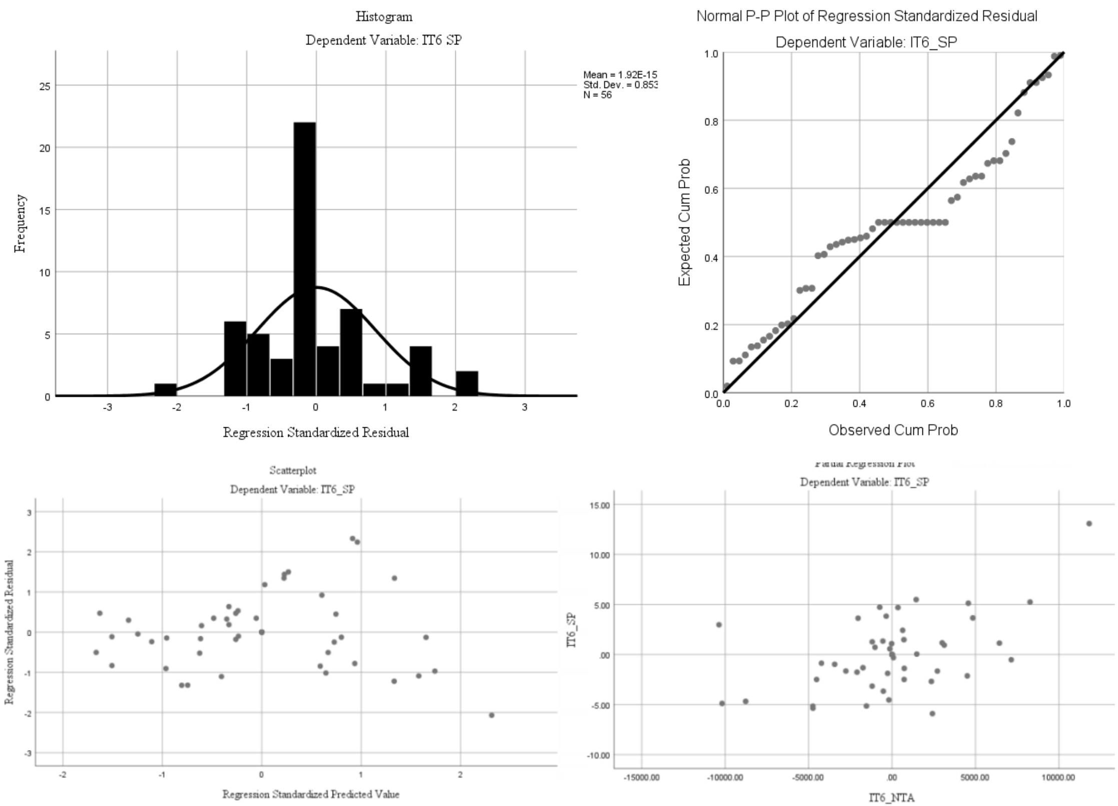


Figure 55. Multiple regression: Stock price, NTA, GDP & P/E - IT sector

Energy Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of E2 from the energy sector, I run the multiple regression analysis. There was only one model in this case with GDP as the predictor (see

Table 28). In the model, I eliminated the other variables, NTA (p = .207) and P/E (p = .957) since they were not contributing significantly to the model. As shown in Table 28, GDP was the significant factor (adj$R$^2 (42) = .725, B = .01, t(42) = 10.707, p = .001). The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the industry sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 56). The F statistics showed the Model with GDP is better (F(42) = 114.64, p = .001) and the model is useful. The regression equation for predicting the stock price of E2 was $\hat{Y}$ = -89.329 + .01*(GDP). The coefficient of determination was 73% at 95% CI. I present the test results of industrial, IT and energy sectors on multicollinearity in Table 29 (see Table 29).

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 57). The data also met other assumptions and shows the absence of outliers (see Figure 58). With the transformed data that met all the parametric assumptions, I run the multiple regression.

Table 28

Hypothesis 3 - Test Results: Industrial, IT & Energy

Corp.		*B*	*t*(42)	*p*	*F*(42)	*p*	*R*^2
I4	GDP	.002	4.209	.001	17.715	.001	.280
I4	GDP	.002	3.939	.001	16.924	.001	.426
	P/E	.294	3.412	.001			
IT6	GDP	.005	15.316	.001	234.59	.001	.845
IT6	GDP	.003	5.274	.001	152.635	.001	.876
	NTA	.001	3.403	.001			
IT6	GDP	.003	4.890	.001	127.271	.001	.898
	NTA	.001	3.752	.001			
	P/E	.174	3.154	.003			
E2	GDP	.01	10.707	.001	114.64	.001	.725

Note. The test results on hypothesis 3 from industrial, information technology and energy sectors of the S&P 500. The stratified samples are corporations (Corp.) I4 through E2. GDP = gross domestic product of the United States. P/E = P/E. NTA = non-tangible assets. *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, and *R*^2 is the coefficient of regression at 95% confidence interval.

Table 29

Hypothesis 3 - Residual &Collinearity: Industrial, IT & Energy

Corp.		Tol	Std Resid	Mahal	Cooks	Model
I4	GDP	1.00		8.304	.350	1
I4	GDP	.96				2
	PE	.96				
IT6	GDP	1.00		13.259	1.005	1
IT6	GDP	.232				2
	NTA	.232				
IT6	GDP	.219				3
	NTA	.232				
	PE	.789				
E2	GDP	1.00	3.288	4.679	.129	

Note. Hypothesis 3: Residual and collinearity statistics results from industrial, information technology and energy sectors of S&P 500. The stratified samples are corporations (Corp.) *I4* through *E2*. Tol = Tolerance, Std Resid = Standardized residuals, Mahal = Mahalanobis distance D, Cooks = Cooks' distance, Model = various models

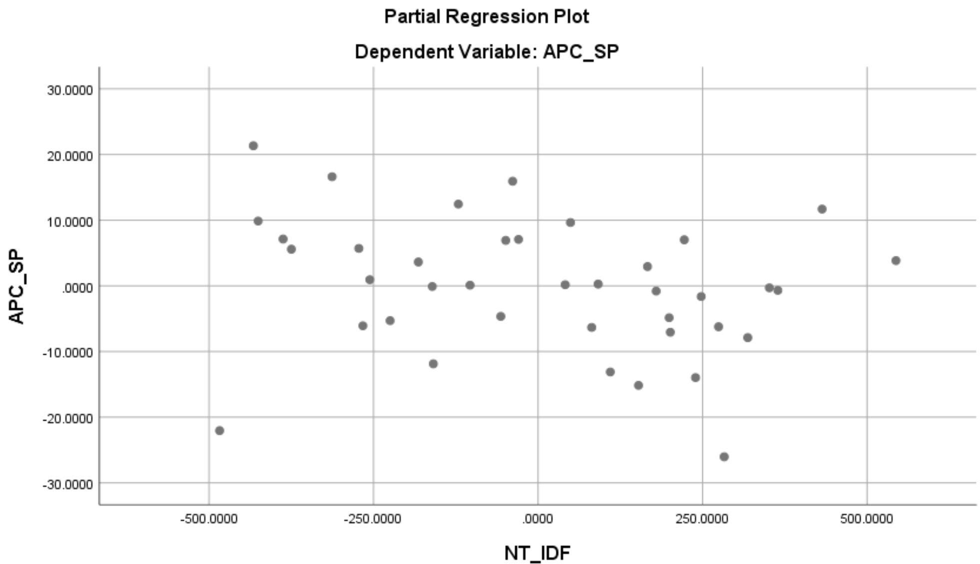


Figure 56. Partial regression plot - Stock price & NTA: Energy sector S&P 500

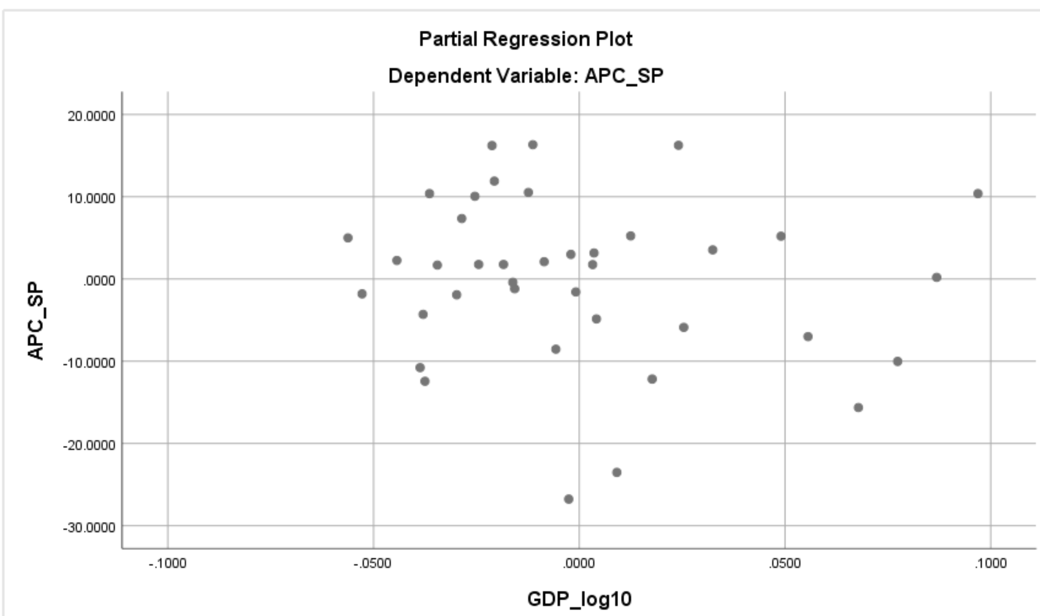


Figure 57. Partial regression plot - Stock price & GDP: Energy sector S&P 500

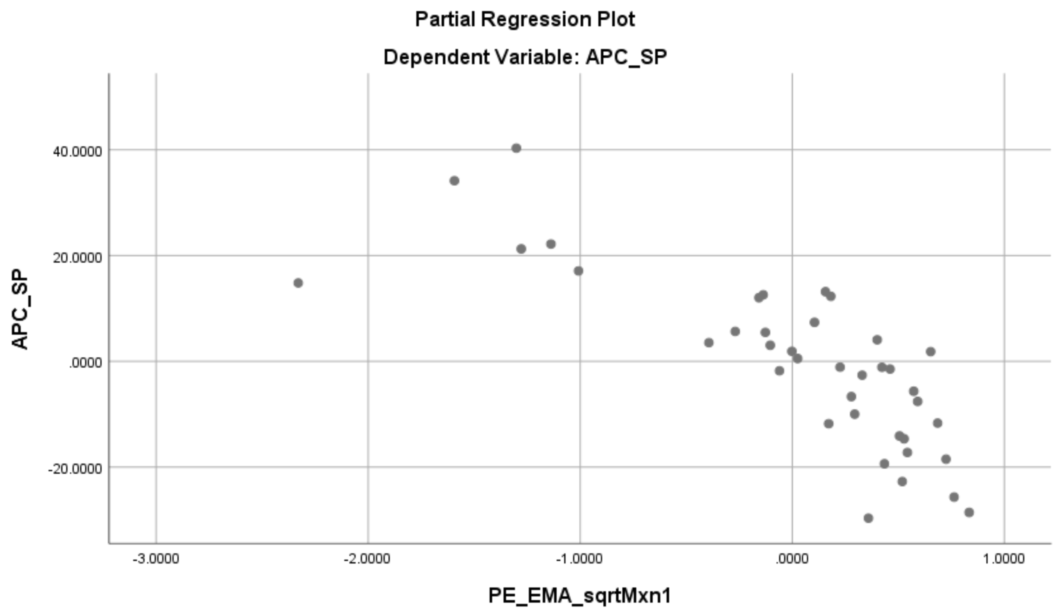


Figure 58. Partial regression plot - Stock price & P/E: Energy sector S&P 500

Utility Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of U1 from the utility sector, I run the multiple regression analysis. Because all the three predictors were contributing variables, I considered three models in this case (see Table 30). Model 1 had only one predictor, GDP; Model 2 had two predictors, GDP and P/E; and Model 3 had three predictors, NTA, GDP, and P/E.

For Model 1, as shown in Table 30, adj$R$^2 = .87, for GDP, B = .009, t(42) = 16.963, p = .001. The F statistics (F(42) = 287.75, p = .001) also showed and the model is significant.

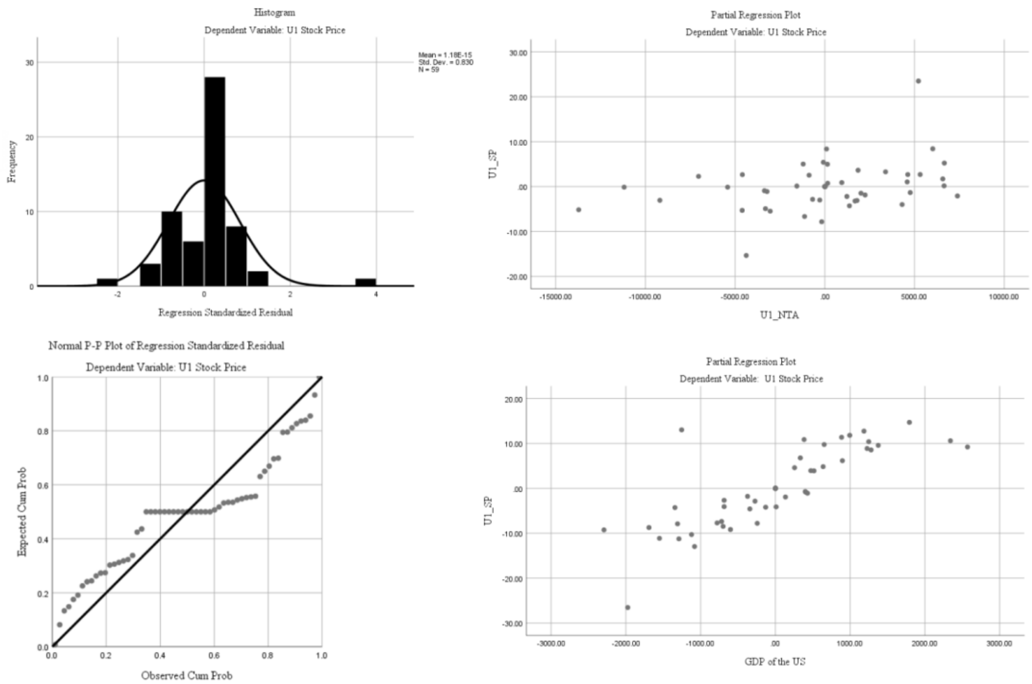
For Model 2, as shown in Table 30, adj *R*^2 = .89; for GDP, *B* = .007, *t*(41) = 10.038, *p* < .001; for P/E, *B* = .814, *t*(41) = 2.989, *p* = .005.

For Model 3, as shown in Table 30, adj *R*^2 = .90; for NTA, *B* = .001, *t*(40) = 2.37, *p* < .023; for GDP, *B* = .007, *t*(40) = 8.802, *p* = .001; for P/E Multiple, *B* = .698, *t*(40) = 2.653, *p* = .011.

All three models were significant (*p* < .05). However, I chose Model 1, since it has the highest parameters (as shown in Table 30, *t*-value (*t*(42) = 16.96) and *F*-value (*F*(42) = 287.75). As shown in Table 31, U1 from the utility sector had three models.

The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the utility sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 59). The regression equation for predicting the stock price of U1 was $\hat{Y}$ = -97.78 + .009*(GDP). The coefficient of determination was 974%. The model 1 was better than the other two models.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 59). The data also met other assumptions and shows the absence of outliers (see Figure 62). With the transformed data that met all the parametric assumptions, I run the multiple regression.



.

Figure 59. Multiple Regression: Stock price, NTA, GDP, & P/E - Utility sector

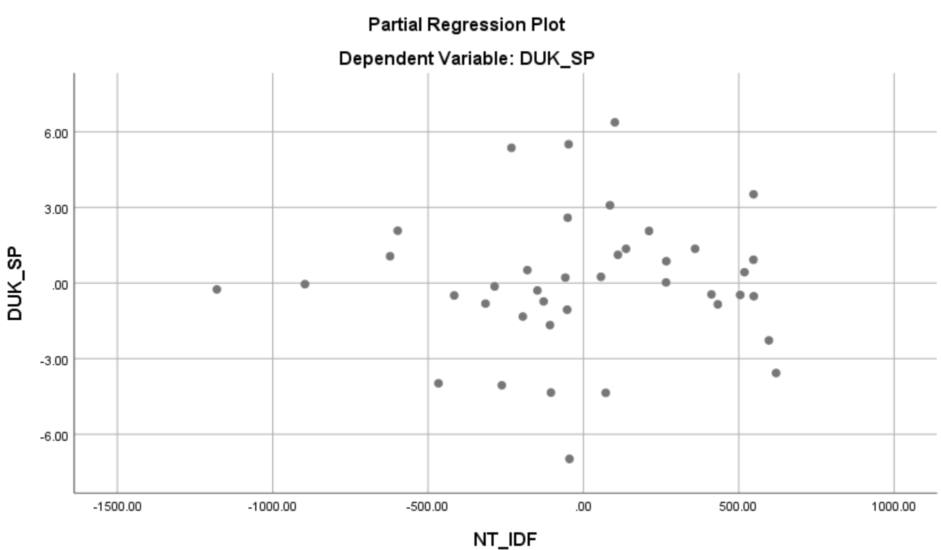


Figure 60. Partial regression plot - Stock price & NTA: Utility sector S&P 500

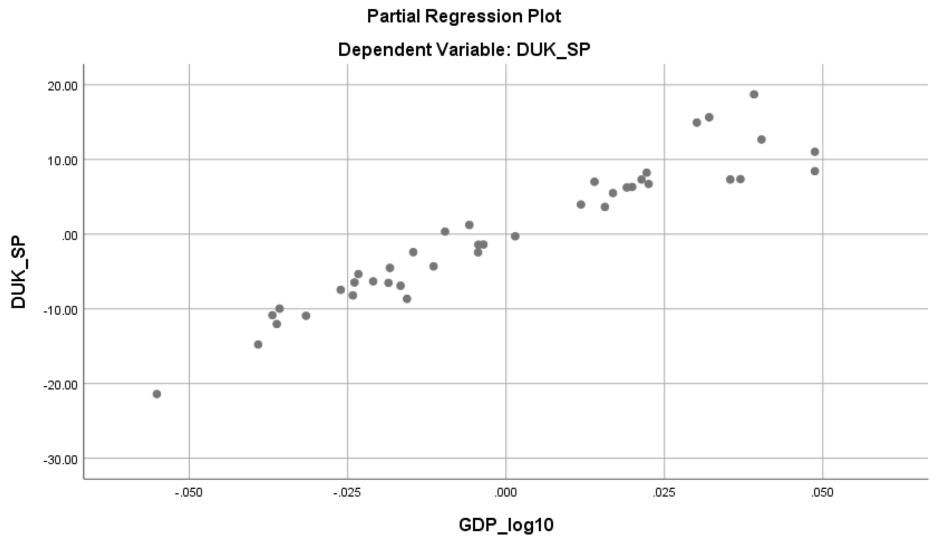


Figure 61. Partial regression plot - Stock price & GDP: Utility sector S&P 500

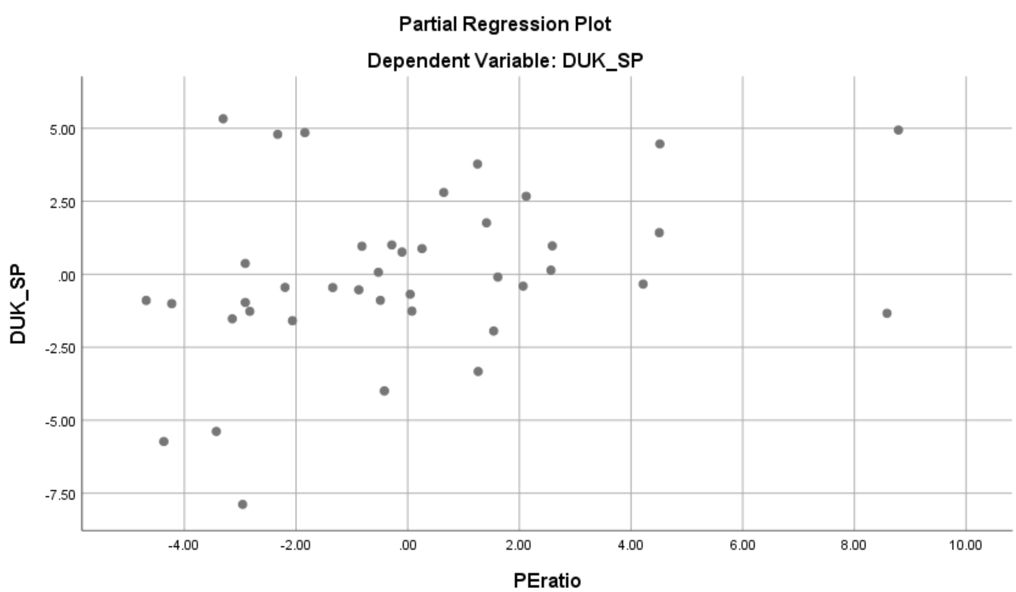


Figure 62. Partial regression plot - Stock price & P/E: Utility sector S&P 500

Telecommunication Services Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of T2 from the telecommunication services sector, I run the multiple regression analysis. Model 1 had only one predictor, GDP; I eliminated the two non-contributing variables, NTA and P/E from the model (see Table 30). For Model 1, as shown in Table 30, adj$R$^2 = .803, for GDP, B = .004, t(42) = 13.277, p = .001.

The regression equation for predicting the stock price of *T2* was $\hat{Y}$ = -34.273 + .004*(GDP). The coefficient of determination was 80% at 95% CI. The model is useful for predicting the stock price.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 66). The data also met other assumptions and shows the absence of outliers (see Figure 63). With the transformed data that met all the parametric assumptions, I run the multiple regression.

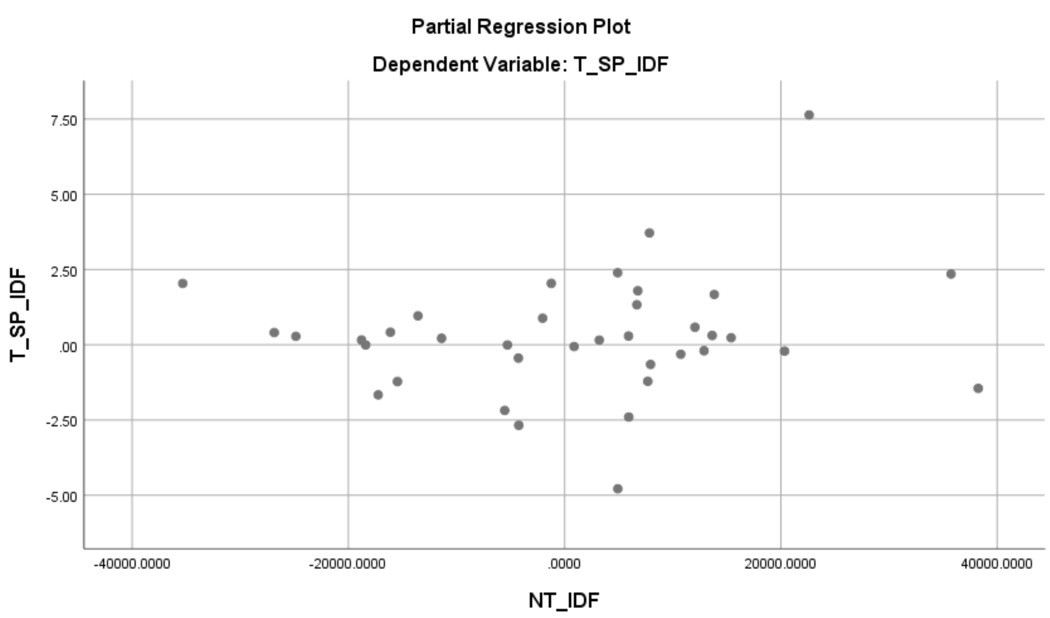


Figure 63. Partial regression plot - Stock price & NTA: Telecom. sector

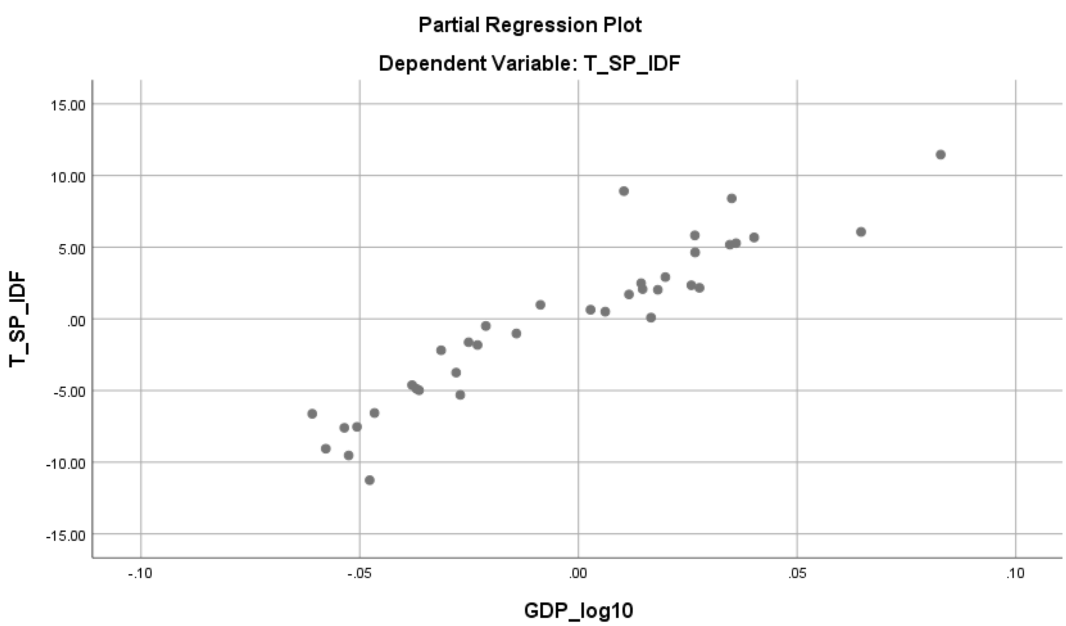


Figure 64. Partial regression plot - Stock price & GDP: Telecom. Sector

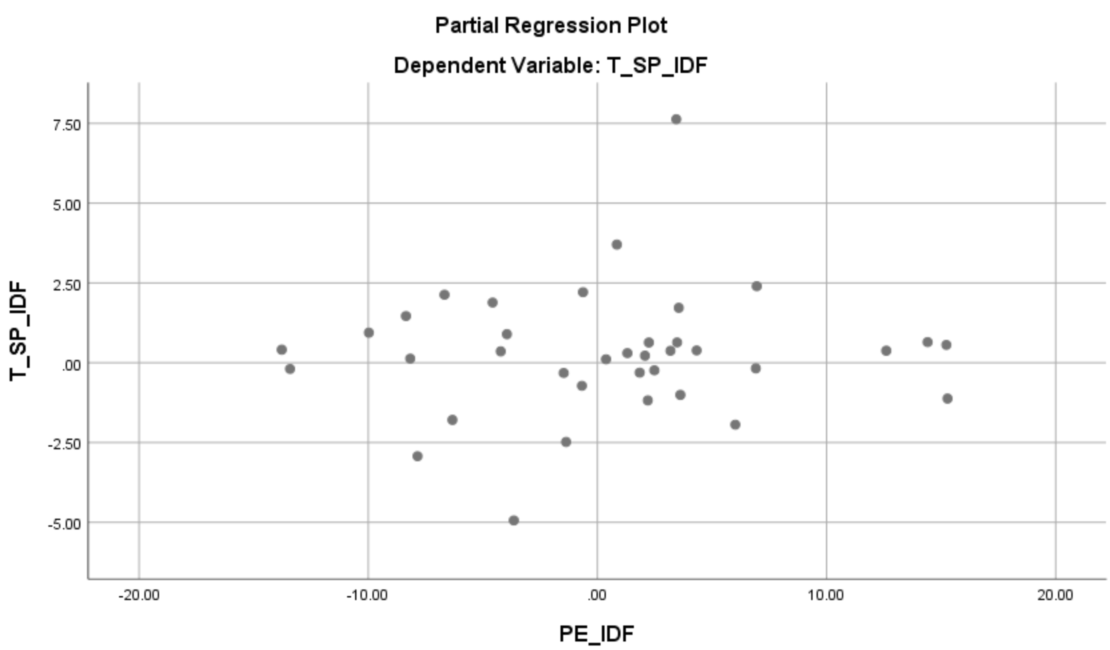


Figure 65. Partial regression plot - Stock price & P/E: Telecom. sector

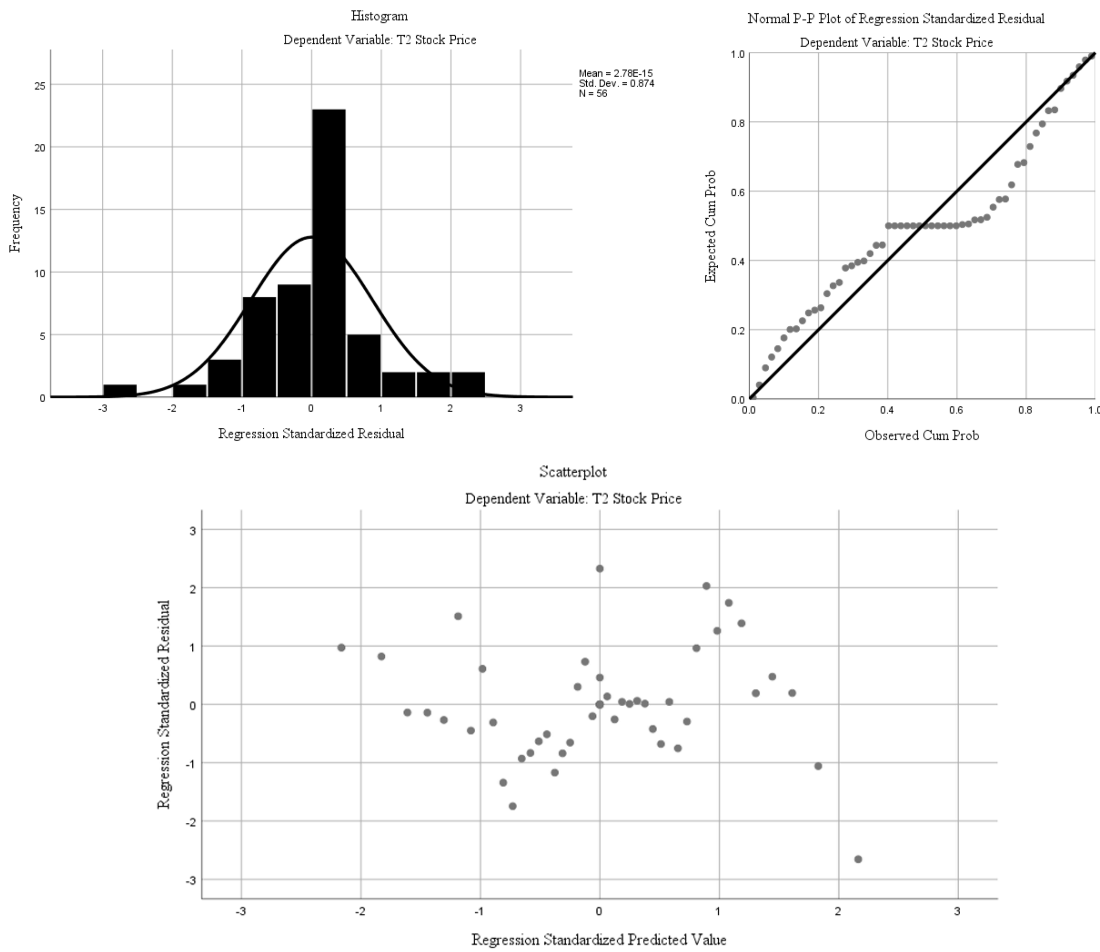


Figure 66. Multiple regression: Stock price, NTA, GDP, & P/E Telecom. sector

Materials Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of M4 from the materials sector, I run the multiple regression analysis. Model 1 had only one predictor, GDP; I excluded the two non-contributing variables NTA and P/E from the model (see Table 30) For Model 1, as shown in Table 30, adj$R$^2 = .782, for GDP, B = .058, t(42) = 12.456, p = .001.

The regression equation for predicting the stock price of *T2* was $\hat{Y}$ = -802.629 + .058*(GDP). The coefficient of determination was 78% at 95% CI. The model is useful.

Table 30

Hypothesis 3 - Test Results: Utilities to Materials

Corp.		*B*	*T*(42)	*p*	*F*(42)	*p*	*R*^2
U1	GDP	.009	16.963	.001	287.745	.001	.870
U1	GDP	.007	10.038	.001	175.526	.001	.980
	P/E	.814	2,989	.001			
U1	GDP	.007	8.802	.001	132.07	.001	.901
	P/E	.698	2.653	.011			
	NTA	.001	2.37	.023			
T1	GDP	.004	13.277	.001	176.271	.001	.803
M4	GDP	.058	12.456	.001	155.157	.001	.782

Note. The test results on hypothesis 3 from utilities, telecommunications, and materials sectors of the S&P 500. The stratified samples are corporations (Corp.) U1 through M4. GDP = gross domestic product of the United States. P/E = P/E. NTA = *nontangible assets*. *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 69). The data also met other assumptions and shows the

absence of outliers. With the transformed data that met all the parametric assumptions, I run the multiple regression.

Table 31

Hypothesis 3 - Residual & Collinearity: Utilities to Materials

Corp.		Tol	*Std Resid*	Mahal	*Cooks*	Model
U1	GDP	1.00	3.83	8.824	.023	1
U1	GDP	.44				2
	PE	.44				
U1	GDP	.372				3
	PE	.425				
	NTA	.563				
T2	GDP	1.00	2.327	4.679	.615	1
M4	GDP	1.00	4.923	4.679	.288	1

Note. Hypothesis 3: Residual and collinearity statistics results from utilities and materials sectors of S&P 500. The stratified samples are corporations (Corp.) *U1* through *M4*. Tol = Tolerance, Std Resid = Standardized residuals, Mahal = Mahalanobis distance D, Cooks = Cooks' distance, Model = various models

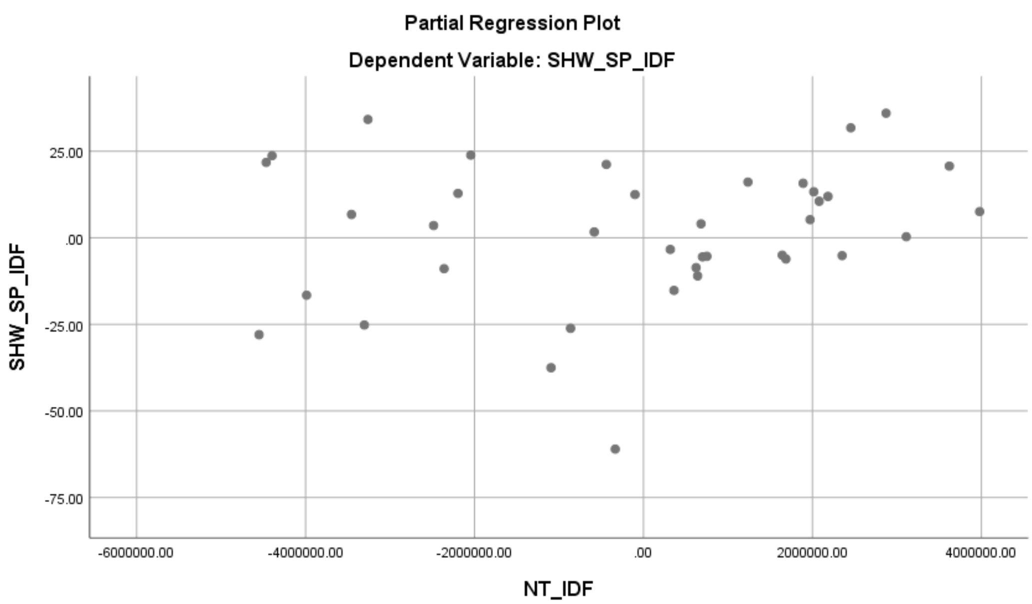


Figure 67. Partial regression plot - Stock price & NTA: Material sector

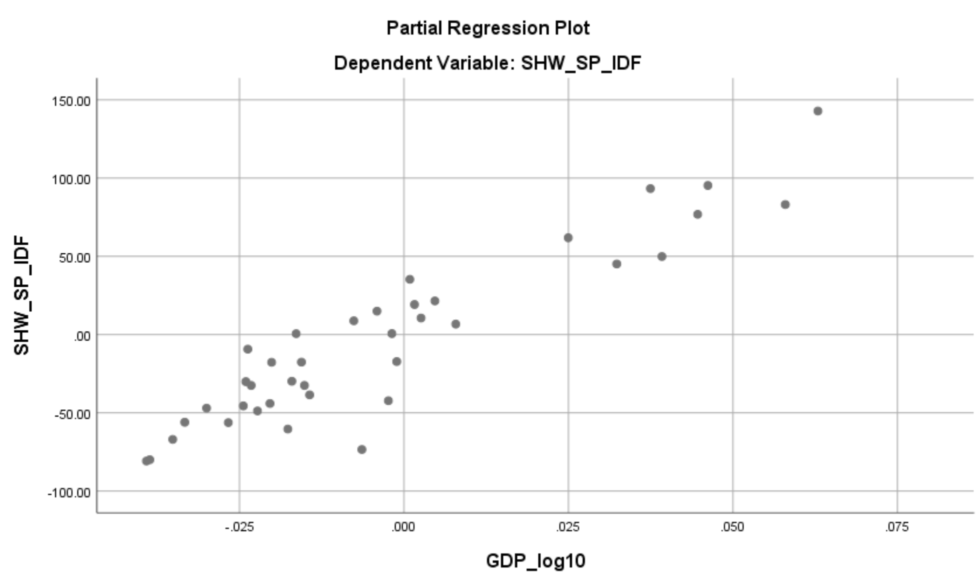


Figure 68. Partial regression plot - Stock price & GDP: Material sector

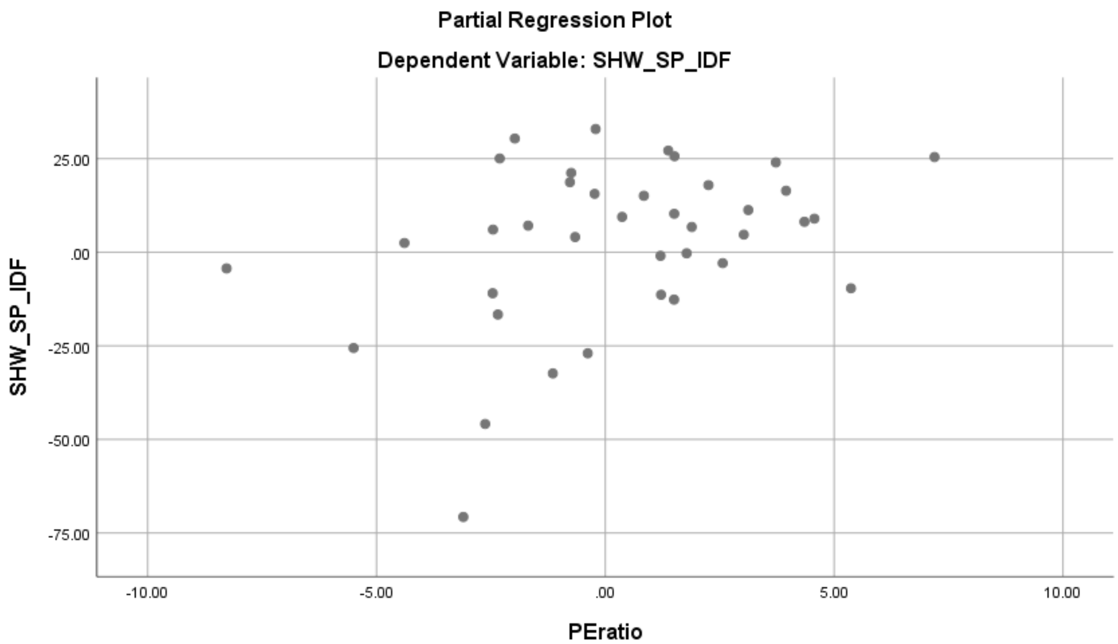


Figure 69. Partial regression plot - Stock price & P/E: Material sector

Healthcare Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of H1, I run the multiple regression analysis. After eliminating the noncontributing variable P/E, I considered two models in this case (see Table 32). Model 1 had only one predictor, GDP and Model 2 had two predictors, NTA and GDP.

For Model 1, as shown in Table 32, adj$R$^2 = .76, for GDP, B = .024, t(42) = 11.549, p = .001.

For Model 2, as shown in Table 32, adj R^2 = .85; for GDP, B = .017, t(41) = 7.869, p < .001; for P/E, B = 1.791, t(41) = 5.442, p = .001. Model 1 and Model 2 were significant, but I choose Model 1 because of higher *t* statistics (*t*(42) = 11.55) and *F* statistics (*F*(42) = 133.37).

The regression equation for predicting the stock price of H1 is $\hat{Y}$ = -218.768 + .017*(GDP) + 1.791* P/E. The coefficient of determination is 85% with 95% CI. This model is useful. The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 70). The data also met other assumptions and shows the absence of outliers. With the transformed data that met all the parametric assumptions, I run the multiple regression.

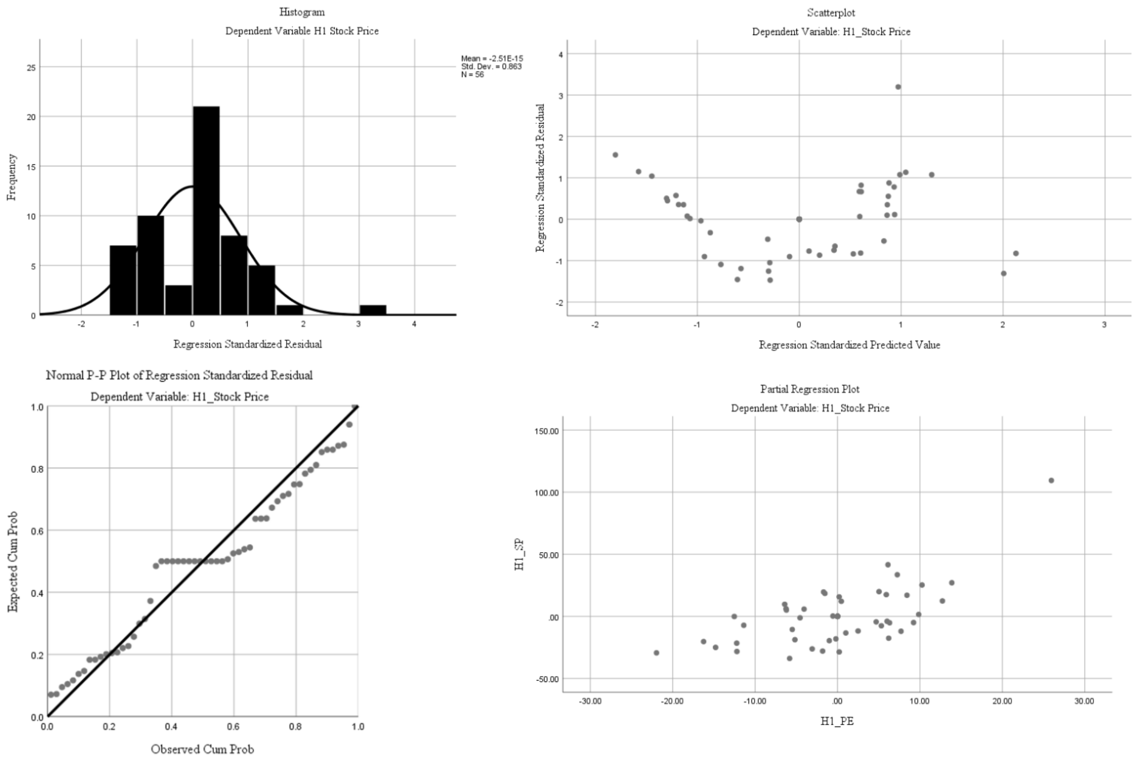


Figure 70. Multiple Regression Plot: Stock price, NTA, GDP & P/E - Healthcare

Financial Sector

The multiple regression analysis was conducted to analyze the relationship between the stock price of F2 from the financial sector and the predictors NTA, GDP, and P/E. Model 1 had only one predictor, GDP. I eliminated the non-contributing variable NTA and P/E from the model (see Table 32). For Model 1, as shown in Table 32, adj*R*^2 = .497, for GDP, *B* = .003, *t*(42) = 6.59, *p* = .001.

The regression equation for predicting the stock price of F2 is $\hat{Y}$ = -26.53 + .003*(GDP). The coefficient of determination is 50% with 95% CI. The model is useful.

The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 71). The data also met other assumptions and shows the absence of outliers. With the transformed data that met all the parametric assumptions, I run the multiple regression.

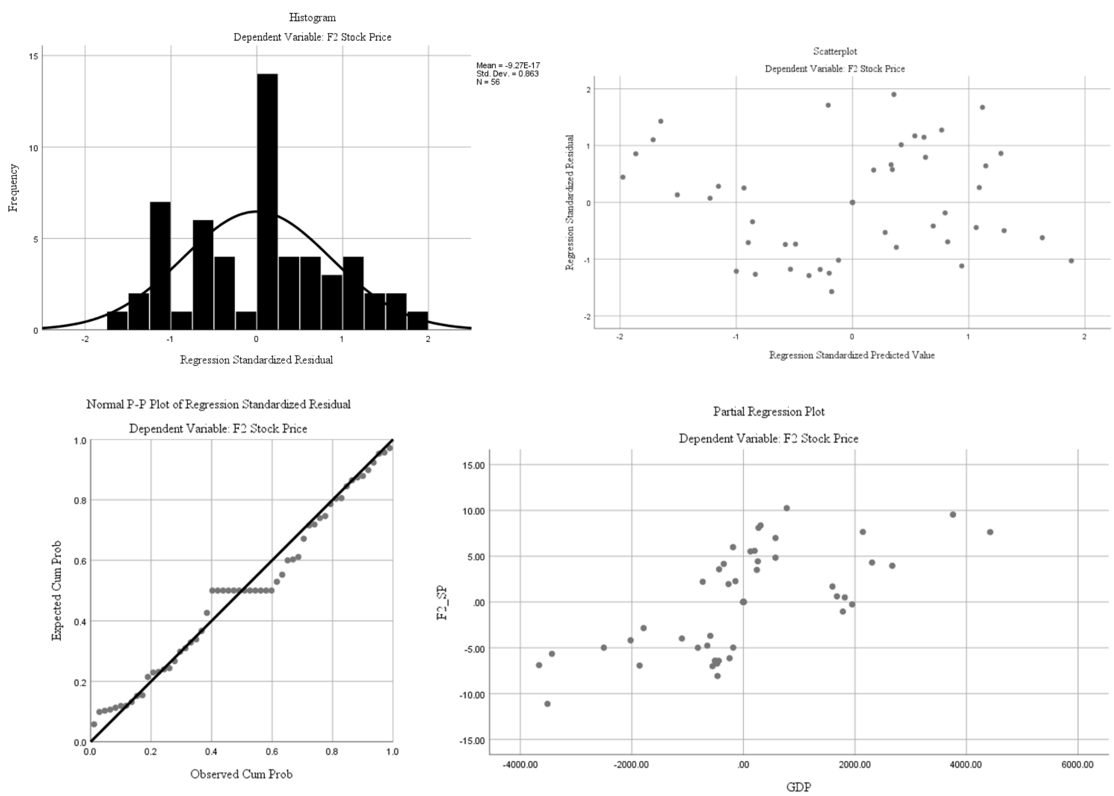


Figure 71. Multiple Regression: Stock price, NTA. GDP, & P/E - Financial

Real Estate Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of R3 from the real estate sector, I run the multiple regression analysis. After eliminating the non-contributing variable P/E, I considered two models in this case (see Table 32). Model 1 has only one predictor, GDP and Model 2 has two predictors, NTA and GDP.

For Model 1, as shown in Table 32, adj$R$^2 = .789, for GDP, B = .012, t(42) = 12.71, p = .001.

For Model 2, as shown in Table 32, adj R^2 = .827; for GDP, B = .009, t(41) = 8.159, p < .001; for NTA, B = -.006, t(41) = -3.189, p = .003. Model 1 and Model 2 were significant, but I chose Model 1 because of higher values of parametric statistics. As shown in Table 32, t statistics t(42) = 12.71.

The regression equation for predicting the stock price of R3 was $\hat{Y}$ = -135.575 + .012*(GDP). The coefficient of determination is 80% with 95% CI. The model is useful. The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 72). The data also met other assumptions and shows the absence of outliers (see Figure 73). With the transformed data that met all the parametric assumptions, I run the multiple regression.

Table 32

Hypothesis 3 - Test Results: Healthcare to Real Estate

Corp.		*B*	*t*(42)	*p*	*F*(42)	*p*	*R*^2
H1	GDP	.024	11.549	.001	133.373	.001	.755
H1	GDP	.017	7.869	.001	126.936	.001	.854
	P/E	1.791	5.442	.001			
F2	GDP	.003	6.59	.001	43.425	.001	.497
F2	GDP	.002	5.619	.001	33.930	.001	.605
	P/E	.440	3.539	.001			
R3	GDP	.012	12.71	.001	161.538	.001	.789
R3	GDP	.009	8.159	.001	103.488	.001	.827
	NTA	-.006	-3.189	.003			

Note. The test results on hypothesis 3 from the healthcare, financial and real estate sectors of the S&P 500. The stratified samples are corporations (Corp.) H1 through R3. GDP = gross domestic product of the United States. P/E = P/E. NTA = nontangible assets. *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Table 33

Hypothesis 3 - Residual & Collinearity: Healthcare to Real Estate

Corp.		Tol	*Std Resid*	Mahal	*Cooks*	Model
H1	GDP	1.00	3.197	8.076	1.151	1
H1	GDP	.579				2
	PE	.579				
F2	GDP	1.00	1.90	11.659	.118	1
F2	GDP	.865				2
	PE	.865				
R3	GDP	1.00	3.89	8.647	1.28	1
R3	GDP	.541				2
	NTA	.541				

Note. Hypothesis 3: Residual and collinearity statistics results from healthcare, financial and real estate sectors of S&P 500. The stratified samples are corporations (Corp.) *H1* through *R3*. Tol = Tolerance, Std Resid = Standardized residuals, Mahal = Mahalanobis distance D, Cooks = Cooks' distance, Model = various models

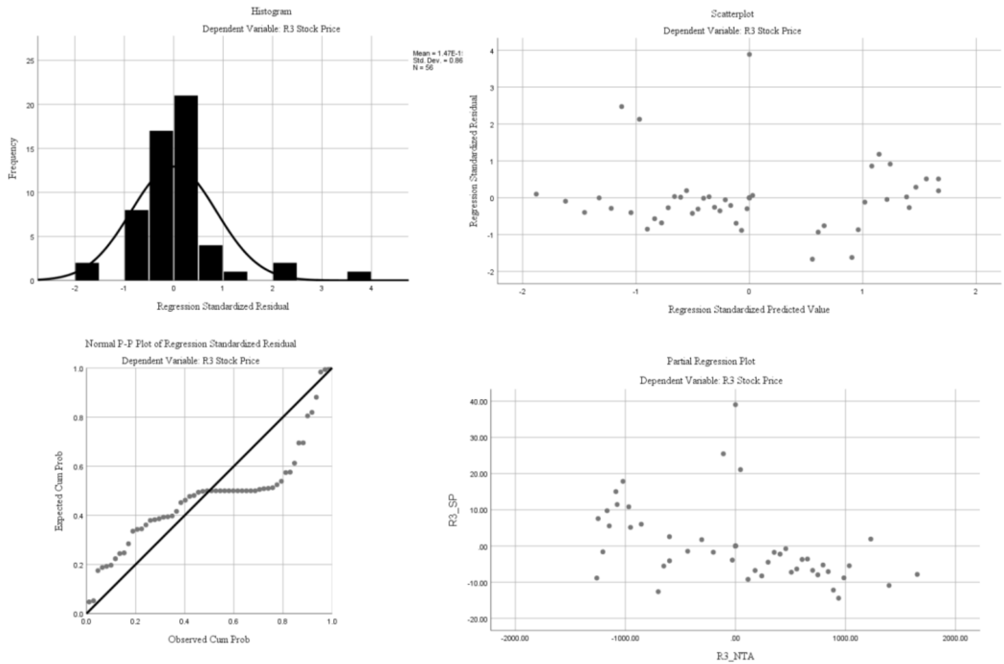


Figure 72. Multiple Regression: Stock price, NTA, GDP, & P/E – Real Estate

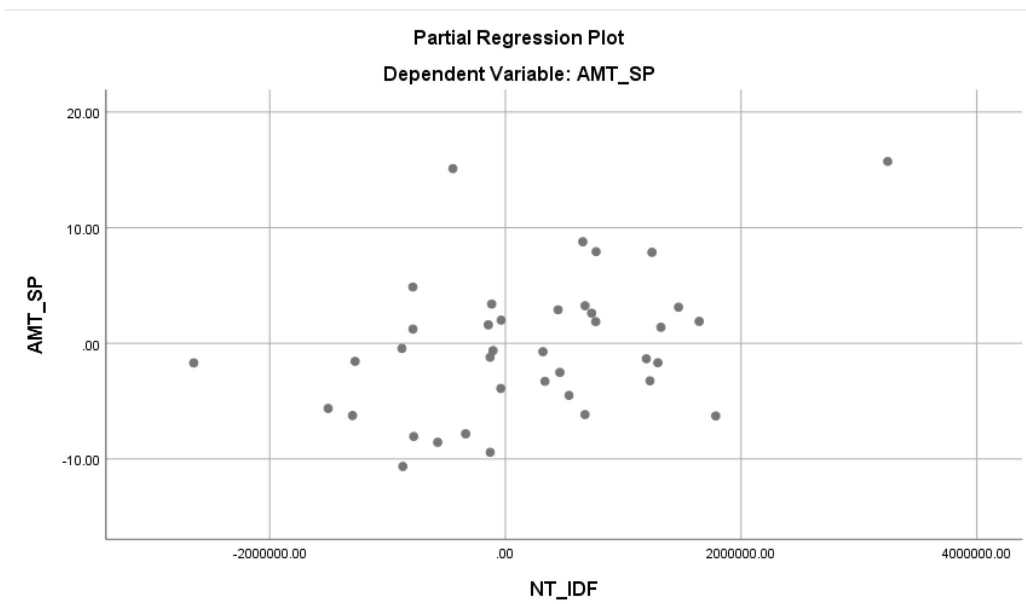


Figure 73. Partial regression plot - Stock price & NTA: Real Estate sector

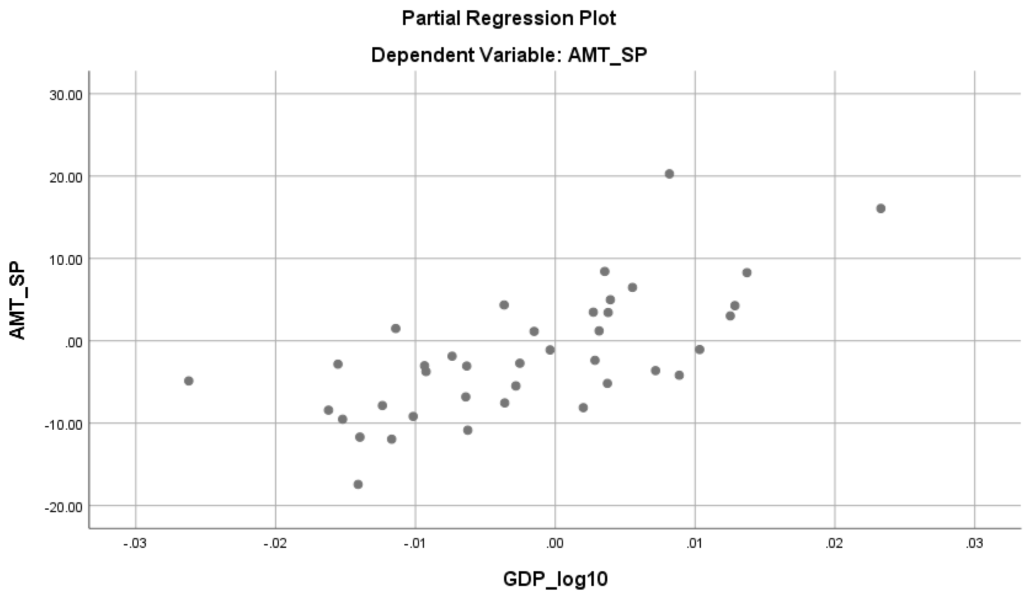


Figure 74. Partial regression plot - Stock price & GDP: Real Estate sector

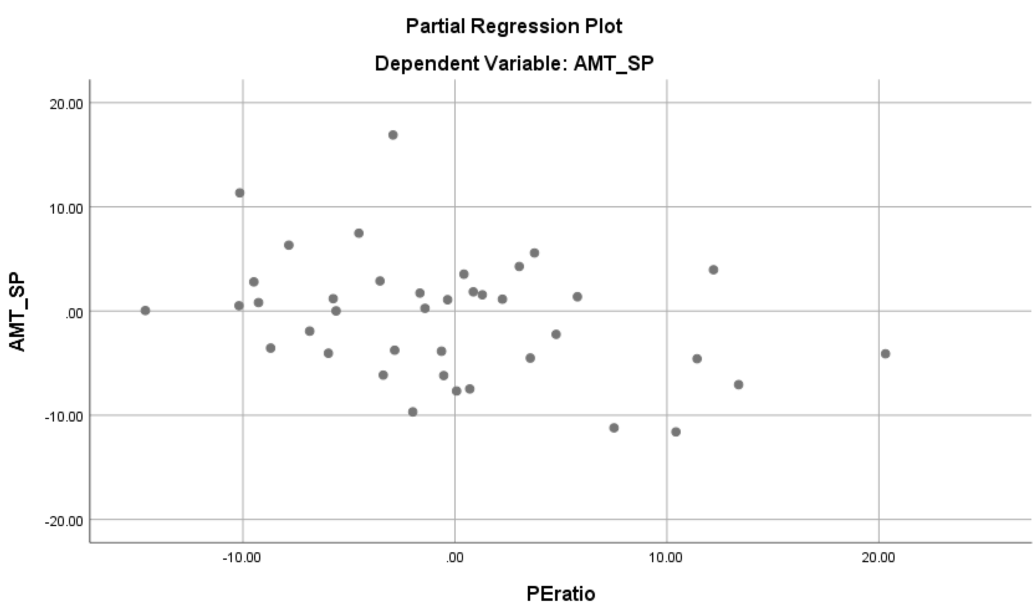


Figure 75. Partial regression plot - Stock price & P/E: Real Estate sector

Consumer Discretionary Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of CD1 from the consumer discretionary sector, I run the multiple regression analysis. With predictor GDP, I considered only one model (see Table 34). The NTA and GDP were the noncontributing variables in this case (see Table 35).

For Model 1, as shown in Table 34, adj$R$^2 = .557, for GDP, B = .184, $t(42)$ = 7.42, p = .001. F statistics also showed the model is significant ($F(42)$ = 55.07), p = .001). This result was consistent with hypothesis test 2 on CD1.

The coefficient of determination is 56% with 95% CI (see Table 34). The regression equation for predicting the stock price of CD1 is $\hat{Y}$ = -2673.28 + .184*(GDP). The model is useful. The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 76). The data also met other assumptions and shows the absence of outliers. With the transformed data that met all the parametric assumptions, I run the multiple regression.

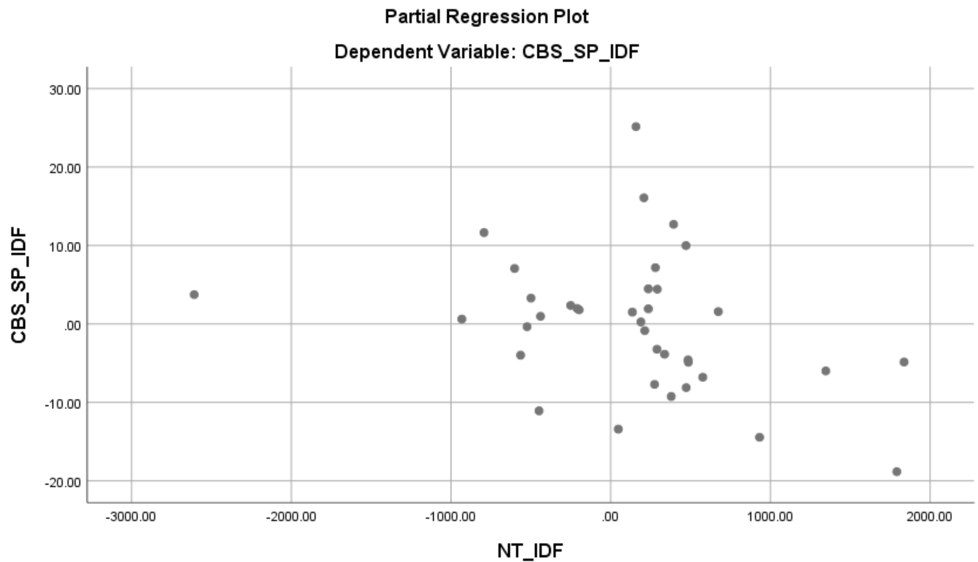


Figure 76. Partial regression plot - Stock price & NTA: Consumer disc. sector

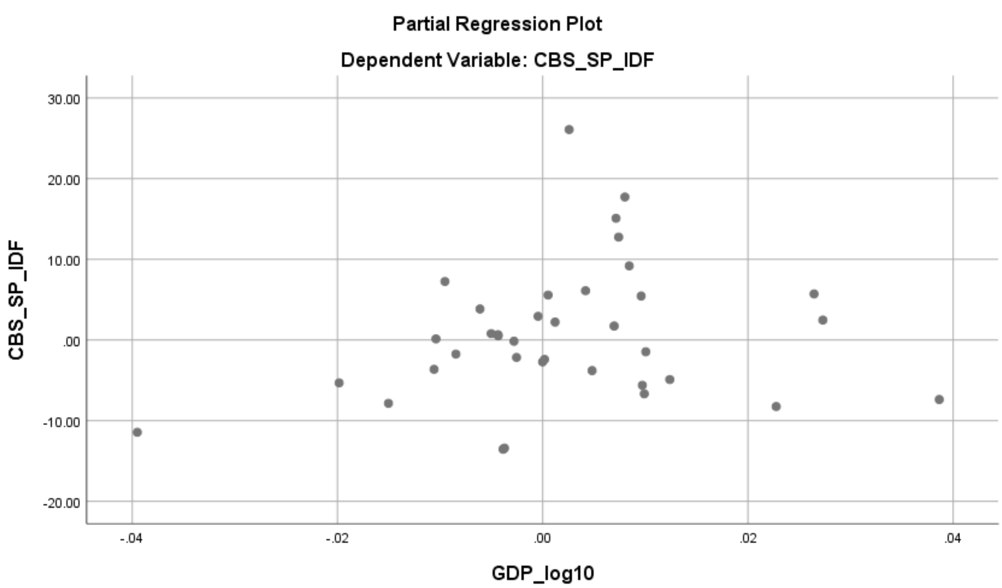


Figure 77. Partial regression plot - Stock price & GDP: Consumer disc. sector

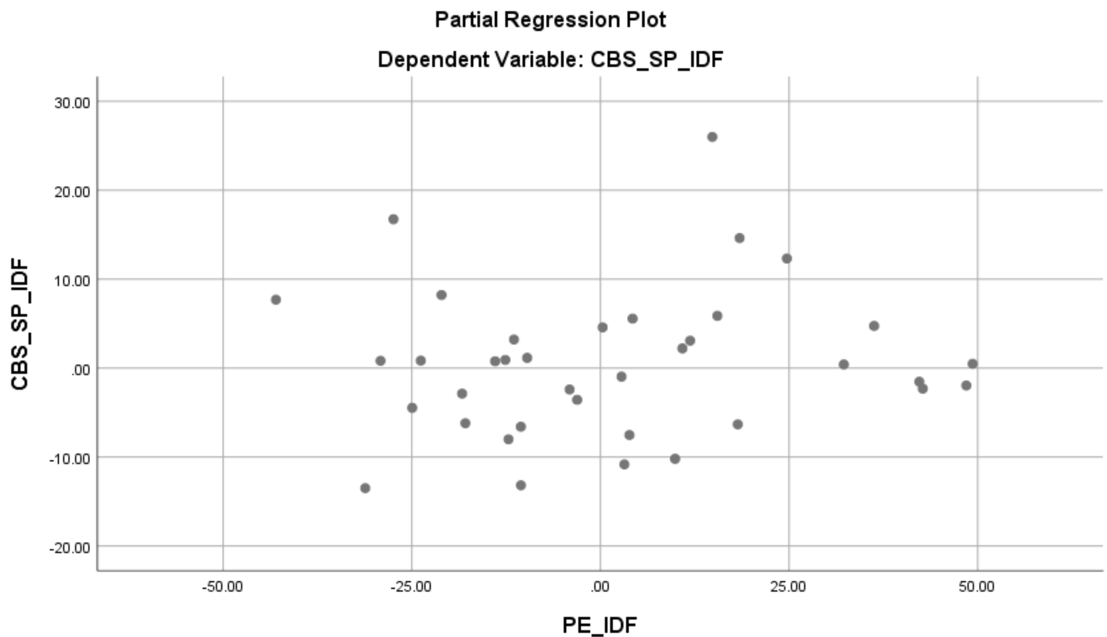


Figure 78. Partial regression plot - Stock price & P/E: Consumer disc. sector

Consumer Staples Sector

To analyze the correlation between the predictor variables, NTA, GDP, and P/E and the outcome variable stock price of CS1 from the consumer staples sector, I run the multiple regression analysis. Because all three variables were contributing to the model, I considered three models in this case (see Table 34). Model 1 has only one predictor, GDP and Model 2 has two predictors, GDP, and P/E, and Model 3 has three predictors, NTA, GDP, and P/E.

For Model 1, as shown in Table 34, adj$R$^2 = .69, for GDP, B = .008, t(42) = 9.831, p = .001.

For Model 2, as shown in Table 34, adj R^2 = .749; for GDP, *B* = .005, *t*(42) = 5.162, *p* < .001; for P/E, *B* = .701, *t*(41) = 3.296, *p* = .002.

For Model 3, as shown in Table 34, adj R^2 = .771; for GDP, *B* = .004, *t*(42) = 3.087, *p* < .004; for NTA, *B* = .001, *t*(41) = 2.224, *p* = .032; for P/E, *B* = .992, *t*(42) = 4.077, *p* = .001. As shown in Table 34. all three models were significant, but I chose Model 1 because of higher *t* statistics (*t*(42) = 9.83) and *F* statistics (*F*(42) = 96.65).

The regression equation for predicting the stock price of CS1 was $\hat{Y}$ = -70.203 + .008*(GDP). The coefficient of determination is 77% with 95% CI. The model is useful. The transformed data used for the parametric analysis shows the discernible difference and shows the data met the assumptions of linearity, normality and heteroscedasticity (see Figure 79). The data also met other assumptions and shows the absence of outliers (see Figure 82. With the transformed data that met all the parametric assumptions, I run the multiple regression.

Table 34

Hypothesis 3 – Test results: Consumer Disc. &Consumer Staples

Corp.		*B*	*t*(42)	*p*	*F*(42)	*p*	*R*^2
CD1	GDP	.184	7.421	.001	55.074	.001	.557
CS1	GDP	.008	9.831	.001	96.65	.001	.690
CS1	GDP	.005	5.162	.001	65.108	.001	.749
	P/E	.701	3.296	.002			
CS1	GDP	.004	3.087	.004	49.229	.001	.771
	P/E	.992	4.077	.001			
	NTA	.001	2.224	.032			

Note. The test results on hypothesis 3 from consumer discretionary and consumer staples sectors of the S&P 500. The stratified samples are corporations (Corp.) CD1 through CS1. GDP = gross domestic product of the United States. P/E = P/E. NTA = *nontangible assets*. *B* = unstandardized coefficient, *t* and *F* are the test statistics, *p* is the significance, *R*^2 is the coefficient of regression at 95% confidence interval.

Table 35

Hypothesis 3 - Residual & Collinearity: Consumer Disc. & Staples

Corp.		Tol	*Std Resid*	Mahal	*Cooks*	Model
CD1	GDP	1.00	5.175	4.679	.319	1
CS1	GDP	1.00	4.892	9.875	.146	1
CS1	GDP	.477				2
	P/E	.477				
CS1	GDP	.314				3
	P/E	.385				
	NTA	.658				

Note. Hypothesis 3: Residual and collinearity statistics results from consumer discretionary and consumer staples sectors of S&P 500. The stratified samples are corporations (Corp.) *CD1* through *CS1*. Tol = Tolerance, Std Resid = Standardized residuals, Mahal = Mahalanobis distance D, Cooks = Cooks’ distance, Model = various models

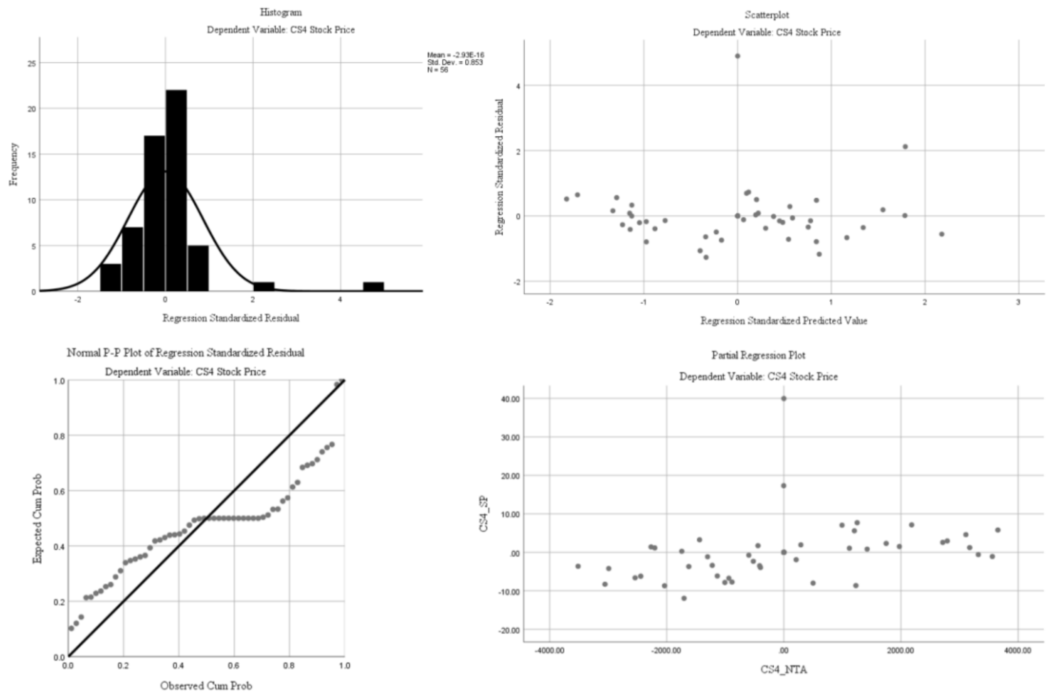


Figure 79. Multiple Regression: Stock price, NTA, GDP, & P/E – Cons. staple

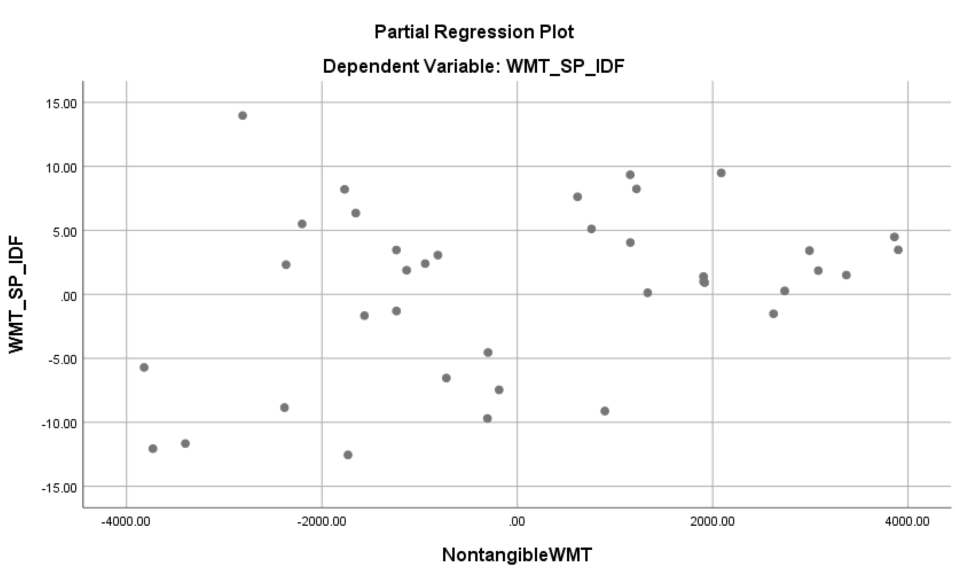


Figure 80. Partial regression plot - Stock price & NTA: Consumer staples

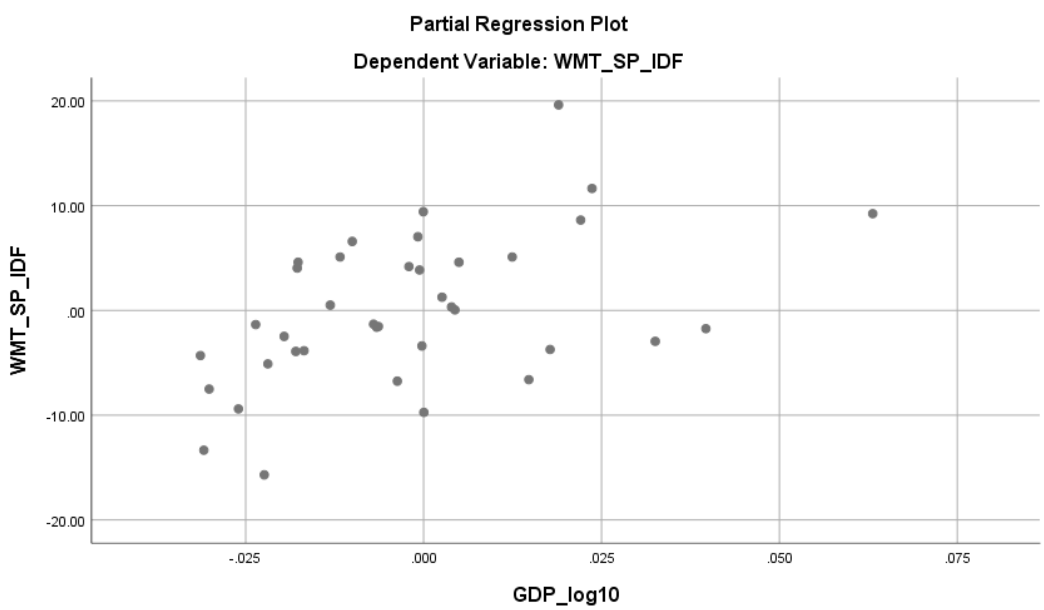


Figure 81. Partial regression plot - Stock price & GDP: Consumer staples

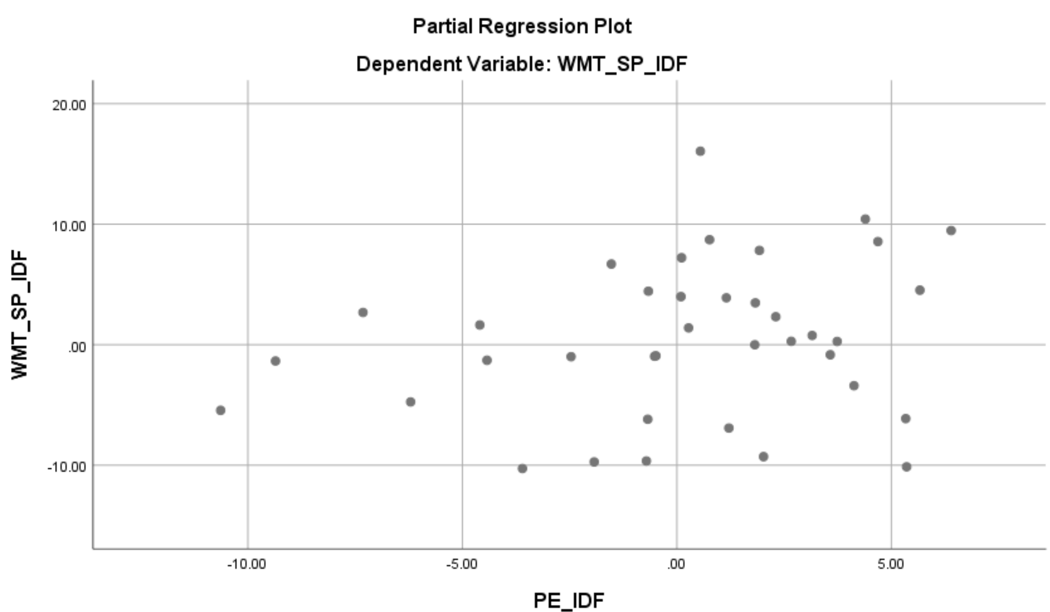


Figure 82. Partial regression plot - Stock price & P/E: Consumer staples

Summary: Hypothesis Test 3

The predictor variables in the multiple regression analysis were NTA, GDP, and the P/E and the stock price was the outcome variable. In this study, I empirically analyzed to what extent the NTA, GDP, and P/E reflected in the stock price. The scatterplots of standardized predicted values and standardized residuals showed the data of corporations from the industry sector were normally distributed and met other assumptions of linearity, independence, homoscedasticity (see Figure 14). From the multiple regression analysis, only three corporations' stock price is predictable with all the three predictors. The stock price of 19 corporations was found to be predictable with two factors and 24 corporations with one factor.

Runs Test

After the regression analysis, I move to the next stage of runs test. As shown in Figure 1, the next process of the research is to analyze whether the stock market is weak-form efficient and the stock price follows a random walk. By testing hypothesis 1, I have evidence that there was no statistically significant correlation between NTA and the stock price of 11 corporations from the 56 samples. However, the NTA of the remaining 45 corporations were significantly correlated with the stock price.

By employing the run test on a randomly selected sample corporation, I4, I tested the weak-form EMH. For that purpose, I used the stock prices of 56 corporations from Q4 2007 to Q3 2018 for the runs test. However, I present only the results of I4 from industrial sector. There were 18 runs (r =18), 13 positive (n_1 = 13) and 30 negative (n_2 = 30) changes happened during the 11 years. The number of runs (r = 18) were within the upper limit (UL = 22.01) and the lower limit (LL = 16.27). At 95% CI, r falls within the upper limit and the lower limit, the null hypothesis H0 was rejected. This result implied that the stock market was weak-form efficient and the EMH holds. However, I failed to reject the null hypothesis in 26 cases when I tested the EMH by using the runs test on 45 corporations.

When the random walk holds, the probability of increasing and decreasing the stock price must be the same, 50%. For 44 quarters (N = 44), the expected number of runs is 22. Momentum investors rejects the random walk theory. The momentum investors assume a price increase implies a further price increase and vice versa (Brigham & Ehrhardt, 2016). When the number of runs, r is between the lower limit and the upper limit, the market is weak-form efficient.

Summary

To test the three research hypotheses, I collected appropriate and proximate data on IA, goodwill, P/E, and the stock price for 56 corporations of the S&P 500 from SEC and macroeconomic data from the BEA. The data covered 44 quarters from Q4 2007 to Q3 2018. By using the stratified random sampling method, I selected 56 corporations as the GPower software program recommended 55 as the required sample at 80% confidence level for a two-tail regression analysis. There were 9900 data points in total, and the raw data required many data transformations to comply with the assumptions of regression analysis such as linearity, independence, normality, and homoscedasticity. To test the assumptions, I employed various statistical methods such as residual scatterplot and normality P-P Plot. By using simple regression, in hypothesis 1, I statistically analyzed to what extent NTA reflected in the stock price and hypothesis 2, I analyzed to what extent GDP reflected in the stock price. For 45 corporations, the correlation between NTA and the stock price is statistically significant, however, 11 cases failed to show any significance. From the hypothesis test 2, I found the GDP and the stock price are correlated in 53 cases and found no evidence of correlated in 3 cases. In hypothesis test 3, by employing multiple regression I analyzed to what extent the combination of NTA, GDP, and the P/E reflected in the stock price; GDP and P/E were included to control all the extraneous variables. With the combination of all the three predictors with the coefficient of determination above 80% at 95% confidence level, I could predict the stock price of only three corporations. When I test the weak-form EMH by using the runs test, I found 19 corporations follow the random walk however, 26 corporations failed. That implies the arbitrage opportunity exists in stock market. In Chapter 5, I discuss the results in detail and explain the limitations, recommendations, and implications of this study on positive social change.

Chapter 5 Discussion, Recommendation, and Conclusion

Introduction

In this research, to empirically analyze the implications of NTA and the macroeconomic parameter on the stock price, I engaged with 9900 data points on financial data of 56 corporations of the S&P 500 and the economic parameter of the United States for 44 quarters from Q4 2007 to Q3 2018. To what extent NTA reflected in stock price was the first research question (RQ1) and I found the statistical evidence from the analysis to answer the RQ1. The results showed that NTA and the stock price of 45 corporations out of 56 samples were statistically correlated. However, there was no evidence that that of 11 corporations were correlated. To what extent the GDP reflected in the stock price was the second research question (RQ2) and found the statistical evidence to answer the RQ2. I have compelling evidence that the GDP of 53 corporations out of the 56 samples studied were statistically correlated, but no evidence in the case of three corporations. To what extent the NTA, GDP and the P/E reflected on the stock price was the third research question (RQ3) and I also found the statistical evidence to answer RQ3. The answer to RQ3 led to creating the best fit model for predicting the stock price. In the following section of Chapter 5, I present the key findings, interpretations of the findings, implications of the study, limitations, recommendations, and the significance of this research on positive social change.

Key Findings

Correlation between NTA and Stock Price

The results from the simple regression analysis on the statistical correlation between NTA and the stock price are:

1. Out of 56 corporations selected as stratified sampling from the S&P 500 for the quantitative research that constitute financial data for 44 quarters from October 2007 through September 2018, the results show that 45 corporations have a statistically significant correlation between NTA and the stock price. However, for 11 corporations, there is no evidence for a statistically significant correlation between NTA and their respective stock prices. The combined NTA of these 11 corporations for Q3 2018 was $531.64 billion that has no statistically significant correlation with their stock prices. (H5, I2, I3, U2, M1, E1, F7, H6, CD8, I4, and F5).
2. The correlation between NTA and stock price of all the corporations sampled from the sectors such as information technology, telecommunication services, real estate, and consumer staples is statistically significant (see Table 6 through Table 27). However, the three corporations from the industrial sector alone have no significant correlation with NTA (see Table 6),

3. The NTA of 38 corporations has a positive correlation with their respective stock prices, while NTA of seven corporations has a negative correlation and 11 corporations have no statistically significant correlation. The negative correlation between NTA and the stock price of seven corporations is a serious concern.
4. The results shown that for each one million dollars increase in the NTA, the stock price of four corporations had increased by more than 10 cents (U2, CD5, CD8, and CD1) while the stock price of four corporations had decreased by more than 10 cents (CD5, U3, CD8, and E2).
5. For three corporations, (R1, IT6, I6) their NTA can explain over 80% of the variance in stock price (see Table 6, Table 7 & Table 14). NTA can explain from 60% to 80% of the variance in stock price of 14 corporations. For another 14 corporations, NTA can explain from 30 to 60% of the variance in stock price. For the other 14 corporations, NTA can explain less than 30% of the variance in stock price. However, for 11 corporations, there was no statistically significant correlation between NTA and the stock price.

Correlation between the GDP of the United States and Stock Price

The results from the simple regression analysis on the statistical correlation between GDP and the stock price are:

1. I have evidence that 53 corporations out of 56 stratified samples had a statistically significant correlation between GDP and their respective stock prices. However, three corporations (F1, E1, and E3) had no statistically significant correlation between GDP and their stock prices (see Table 19 and Table 24).
2. At 95% CI, for the slope to predict the stock price from GDP was higher than .010 for 27 corporations; thus, for each one billion dollars increase of GDP of the United States, the stock price of 27 corporations increases by 1 cent. The corporation, CD1 from the consumer discretionary sector tops the list with 18.4 cents increment and the corporation, and the corporation F1 from the financial sector was at the bottom of the list with a tenth of a cent increment for each one billion dollars increase of GDP of the United States (see Table 13).
3. The coefficient of determination, R^2 was above 80% for 33 corporations, between 60% to 80% for 12 corporations, between 30% to 60% for six corporations, and less than 30% for two corporations (see Table 17 through Table 27).
4. In the energy sector (E1 and E3), there were either no significant relationship or less significant relationship between GDP and their stock prices (see Table 8).

5. The GDP can explain over 90% of the variance in the stock price of 12 corporations R1, I6, CS2 U1, U2, IT1, IT4, U3, IT6, H5, R3 & M4 (see Table 25, Table 17, Table 27, Table 20, Table 18, Table 23 & Table 22).

Interpretation of Findings

Correlation between NTA and Stock Price

According to Cochrane (2013), the expected investment growth must link to expected stock return, but many empirical studies have proved otherwise. This empirical study has evidence that the NTA of seven corporations have negative correlations with the stock price and 11 corporations have no statistically significant correlation between NTA and the stock price. This result was consistent with the previous studies.

By using the methodology proposed by Gu and Lev (2017), another recent study claims that the IAs have a positive and significant relationship with stock performances for the computer software and hardware sector (Basso, de Oliveira, Albuquerque, Kimura, & Braune, 2015). I have statistical evidence that the NTA of seven corporations out of eight samples from the information technology sector were statistically correlated with their respective stock prices (see Table 7).

The NTA drives shareholder values, business growth, and are the ultimate capital efficient strategy, but the business community still needs to find ways to better leverage the value of already existed NTA (Sherman, 2018). As shown in Table 1, based on the Securities and Exchange Commission (SEC) data, the NTA, sum of IA and goodwill, constitute a significant portion of corporate assets (SEC, 2018). In three years, from 2014 to 2017, NTA of 30 large corporations from the United States increased by $272.11 billion. Further, the NTA of these corporations increased to $1.02 trillion in 2017 (SEC, 2018). Bryan, Rafferty, and Wigan (2017) claimed that IA is elusive in many instances. From this study, I have statistical evidence that NTA and stock price of 11 corporations have no significant relationship and for seven corporations the correlation was negative. Investment on R&D is a significant part of NTA which is a strategic asset that may not reflect in the present stock price. However, it adds value in the long run. Saad and Zantout (2014) argued that the large firms that significantly increase R&D expenditure experience negative abnormal returns for three years. The evidence from the robust statistical tests of this research are consistent with previous studies.

Correlation between GDP and Stock Price

From this research, I have compelling evidence that 53 corporations out of 56 stratified samples have a statistically significant correlation between GDP and their respective stock prices. Whether that correlation was due to GDP or the stock price or the result of the successful implementation of macroeconomic policies of the government was beyond the scope of this research. The evidence shows that corporation CD1 from the consumer discretionary sector tops the list with 18.4 cents increment in stock price for every one billion dollars increase on GDP (see Table 26).

From this study, I have statistical evidence that the GDP can explain over 80% of the variance in the stock prices of 33 corporations. For 12 corporations, GDP can explain from 60% to 80% of the variance in their stock prices; for another six corporations, GDP can explain from 30 to 60% of the variance in their stock prices; for two corporations, GDP can explain less than 30% of the variance in their stock prices. However, for three corporations, the GDP and their stock prices were not statistically significant.

The results show that the stock price of corporations from the consumer-related sectors such as consumer staples, consumer discretionary, information technology, and health care are strictly related to GDP. GDP can explain over 80% of the variance in stock prices of:

- four corporations out of four samples from the consumer staples sector (CS1, CS2, CS3, and CS4)
- three corporations out of eight samples from the consumer discretionary sector (CD4, CD6, and CD7)
- five corporations out of eight samples from the information technology sector (IT1, IT4, IT6, IT7, and IT8)
- five corporations out of six samples from the healthcare sector (H1, H3, H4, H5, and H6),

The other sectors that were strictly related to GDP were, materials, industrial, real estate, and telecommunications but financials and energy were not. The corporations that were not performing well as their counterparts (CD1, CD2, CD3, CD5, and CD8; H2*;* IT2, IT3, and IT5) should find the reason for better prospects.

The study found evidence that GDP can explain over 90% of the variance in the stock price of 12 from the industrial sector. GDP can explain over 90% of the variances in the stock price of few other corporations. They are two corporations from the real estate (R1 and R3), one from the industrial (I6), one from consumer staples (CS2), three from utilities (U1, U2, and U3), three from the information technology (IT1, IT4, and IT6), and one from the materials sector (M4).

Correlation between NTA**, GDP, P/E, and Stock Price**

From the simple regression analysis (H_a1 and H_a2), I found evidence that only three corporations for which NTA can explain over 80% of the variance in their stock prices. However, the H_a2 result show that GDP can explain over 80% of the variance in the stock price of 33 corporations. The multiple regression analysis (MRA) confirmed these results. When I used three predictors (NTA, GDP, and P/E) in MRA, in 28 cases, I eliminated both NTA and P/E from the model because they did not significantly contribute to the model. In 19 cases, I used either one of NTA or P/E (see Table 28 through Table 35).

As shown in Table 29, I4 from the industrial sector has two models. Model 1 has only one predictor GDP. Because NTA and P/E were non-contributing variables, I excluded them from the model. However, Model 2 has two predictors, GDP, and P/E. I excluded NTA from the model as it was a noncontributing variable.

The IT6 from the information technology sector has three models (see Table 29). However, I chose Model 1 because of higher *t*-value (t(42) = 15.316) and higher *F*-value (F(42) = 234.59) (see Table 29). Similarly, I chose Model 1 of U1 for the same reasons (see Table 31). In the MRA, all the models from various sectors show that the GDP was the significant contributor in the model than NTA (see Table 28 through Table 35). This evidence was consistent with the evidence obtained from the test results on hypothesis 1 and hypothesis 2. This consistency of the results from this study showed the conclusions were not due to chance. For that reason, I did not violate *Type I errors* and *Type II errors*. The model reflected the statistical significance of the variables, NTA, GDP, and P/E to predict the outcome variable, stock price. That concluded to what extent to which the macroeconomic parameter GDP and NTA of 56 corporations from 11 industry sectors of the S&P 500 reflected in the stock price.

Runs Test

By testing hypothesis 1, I had evidence that there was no statistically significant correlation between NTA and the stock price of 11 corporations from the 56 samples. However, the stock price and NTA of the remaining 45 corporations were significantly correlated. As shown in Figure 1, the next process of the research was to analyze whether the stock market was a weak-form efficient and the stock price follows a random walk.

By employing the run test on a randomly selected sample corporation, I4, I tested the weak-form EMH. For that purpose, I used the stock price of 56 corporations from Q4 2007 to Q3 2018. When the random walk holds, the probability of increasing and decreasing the stock price must be the same, 50%. For 44 quarters (*N* = 44), the expected number of runs is 22. The number of runs varies in all the 56 cases. For 30 corporations, the number of runs (*r*) was within the upper limit (*UL*) and the lower limit (*LL*). At 95% CI, *r* falls within the upper limit and the lower limit, the null hypothesis H0 was rejected. I rejected the null hypothesis for 19 corporations. However, I failed to reject the null hypothesis for another 26 corporations. The evidence was not enough to prove that the stock market was weak-form efficient. However, I accomplished the primary objective of this research from the results of the three hypotheses testing, thereby quantify the extent to which the NTA and the macroeconomic parameters reflected in the stock price.

Limitations

All the data NTA, GDP, P/E, and the stock price used in this study were in ratio scale and assumed error-free. However, measuring and reporting NTA to comply with various accounting principles was a challenge. I used the secondary data from the annual reports of corporations that the SEC publish periodically and the data on GDP from BEA. BEA is the “source of accurate and objective data” on the economy of the United States (United States Department of Commerce, 2015).

Evaluating all the IAs and determining their relationship by using performance indicators was a critical issue in modern economies (Mehrazeen, Froutan, & Attaran, 2012). The subjective and theoretical factors affect the valuation of the IA, and this varies for every corporation and in every sector, but the values of IA from the quarterly reports of corporations from the SEC website are acceptable. Accounting standards do not permit to include IA that the corporations create internally. The two accounting standards such as the GAAP and FASB treat the NTA differently. Hence foreign corporations that listed on NYSE file their financial reports only annually in their standard (FASB) are critical for comparative evaluation. Lack of quarterly report of foreign corporations listed on stock exchanges in the United States may limit the in-depth analysis.

One of the theoretical frameworks of this study was the arbitrage pricing theory, in which Ross (1976) assumed that many factors affect the stock performance but did not specify those factors. This study included only NTA and GDP as the significant predictor variables since the objective was to find the extent to which they affect the stock price. However, many internal factors, such as investments, liabilities, and NTA, or external factors, such as interest rate, exchange rate, money supply, and GDP affect the stock price.

This empirical study included only the secondary data from 56 corporations listed on NYSE and NASDAQ. However, there were 19 stock exchanges in the world whose market capitalization was over $1 trillion each, and they accounted for 87% of the global market capitalization as of April 30, 2018 (WFE, 2018). Incorporating all the corporations listed in the stock exchanges from around the world was beyond the scope of this dissertation. Hence, the stratified sampling method had been employed to select 56 corporations from every GICS sectors to incorporate the general characteristics of the various corporations of the S&P 500, listed in NYSE and NASDAQ. This selection procedure eliminated the limitations caused by having a bias in selecting samples; however, it covered only a small portion of the global market.

The relevant information that may significantly affect the stock price were many, but in this study, I included only three factors such as NTA (IA and goodwill), GDP of the United States, and P/E. After determining or calculating the variables, I employed the analytical program such as the SPSS to determine the relationship between the variables. Many assumptions related to the statistical analysis that is evident in other quantitative studies are also another limitation of this study.

According to EMH, all relevant information reflects in the stock price. That relevant information can range from country risk and business risk to the competitive edge of corporations. However, in this study, I could include only a few variables to understand the stock market phenomenon because of the limitations of the dissertation process and available resources which included the time limit.

Recommendations of the Study

The objective of this quantitative study was to empirically quantify the correlation between the NTA, P/E, GDP, and stock price. The results revealed how efficiently the past information reflected in the stock price which is a test on EMH. This study did not intend to provide additional information about the causality in the form of a qualitative study, but rather a relational study to determine the significant factors that affect the stock price. Little information existed on growth factors and rate of growth on small and medium enterprise (SME) (Brebero, Carlos Castillas & Barringer, 2011). Moreover, from the 1995-2014 data, Tripti and Arnav (2015) claimed that GDP and inflation did not affect the stock returns in the BRICS markets. More research is needed to seek a different perspective by testing the hypotheses on SME, medium-cap, and large-cap corporations with other macroeconomic parameters in a different context.

There may be a gap in the literature on the long-term value of NTA. The IA and goodwill form a significant part of the financial statements that is the value of information and knowledge and creates competitive advantage, market capitalization, and corporate growth (Peng, Lai, Chen, & Wei, 2015; Saad & Zantout, 2014). However, many developing countries including Malaysia developed IA at a slow pace; since 2004 Malaysia was developing IA at a significantly higher rate that was consistent with America, Europe, and Australia (Salamudin, Bakar, Ibrahim & Hassan, 2010). The industry needs more research in developing countries to analyze the financial implications of IA and goodwill and their relationship with stock price.

Accounting standards of the firm often lead to value-destroying decisions (Stern & Willett, 2014). The GAAP requires to write off intangible investments such as R&D and training in the year that expensed. These constraints may cause the underinvestment in the intangibles and wealth destruction which is another area for scholarly research.

The EMH and APT enabled the derivation of the hypothesis and the incorporation of different variables in this study. The variables in this study were the NTA, GDP, P/E, and the stock price. However, the theories allow the use of different variables such as earnings per share (EPS), real GDP, or interest rate in other hypotheses. This study allows the discourse community to explore similar studies in a different context and various stock market indices with different variables such as dividend yield, basic net income per share, exchange rate, interest rate.

In the Keynes' analysis, the investment expenditure is a factor that affects the interest rate, but today, many factors, such as transaction cost and capital gain tax, play a prominent role in choosing investment strategies. These variables can be the predictors in relational studies in the future. For further expanding the knowledge created from this research, the Neo-Keynesian researchers could explore the consequences of macroeconomic policies or accounting standards on the value of NTA and stock performances.

The two cognitive biases that may affect the investment decision are home bias and recency bias (Bianchi, Guidolin & Ravazzolo, 2017). The home bias is the tendency to invest large equities in a domestic market because many investors are not familiar with the opportunities and threats in a foreign market. The study on the effect of macroeconomic variables on the stock market of a foreign country could eliminate that home bias of many investors.

The sustainable growth of the corporation, expected return, and the overall economic growth are the objectives of the long-horizon investment in stocks. The link between human capital, which is one of the intangible assets, and economic growth remains critical to the empirical analysis, because of the measurement issues related to human capital stock (Skare & Lacmanovic, 2016). In this study, I did not calculate the value of NTA separately but directly obtain from the corporations' financial reports at the SEC. This procedure delimits the tedious and critical process of measuring the NTA and adds validity to this study.

Significance to Social Change

This research, the outcome of many years of dedication, prepared me to become an independent researcher and provided a different perspective on the stock market. The '*nontangible assets'* that I created for my life during this research will yield better prospects and will undoubtedly change the quality of my life, and the positive change starts from me. The compelling evidences from my research may inspire and awaken many shareholders to wisely use the resources for creating wealth in a socially responsible manner.

The evidence from this research on the implications of NTA and the economic parameter on the stock price of 56 corporations listed on NYSE and NASDAQ was compelling. By relying on the evidence, the stakeholders could focus on the value of NTA that was absent from all the valuation methods for informed investment decisions or policy-making (see Table 2). Informed investments create wealth which drives the economy. The findings of this research provide a new perspective and hope for making informed investment decisions for wealth creation. Without economic prosperity, social change is challenging.

Investors must choose the investment strategy judiciously for long-term stock investments for sustainable growth. The results of this study on the factors that significantly drive the stock price enable the investors to make intelligent investment decisions. Stocks are an excellent medium to build wealth, but only for those investors who know what they can accomplish, how to utilize the opportunities, and adapt to the volatile stock market environment.

Many studies claim that there is a positive correlation between social changes, the growth of organizations, and the growth of the global economy. The information on the effect of macroeconomic parameters and the combined effect of different factors that significantly affect the stock price of corporations may help the stakeholders for efficiently employing the limited resources for sustainable growth, which is a corporate social responsibility. This research was all about finding an analytical method to aid more informed stock investment decisions and the wealth creation for the goodwill of society. Condorcet (1796), the French philosopher, mathematician, and political scientist claim that finance and economics could solve many fundamental problems of humankind. Socially responsible wealth creation, sustainable growth, and preserving the limited resources are the necessary factors for a positive social change.

Conclusion

Sherman (2018) claimed that NTA drives shareholder value, business growth, and the ultimate capital efficient strategy, but the business community needs to find a way to better leverage the value of already existed NTA. The goal of this empirical research was to quantify the correlation between NTA, GDP, P/E, and the stock price. From this study, I have statistical evidence that the NTA of seven corporations have negative correlations with the stock price and 11 corporations have no statistically significant correlation between NTA and the stock price. In the stock market analysis, Ross (1976) claimed the macroeconomic parameters ccould be factors in a linear function. I found statistical evidence that the macroeconomic parameter, GDP can explain the variance in the stock price of 95% of the samples in this study and GDP is a factor in the linear functions of the models. These results are consistent with the previous studies that show the conclusions are not due to chance and I did not violate *Type I errors* and *Type II errors*. Epistemology is the study of pure knowledge and evidence, and in this research, I justified the claims based on evidence that has good quality, logic, and reason.

According to systems theory, many interconnected factors may affect the stock price, but this research is not feasible to incorporate all the factors that may affect the stock price. Growth needs enough cash flow to sustain it, and stocks are the financial vehicles for the corporations to raise funds to expand. Investors use various metrics and models for stock selections even if they have less success they are industry practices. There is no justification for using extremely complex forecasting models that integrate both technical and fundamental analyses because various unpredictable factors drive the market. This research was an attempt at finding an answer to the pivotal question in finance: is the stock market efficient and how significantly do NTA and the macroeconomic factor affect the stock price? By empirically analyzing the data, I found the answer to the three RQs with compelling evidence that are consistent with previous studies.

The significance for positive social change from this research is knowledge from this research about the implications of NTA and GDP on the stock price that the investors, policymakers, and other stakeholders could use for preserving the limited resources and strategically creating wealth. The stakeholders may derive many other practical insights and potential breakthrough on policy-making regarding non-tangible assets from the results of this research in which I empirically analyzed data (9900 data points) for 44 quarters from October 2007 to September 2018, on financial statements of 56 corporations of the S&P 500 and the GDP of the United States.

References

Adrangi, B., Chatrath, A., & Raffiee, K. (2014). Volatility spillovers across major equity markets of Americas. *International Journal of Business, 19*(3), 255-274. Retrieved from http://www.craig.csufresno.edu/ijb/IJB-1Frame2Source1.htm

Aerts, J. C., J., H., Botzen, W. J., W., & Werners, S. E. (2015). Portfolios of adaptation investments in water management. *Mitigation and Adaptation Strategies for Global Change, 20*(8), 1247-1265. doi:10.1007/s11027-014-9540-0

Ahmed, S. P., Ullah, G. W., & Tanzia, R. A. (2014). Factors affecting the stock price variability of Dhaka Stock Exchange. *Independent Business Review, 7*(2), 61-67. Retrieved from http://www.sb.iub.edu.bd/ibr/

Ahn, H. (2014). Does trading by small investors improve or deteriorate price efficiency? Evidence from the minimum trade unit changes on the Korea Exchange. *International Journal of Financial Studies, 2*(2), 203-219. doi:10.3390/ijfs2020203

An Tongliang, W. W. (2018). R&D value of Chinese manufacturing listed companies: Based on the financial market's valuation of corporate assets. *China Political Economy, 1*(2), 241-262, doi: 10.1108/CPE-10-2018-012

Alajbeg, D., Bubas, Z., & Sonje, V. (2012). The efficient market hypothesis:

Problems with interpretations of empirical tests. *Financial Theory and Practice, 36*(1), 53-72. Retrieved from http://www.fintp.hr/

Allirajan, M. (2017, Oct 21). India's share in global market-cap still at average levels. *The Times of India* (Online). Retrieved from https://timesofindia.indiatimes.com/business

Alves, S., & Martins, J. (2014). The Impact of Intangible Assets on Financial and Governance Policies: A Simultaneous Equation Analysis. *Journal of Applied Finance & Banking, 4*(1), 61-89. Retrieved from https://www.scienpress.com/journal_focus.asp?Main_Id=56

Amiri, A., Ravanpaknodezh, H., & Jelodari, A. (2016). Comparison of stock valuations with their intrinsic value in Tehran Stock Exchange. *Marketing and Branding Research, 3*(1), 24-40, Retrieved from http://www.imi.ir/EN/Pages/Home.aspx

Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2015). *Quantitative methods for business*. (13th ed.). Cincinnati, OH: South-Western College Publication.

André, P., Dionysiou, D., & Tsalavoutas, I. (2018). Mandated disclosures under IAS 36 Impairment of Assets and IAS 38 Intangible Assets: value relevance and impact on analysts' forecasts. *Applied Economics, 50*(7), 707-725. doi:10.1080/00036846.2017.1340570

Angelidas, T., Degiannakis, S., & Filis, G. (2015). US stock market regimes and oil price shocks. *Global Finance Journal, 28*, 132-146, doi: 10.1016/j.gfj.2015.01.006

Antonenko, P. D. (2015). The instrumental value of conceptual frameworks in educational technology research. *Educational Technology, Research and Development*, *63*(1), 53-71. doi:10.1007/s11423-014-9363-4

Arcabic, V., Globan, T., & Raguz, I. (2013). The relationship between the stock market and foreign direct investment in Croatia: Evidence from VAR and co-integration analysis. *Financial Theory and Practice*, *37*(1), 109-126. Retrieved from http://www.fintp.hr/

Areal, N., Oliveira, B., & Sampaio, R. (2013). When times get tough, gold is golden. *The European Journal of Finance, 21*(6), 507-526, doi:10.1080/1351847X.2013.854821

Arnott, R. D., Hsu, J., & Moore, P. (2005). Fundamental indexation. *Financial Analysts Journal*, *61*(2), 83-99. Retrieved from https://www.cfainstitute.org/

Asalman, Z., Alsalman, Z., & Herrera, A. M. (2015). Oil price shocks and the U.S. Stock Market: Do sign and size matter. *Energy Journal, 36*(3), 171-188. doi:10.5547/01956574.36.3.zals

Asiri, B. K., & Abdalla, M. A. (2015). Economic growth and stock market development in Bahrain. *Journal of Applied Finance and Banking, 5*(2), 67080. Retrieved from http://www.scienpress.com/journal_focus.asp?Main_Id=56

Asness, C. S., Frazzini, A., & Pedersen, L. H. (2014). Low-risk investing without industry bets. *Financial Analysts Journal*, *70*(4), 24-41. Retrieved from https://www.cfapubs.org/loi/faj

Babbie, E. R. (2015). *The practice of social research.* (14th ed.). Boston, MA: Cengage Learning.

Bachelier, L. (1900). *Louis Bachelier's theory of speculation: The origin of modern finance*. (M. Davis & A. Etheridge. Trans.). Princeton, NY: Princeton University Press.

Back, A. (2017, Nov 15). With tweak, earnings look that much better. *Wall Street Journal* (U.S. ed.). pB20. Retrieved from https://www.wsj.com/

Barak, S., & Modarres, M. (2015). Developing an approach to evaluate stocks by forecasting effective features with data mining methods. *Expert Systems with Applications*, *42*(3), 1325-1339. doi: 10.1016/j.eswa.2014.09.026

Barbero, J., Carlos Casillas, J. & Barringer, B. (2011). Forms of growth: How SMEs combine forms of growth to achieve high growth. *Journal of Management & Organization, 18* (1), 81–97. Doi: 18. 81-97. 10.5172/jmo.2012.81

Basias, N., & Pollalis, Y. (2018). Quantitative and qualitative research in business &

technology: Justifying a suitable research methodology. *Review of Integrative Business and Economics Research, 7,* 91-105. Retrieved from http://buscompress.com/journal-home.html

Basso, L. F. C., de Oliveira, J. A. S., Kimura, H., & Braune, E. S. (2015). The impact of intangibles on value creation: Comparative analysis of the Gu and Lev methodology for the United States software and hardware sector/Impacto de los intangibles sobre la creación de valor: Análisis comparativo de la metodología de gu y lev en el sector de software y hardware de estados unidos. *Investigaciones Europeas de Direccion y Economia de la Empresa, 21*(2), 73-83. doi:10.1016/j.iedee.2014.09.001

Battisti, M., Belloc, F., & Del Gatto, M. (2015). Unbundling technology adoption and TFP at the firm level: do intangibles matter? *Journal of Economics & Management Strategy*, *24*(2), 390-414. Retrieved from http://editjems.org/

Bayan, D., Rafferty, M., & Wigan, D. (2017). Capital unchained: Finance, intangible assets and the double life of capital in the offshore world. *Review of International Political Economy, 24*(1),238-246. doi:10.1080/09692290.2016.1262446

Berks, J., & DeMarzo, P. (2016). *Corporate finance.* (4th ed.). New York, NY: Pearson.

Bianchi, M. S., Corvino, A., Doni, F., & Rigolini, A. (2016). Relational capital disclosure, corporate reporting and company performance. *Journal of Intellectual Capital, 17*(2), 186-217. doi:10.1108/JIC-07-2015-0065

Bianchi, P. (2017). *The economic importance of intangible assets.* (1st ed.). Oxford, England: Taylor & Francis.

Bianchi, D., Guidolin, M., & Ravazzolo, F. (2017). Macroeconomic factors strike back: A Bayesian changepoint model of time-varying risk exposures and premia in the U.S. cross-section. Journal of Business and Economic Statistics, 35(1), 110-129. doi: 10.1080/07350015.2015.1061436

Black, F., & Scholes, M. (1973). The pricing of options and corporate liabilities. *Journal of Political Economy, 81*(3), 637-654. doi:10.1086/260062

Bloch, C. (2008). The market valuation of assets. *Economic Innovation, 17*(3), 269-284. doi:10.80/1038590601177133

Block, S. B., & Hirt, G. A. (2016). *Foundation of financial management.* (16th ed.). New York, NY: McGraw-Hill Education.

Bodie, Z. (2016). *Essentials of Investments.* (10th ed.). New York, NY: McGraw-Hill Higher Education.

Bodie, Z., Kane, A., & Marcus, A. J. (2017). *Investments.* (11th ed.). New York, NY: McGraw-Hill Education.

Borisova, G., & Brown, J. R. (2013). R&D sensitivity to asset sale proceeds: New evidence on financing constraints and intangible investment. *Journal of*

Banking & Finance, 37(1), 159-173. doi: 10.1016/j.jbankfin.2012.08.024

Bortoluzzo, A. B., Minardi, A. M. A. F., & Passos, B. C. F. (2014). Analysis of multi-scale systemic risk in brazil's financial market/Análise do risco sistemático multi-escalar no mercado financeiro do brasil. *Revista De Administração, 49*(2), 240-250. Retrieved from https://www.sciencedirect.com/journal/revista-de-administracao

Brealey, R. A., Myers, S.C., & Marcus, A. J. (2007). *Fundamentals of corporate finance.* New York, NY: McGraw-Hill Irwin.

Brealey, R. A., Myers, C. S., & Allen, F. (2013). *Principles of corporate finance.* (11 ed.). New York, NY: McGraw-Hill Irwin.

Brigham, E. F., & Ehrhardt, M. (2016). *Financial management: Theory and practice.* (15th ed.). Cincinnati, OH: South-Western College Publication.

Brooks, R. (2015). Financial management: Core concepts. (3rd ed.). New York, NY: Pearson.

Brown, W. D., He, H., & Teitel, K. (2006). Conditional conservatism and the value relevance of accounting earnings: An international study. *European Accounting Review, 15*(4), 605-626. doi:10.1080/09638180601102198

Bruce, P., & Bruce, A. (2017). *Practical statistics for data scientists: 50 essential concepts.* (1st ed.). Sebastopol, CA: O'Reilly Media.

Bryan, D., Rafferty, M., & Wigan, D. (2017). Capital unchained: Finance, intangible assets and the double life of capital in the offshore world. *Review of International Political Economy*, *24*(1), 56-86. doi: 10.1080/09692290.2016.1262446

Bryan, D., & Rafferty, M. (2018). *Risking together: How finance is dominating everyday life in Australia.* Sydney, Australia: Sydney University Press.

Brzeszczyski, J., & Mcintosh, G. (2014). Performance of portfolios composed of British SRI stocks. *Journal of Business Ethics, 120*(3), 335-362. doi:10.1007/s10551-012-1541-x

Bunnag, T. (2016). Volatility transmission in crude oil, gold, the S&P 500 and United States dollar index futures using VAR-MGARCH model. *International Journal of Energy Economics and Policy, 6*(1) Retrieved from https://www.scimagojr.com/journalsearch.php?q=21100281302&tip=sid

Cañibano, L. (2012). La relevancia de los intangibles en la información financiera. *Contaduria Universidad De Antioquia, 60*, 41-54. Retrieved from http://aprendeenlinea.udea.edu.co/revistas/index.php/cont

Cañibano, L. (2018). Accounting and intangible. *Spanish Accounting Review. 21*(1), 1-6. *Journal of Accounting Literature, 19*, 102-137. Retrieved from https://www.journals.elsevier.com/journal-of-accounting-literature/

Cardoza, K., Gray, C., & Barney, J. (2008). Patents a valuable indicator of stock performance. *The Journal of Investing, 17*(2), 68-74. Doi:

10.3905/joi.2008.707219

Caritat, M. J., & Condorcet, M. D. (1796). *Outlines of an historical view of the progress of the human mind being a posthumous work of the late M. de Condorcet.* (tr. from the French). New York, NY: Land and Ustick.

Carpenter, J. N., Lu, F., & Whitelaw, R. F. (2015). The real value of China's stock market. *National Bureau of Economic Research, Inc*. n/a. doi:10.3386/w20957

Celik, S. (2012). Theoretical and empirical review of asset pricing models: A structural synthesis. *International Journal of Economics and Financial Issues, 2*(2), 141-n/a. Retrieved from https://www.econjournals.com/index.php/ijefi

Chang, C., Huang, H., Chang, Y., & Lin, T. (2015). Stock characteristics, trading behavior, and psychological pitfalls. *Managerial Finance*, *41*(12), 1298-1317. Retrieved from http://www.emeraldinsight.com/loi/mf

Chen, C., Kohlbeck, M., & Warfield, T. (2008), Timeliness of impairment recognition: Evidence from the initial adoption of SFAS 142, *Advances in Accounting, Incorporating Advances in International Accounting, 24*(1), 72-81. Retrieved from http://maaw.info/AdvancesInAccounting.htm

Chen, L., Da, Z., & Zhao, X. (2013). What drives stock price movements? *The Review of Financial Studies*, *26*(4), 841-876. Retried from http://rfssfs.org/

Chen, L., & Pottier, S. W. (2015). The relative informativeness of analysts' stock return forecasts and rating changes for insurance companies. *Geneva Papers* *on Risk & Insurance, 40*(3), 516-537. doi:10.1057/gpp.2015.8

Chen, Y., Mantegna, R. N., Pantelous, A. A., & Zuev, K. M. (2018). A dynamic analysis of the S&P 500, FTSE 100 and EURO STOXX 50 indices under different exchange rates. *PLoS One, 13*(3) doi:10.1371/journal.pone.0194067

Cheng, P., Lin, Z., & Liu, Y. (2017). Characteristics of long-run return and risk: A unified performance metric. *The Journal of Real Estate Research, 39*(2), 165-187. Retrieved from http://pages.jh.edu/jrer/links/default.htm

Cheung, C., Hoguet, G., & Ng, S. (2015). Value, size, momentum, dividend yield, and volatility in China's A-share market. *Journal of Portfolio Management, 41*(5), 57-70. Retrieved from http://www.iijournals.com/toc/jpm/current

Chiou, C. (2015). Understanding the cash flow-fundamental ratio. *International Journal of Economics and Financial Issues, 5*(1), 148-157. Retrieved from https://www.econjournals.com/index.php/ijefi

Choe, H., Kho, B., & Stulz, R. M. (1999). Do foreign investors destabilize stock markets? The Korean experience in 1997. *Journal of Financial Economics, 54*(2), 227-264, doi:10.1016/S0304-405X(99)00037-9

Christensen, T. E., Cottrell, D. M., & Baker, R. E. (2013). *Advanced Financial Accounting.* (10th ed.). New York, NY: McGraw-Hill Education.

Chung, Y., Liao, T. L., & Chiang, Y. (2015). The selection of popular trading strategies. *Managerial Finance, 41*(6), 563-581. Retrieved from http://www.emeraldinsight.com/loi/mf

Cleary, P., & Quinn, M. (2016). Intellectual capital and business performance: An exploratory study of the impact of cloud-based accounting and finance infrastructure. *Journal of Intellectual Capital*, *17*(2), 255-278. Retrieved from https://emeraldinsight.com/journal/jic

Cochrane, J. H. (2013). Finance: Function matters, not size. *The Journal of Economic Perspectives, 27*(2), 29-50. doi:10.1257/jep.27.2.29

Corbin, J., & Strauss, A. (2017). *Basis of qualitative research: Techniques and procedures for developing grounded theory.* (4th ed.). Thousand Oaks, CA: Sage Publications.

Cooper, D. R., & Schindler, P. S. (2013). *Business research methods*. (12th ed.). New York, NY: McGraw-Hill Irwin.

Cornell University. (2018). *Transfer of intangible property to foreign corporations*. Retrieved from https://www.law.cornell.edu/cfr/text/26/1.367(d)-1T

Courtault, J. M., Kabanov, Y., Bru, B., Crepel, P., Lebon, I., & Marchand, A. (2000). Louis Bachelier on the centenary of theorie de la speculation. *Mathematical finance, 10*(3), 339-353. doi:10.1111/1467-9965.00098

Cresebro, J. W., & Borisoff, D. J. (2007). What makes qualitative research qualitative? *Qualitative Research Reports in Communication, 8(*1), 3-24. doi:10.1080/17459430701617846

Creswell, W. J. (2013*). Research design: qualitative, quantitative, and mixed methods approaches.* (4th ed.). Thousand Oaks, CA: Sage Publications.

Damodaran, A. (2016). *Damodaran on valuation: Security analysis for investment and corporate finance.* Hoboken, NJ: John Wiley & Sons.

Damodaran, A. (2017). Response to how to market the markets: The trouble with profit maximization. *Eastern Economic Journal, 43*(2), 368-369. doi:10.1057/s41302-016-0088-4

Datar, S. M., Rajan, M, V. (2016). *Horngren's cost accounting: A managerial emphasis.* (16th ed.). Upper Saddle River, NJ: Pearson.

DeFusco, R. A., McLeavey, D. W., Pinto, J. E., Anson, M. J. P., & Runkl, D. E. (2018). *Quantitative investment analysis*. Hoboken, NJ: John Wiley & Sons.

Degutis, A., & Novickyte, L. (2014). The efficient market hypothesis: A critical review of literature and methodology. *Ekonomika, 93*(2), 7-23. Retrieved from http://www.ekonomika.org.rs/en/index.html

Delost, M. E., & Nadder, T. S. (2014). Guidelines for initiating a research agenda: Research design and dissemination of results. *Clinical Laboratory Science, 27*(4), 237-244. Retrieved from https://members.ascls.org/publications

Deng, Y., Liu, C., & Zheng, Z. (2014). The price of correlation risk: Evidence from Chinese stock market. *China Finance Review International, 4*(4), 343-359.

doi: 10.1108/CFRI-01-2014-0002

Denzin, N. K. (2017). *The research act: A theoretical introduction to sociological methods.* New York, NY: Routledge.

Denzin, N. K., & Lincoln, Y. S. (2017). *The Sage handbook of qualitative research.* (5th ed.). Thousand Oaks, CA: Sage Publications.

Dickinsin, V. (2011). Cash flow patterns as a proxy for firm life cycle. *The Accounting Review, 86*(6), 1969-1994, doi:10.2308/accr-10130

Dobni, D. M., & Racine, M. D. (2016). Investors' images of the stock market: Antecedents and consequences. *Financial Services Review*, *25*(1), 1-28. Retrieved from https://www.researchgate.net/journal/1057-0810_Financial_Services_Review

Dudney, D. M., Jirasakuldech, B., Zorn, T., & Emekter, R. (2015). Do residual earnings price ratios explain cross-sectional variations in stock returns? *Managerial Finance, 41*(7), 692-713. Retrieved from http://www.emeraldinsight.com/loi/m

Dumitrescu, P. A., OacheSu, M., & Cerchia, A. E. (2015). Development and integration of a quality management system for the banking sector. *Valahian Journal of Economic Studies, 6*(4), 7-18. Retrieved from http://www.vjes.eu/

Duzinskas, R., & Arturas, J. l. (2014). Intangible asset concept: Economic thought development, definitions, peculiarities and element. *Verslo Sistemos Ir*

Ekonomika, 4(2) Retrieved from https://gid.lt/ekonomika/verslo-ekonomika-5

Dzikevicius, A., & Saranda, S. (2016). Formation of an integrated stock price forecast model in Lithuania. *Business, Management and Education, 14*(2), 292-307. doi:10.3846/bme.2016.337

Edmans, A. (2012). The link between job satisfaction and firm value, with implications for corporate social responsibility. *Academy of Management Perspectives, 26*(4), 1-19. doi:10.5465/amp.2012.0046

El-Nader, H., & Alraimony, A. D. (2013). The macroeconomic determinants of stock market development in Jordan. *International Journal of Economics and Finance, 5*(6), 91-103. Retrieved from http://www.ccsenet.org/journal/index.php/ijef

Ellis, C. D. (2014). The rise and fall of performance investing. *Financial Analysts Journal, 70*(4), 14-23. Retrieved from http://www.cfapubs.org/loi/faj

Emm, E. E., & Trevino, R. C. (2014). The changing risk-return characteristics of value and growth investing. *Journal of Financial Planning, 27*(11), 55-60. Retrieved from https://www.onefpa.org/journal/Pages/default.aspx

Epaphra, M., & Salema, E. (2018). The impact of macroeconomic variables on stock prices in Tanzania. *Journal of Economics Library*, *5*(1), 12-41. doi:10.1453/jel.v5i1.1561

Estrada, J. (2014). Rethinking risk (II): The size and value effects. *The Journal of*

Wealth Management, 17(3), 78-83,6. Retrieved from http://jwm.iijournals.com/

Fama, E. F. (1965a). Random walk in stock market prices. *Financial Analysts Journal*, *21*(5), 55-59, doi:10.2469/faj.v51.n1.1861

Fama, E. F. (1965b). The behavior of stock-market prices. *The Journal of Business, 38*(1), 34-105. Retried from https://www.jstor.org/publisher/ucpress?refreqid=excelsior%3Ac2d0f50c08c0af9bae53d39b90c79363

Fama, E. F. (1976). *Foundation of finance.* New York, NY: Basic Books.

Fama, E. F., & Schwert, G. W. (1977). Asset returns and inflation. *Journal of Financial Economics, 5*(2), 115-146, doi:10.1016/0304-405X(77)90014-9

Farooq, O. (2015). Effect of ownership concentration on capital structure: Evidence from the MENA region. *International Journal of Islamic and Middle Eastern Finance and Management, 8*(1), 99-113. Retrieved from https://www.emeraldinsight.com/journal/imefm

Farsio, F., & Fazel, S. (2013). The stock market/unemployment relationship in USA, China and Japan. *International Journal of Economics and Finance, 5*(3), 24-29. Retrieved from http://www.ccsenet.org/journal/index.php/ijef

FASB. (2017). *Financial accounting series: Intangibles-goodwill and other* (Topic 359). Retrieved from http://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1176168778106&acceptedDisclaimer=true

Favero, C. A., Gozluklu, A. E., & Tamoni, A. (2011). Demographic trends, the dividend-price ratio and the predictability of long-term stock market return. *Journal of Financial & Quantitative Analysis, 46(*5), 1493-1520. doi:10.1017/S0022109011000329

Feldman, T., Jung, A., & Klein, J. (2015). Buy and hold versus timing strategies: The winner is. *Journal of Portfolio Management, 42*(1), 110-118. doi:10.3905/jpm.2015.42.1.110

Ferretti, V., Guney, S., Montibeller, G., & von Winterfeldt, D. (2016). Testing best practices to reduce the overconfidence bias in multi-criteria decision analysis. *IEEE*, 1547–1555. doi:10.1109/HICSS.2016.195

Finch, D. J. (2010). *The stakeholder scorecard: Evaluating the influence of stakeholder relationships on corporate performance* (Order No. 3397207). Available from Dissertations & Theses @ Walden University. (205457202). Retrieved from https://ezp.waldenulibrary.org/login?url=https://search-proquest-com.ezp.waldenulibrary.org/docview/205457202?accountid=14872

Foerster, S. (2014). *Financial management: Concepts and applications*. (1st ed.). New York, NY: Pearson.

Foerster, S., Tsagarelis, J., & Wang, G. (2017). Are cash flows better stock return predictors than profits? *Financial Analysts Journal, 73*(1), 73-99. doi:10.2469/faj.v73.n1.2

Fornell, C., Morgeson III, F. V., & Hult, G. T. M. (2016). Stock returns on customer satisfaction do beat the market: Gauging the effect of a marketing intangible. *Journal of Marketing*, *80*(5), 92-107. doi: 10.1509/jm.15.0229

Galí, J., & Gambetti, L. (2015). The effects of monetary policy on stock market bubbles: Some evidence. *American Economic Journal: Macroeconomics*, 7 (1): 233-257. doi: 10.1257/mac.20140003

Gamayuni, R. R. (2015). The effect of intangible asset, financial performance and financial policies on the firm value. *International Journal of Scientific & Technology Research*, *4*(1), 202-212. Retrieved from http://www.ijstr.org/

Gay, R. D. (2016). Effect of macroeconomic variables on stock market returns for four emerging economies: Brazil, Russia, India, and China. *International Business & Economics Research Journal*, 15(3), 119-126. 10.19030/iber.v15i3.9676

Gharbi, S., Sahut, J. M., & Teulon, F. (2014). R&D investments and high-tech firms' stock return volatility. *Technological Forecasting and Social Change*, *88,* 306-312. Retrieved from https://www.journals.elsevier.com/technological-forecasting-and-social-change/

Gilovich, T, Griffin, D, Kahneman, D. (2002). *Heuristic and biases: The psychology* *of intuitive judgment.* Cambridge, UK: Cambridge University Press.

Girma, S., & Vencappa, D. (2015). Financing sources and firm-level productivity growth: Evidence from Indian manufacturing. *Journal of Productivity Analysis, 44*(3), 283-292. doi:10.1007/s11123-014-0418-7

Glenberg, A. M. (1996). *Learning from data: An introduction to statistical reasoning.* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Goodwin, C. J (2005). *Research in psychology: Methods and design.* (4th ed.). Hoboken, NJ: John Wiley & Sons.

Graziano, A. M., & Raulin, M. L. (2007). *Research methods: A process of inquiry*. New York, NY: Pearson.

Gribanov, A. V., Mitrokhin, V. V., & Vilkova, M. V. (2017). Innovation as the main factor for sustainable development of a commercial bank. *European Research Studies, 20*(4), 408-416. Retrieved from https://www.ersj.eu/

Gros, M. (2018). Goodwill impairment test disclosures under IAS 36: Compliance and disclosure quality disclosure determinants and the role of enforcement. *Corporate Ownership and Control, 16*(1-1), 145-167, doi: 10.22495/cocv16i1c1art4

Gu, A. Y. (2015). Value, growth, size, and performance along major market trends; Evidence from the U.S. semiconductor firms. *Academy of Accounting and Financial Studies Journal, 19*(1), 1-19. Retrieved from http://www.alliedacademies.org/academy-of-accounting-and-financial-studies-journal/

Gu, F., & Lev, B. (2011). Intangible assets: Measurement, drivers, and usefulness. In Managing knowledge assets and business value creation in organizations: Measures and dynamics. *IGI Global*, 110-124. doi:10.4018/978-1-60960-071-6.ch007

Gu, F., & Lev, B. (2017). Time to change your investment model. *Financial Analysts Journal*. *73(*4), 1-11. doi:10.2469/faj.v73.n4.4

Günay, S. (2015). Chaotic structure of the BRIC countries and Turkey's stock market. International *Journal of Economics and Financial Issues, 5*(2). Retrieved from https://www.econjournals.com/index.php/ijefi

Haji, A. A., & Ghazali, N. A. M. (2018). The role of intangible assets and liabilities in firm performance: Empirical evidence. *Journal of Applied Accounting Research, 19*(1), 42-59. doi: 10.1108/JAAR-12-2015-0108

Hamilton, L., & Taylor, N. (2017). *Ethnography after humanism: Power, politics and method in multi-species research*. (1st ed.). New York, NY: Palgrave Macmillan.

Harkiolakis, N. (2017). Quantitative research methods: From theory to publication. (1st ed.). Colorado Springs, CO: Creative Space Independent Publishing Platform.

Hassan, S., Mei, T. S., & Johari, H. (2017). Mediating role of operational capabilities between intellectual capital and organizational performance: A proposed theoretical framework. *Academy of Strategic Management Journal*, *16(*3), 1-12. Retrieved from https://wwjarvaw.abacademies.org/journals/academy-of-strategic-management-journal-home.html

He, Y., Ganjam, K., Lee, K., Wang, Y., Narasayya, V., Chaudhuri, S., Chu, X., & Zheng, Yudian. (2018). Transform data by example (TDE): Extensive data transformation in Excel. *SIGMOND '18 Proceedings of the 2018 International Conference on Management of Data*, 1785-1788. doi:10.1145/3183713.3193539

Herawati, A., Achsani, N. A., Hartoyo, S., & Sembel, R. (2017). IPO company stock valuation analysis 2000 - 2014. *International Journal of Organizational Innovation (Online)*. Retrieved from http://www.ijoi-online.org/

Ho, S., & Njindan Iyke, B. (2017). Determinants of stock market development: A review of the literature. *Studies in Economics and Finance*, *34*(1), 143-164. Retrieved from https://emeraldinsight.com/loi/sef

Ho, T. S. Y., & Lee, S. B. (2004). *The Oxford guide to financial modeling.* New York, NY: Oxford University Press.

Hodnett, K. (2014). Value-growth spread: Evidence from the Johannesburg stock exchange. J*ournal of Applied Business Research*, *30*(6), 1939-n/a. Retrieved from https://www.clutejournals.com/index.php/JABR

Hodnett, K., Botes, G., Daswa, K., & Davids, K. (2014). Fundamental indexes as proxies for mean-variance efficient portfolios. *Journal of Applied Business Research*, *30*(6), 1929-n/a. doi: 10.19030/jabr.v30i6.8957

Hsu, L., Kaufmann, P., & Srinivasan, S. (2017). How do franchise ownership structure and strategic investment emphasis influence stock returns and risks? *Journal of Retailing, 93*(3), 350-368. doi:10.1016/j.jretai.2017.04.004

Hubbard, L. D. (2003). Understanding internal controls. *The Internal Auditor, 60*(5), 23-25. Retrieved from https://iaonline.theiia.org/

Huang, H., Dao, M., & Fornaro, J. M. (2016). Corporate governance, SFAS 157 and cost of equity capital: Evidence from United States financial institutions. *Review of Quantitative Finance and Accounting, 46*(1), 141-177. doi:10.1007/s11156-014-0465-1

Huang, J., Shieh, J. C. P., & Kao, Y. (2015). Using economic value added over equity as indicator to measure enterprise performance in Taiwan's securities industry. *Journal of Accounting, Finance & Management Strategy, 10*(1), 13-50. Retrieved from http://performancesforum.org/JAFMS_home.html

Hubbard, D. W. (2014). *How to measure anything: Finding the value of intangibles in business.* (3rd ed.). Hoboken, NJ: Wiley.

IBM. (2018). *IBM SPSS software*. [Computer software]. Retrieved from https://www.ibm.com/analytics/spss-statistics-software

Irwin, D. A. (1991). Mercantilism as strategic trade policy: The Anglo-Dutch rivalry for the East India Trade. *Journal of Political Economy, 99*(6), 1296-1314. doi:10.1086/261801

Jarva, H. (2009). Do firms manage fair value estimates: An examination of SFAS 142 goodwill impairments. *Journal of Business Finance and Accounting, 12*(4), 1059-1086. Retrieved from https://onlinelibrary.wiley.com/journal/14685957

Johnson, B., & Christensen, L. (2016). *Educational research: Quantitative, qualitative, and mixed approaches.* (6th ed.). Thousand Oaks, CA: Sage Publications.

Kashif, M., Saad, S., Chhapra, I. U., & Ahmed, F. (2018). An empirical evidence of overreaction hypothesis on Karachi Stock Exchange (KSE). Asian Economic and Financial Review, 8(4), 449-465. doi:10.18488/journal.aefr.2018.84.449.465

Kartasova, J. (2013). Factors forming irrational Lithuanian individual investors' behaviour. *Verslo Sistemos Ir Ekonomika*, *3*(1) Retrieved from http://www.mruni.eu/lt/mokslo_darbai/vse/archyvas/dwn.php?id=342410

Khajavi, S., & Zare, A. (2016). The effect of audit quality on stock crash risk in Tehran Stock Exchange. *International Journal of Economics and Financial Issues*, *6*(1). Retrieved from https://www.econjournals.com/index.php/ijefi

Khan, R. M., Gul, F., & Ali, E. (2017). Factors influencing stock returns in listed firms of Karachi Stock Exchange. *Paradigms, 11*(2), 248-251. doi:10.24312/paradigms110219

Kim, K. T., & Hanna, S. D. (2016). The impact of the 2008-2009 stock market crash on the wealth of U.S. households. *Journal of Financial Planning, 29*(2), 54-60. Retrieved from https://www.onefpa.org/journal/Pages/default.aspx

Klimczaka, K. M., Dynel, M., & Pikos, A. (2016). Goodwill impairment test disclosures under certainty. Accounting and Management Information System, 15(4), 639-660. Retrieved from https://www.researchgate.net/publication/313552878_Goodwill_impairment_test_disclosures_under_uncertainty

Koijen, R. S., Lustig, H., & vanNieuwerburgh, S. (2017). The cross-section and time series of stock and bond returns. *Journal of Monetary Economics*, *88*, 50-69. Retrieved from https://www.journals.elsevier.com/journal-of-monetary-economics

Koller, T., Goedhart, M., & Wessels, D. (2015). *Valuation: Measuring and managing the value of companies.* (6^{th} ed.). Hoboken, NJ: Wiley.

Koniarski, T., & Sebastian, S. (2015). Inflation-protecting asset allocation: A downside risk analysis. *Journal of Portfolio Management, 41*(2), 57-70,7-8. Retrieved from http://jpm.iijournals.com/

Kong, L. L., Bai, M., & Wang, P. (2015). Is disposition related to momentum in Chinese market? *Managerial Finance, 41*(6), 600-614. Retrieved from http://www.emeraldinsight.com/loi/mf

Kucharska, W., & Flisikowski, K. (2017). The most valuable global brands and condition of economies: A spatial approach. Retrieved from http://www.badania-gospodarcze.pl/images/Working_Papers/2017_No_53.pdf

Kudryavtsev, A., Levav, E., & Shahrabani, S. (2014). Effect of inflation on nominal and real stock returns: a behavioral view. *Journal of Advanced Studies in Finance, 5*(1), 56-65. doi:10.14505/jasf.v5.1 (9).05

Kung, H., & Schmid, L. (2015). Innovation, growth, and asset prices. *The Journal of Finance*, *70*(3), 1001-1037. Retrieved from https://www.jstor.org/journal/jfinance

Lange, G., Wodon, Q., & Carey, K. (2018). *The changing wealth of nations 2018: Building a sustainable future*. Washington, DC: World Bank.

Lawal, A. I., Somoye, R. O. C., & Babajide, A. A. (2016). Impact of oil price shocks and exchange rate volatility on stock market behavior in Nigeria. *Binus Business Review, 7*(2), 171-177. doi:10.21512/bbr.v7i2.1453

Le, H. T. T., Tran, V. T., Nguyen, N. T. P., Ngo, N. S., & Huynh, T. L. D. (2018). The influence of P/EG and F-score on stock return by valued investment portfolio: Empirical evidence from Vietnam. *Asian Economic and Financial*

Review, 8(3), 377-377. doi: 10.18488/journal.aefr.2018.83.366.377

Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed method, arts-based and community based participatory research approach*. New York, NY: The Gilford Press.

Levine, D. M., Stephan, D. F., Krehbiel, T. C., & Bernson, M. L. (2011). *Statistics for managers: Using Microsoft Excel.* (6th ed.). New York, NY: Prentice-Hall.

Li, E. X. N., Liu, L. X., & Xue, C. (2014). Intangible assets and cross-sectional stock returns: Evidence from structural estimation. *SSRN.* Retrieved from http://dx.doi.org/10.2139/ssrn.1560014

Lin, G. T., & Tang, J. Y. (2009). Appraising intangible assets from the viewpoint of value drivers. *Journal of Business Ethics, 88*, 679-689. doi:10.1007/s105510089974y

Lo, A. W., & MacKinlay, A. C. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. The Review of Financial Studies, 1(1), 41-66. Retrieved from http://rfssfs.org/

Lo, A. W. (2005). Reconciling efficient markets with behavioral finance: The adaptive markets hypothesis. *The Journal of Investment Consulting, 7*(2), 21-44. Retrieved from https://investmentsandwealth.org/journalofinvestmentconsulting

Lu-Andrews, R., & Glascock, J. L. (2016). Liquidity, price behavior, and market-related events. Eastern Economic Journal, 43(2), 318-351. doi:10.1057/s41302-016-0002-0

Luo, J., & Liu, H. (2014). Family-concentrated ownership in Chinese PLCs: Does ownership concentration always enhance corporate value? *International Journal of Financial Studies, 2*(1), 103-121. doi:10.3390/ijfs2010103

Machi, L. A., & McEvoy, B. T. (2012). *The literature review, six steps to success*. Thousand Oaks, CA: Corwin.

Magnou, G. (2017). An extreme value theory for measuring financial risk in the Uruguayan funds. *Revista De Economía, 24*(1), 155-175. Retrieved from http://sem-wes.org/es/revista

Malkiel, B. G. (2016). *A random walk down Wall Street: The time-tested strategy for successful investing.* (11 ed.). New York, NY: W.W. Norton & Company.

Manasseh, C. O., Ozuzu, C. K., & Ogbuabor, J. E. (2016). Semi-strong form efficiency test of the Nigerian stock market: Evidence from event study analysis of bonus issues. *International Journal of Economics and Financial Issues, 6*(4). Retrieved from https://econpapers.repec.org/article/ecojourn1/

McConnell, C. R, & Bruce, S, L. (2014). *Macroeconomics: Principles, problems & policies.* (20th ed.). New York, NY: McGraw-Hill Education.

McAiliffe G., & Grant, J. (2014). *Wealth & wisdom: Timeless quotations and comments about money and investing* [Kindle DX version]. Retrieved from http://www.amazon.com

McCormic, K., Salcedo, J., Peck, J., & Wheeler, A. (2017). SPSS statistics for data analysis and visualization. Indianapolis, IN: John Wiley & Sons, Inc.

Meher, B. K., & Sharma, S. (2015). Is PEG ratio a better tool for valuing the companies as compared to P/E? A case study on selected automobile companies. International Journal of Banking, *Risk and Insurance, 3*(2), 48-52. Retrieved from http://www.publishingindia.com/ijbri/

Mehr-un-Nisa. & Nishat, M. (2011). The determinants of stock prices in Pakistan. *Asian Economic and Financial Review, 1*(4), 276. Retrieved from http://aessweb.com/journals/5002

Mehrazeen, A. R., Froutan, O., & Attaran, N. (2012). Establishing the relationship between trademark valuation and firm performance: Evidence from Iran. *International Journal of Economics and Finance, 4*(6), 181-186. doi:10.5539/ijef.v4n6p181

Mendoza, R. R. (2017). Relationship between intangible assets and cash flows: An empirical analysis of publicly listed corporations in the Philippines. *Review of Integrative Business and Economics Research, 6*(1), 188-202. Retrieved from http://buscompress.com/journal-home.html

Mesly, O. (2014). Asymmetry of information and competitive advantage in a closed, dynamic duopolistic system: Consequences for the regulatory authorities. *The*

Journal of Wealth Management, 17(3), 108-120. doi:10.3905/jwm.2014.2014.1.035

Mir, A. E., & Seboui, S. (2006). Corporate governance and earnings management and the relationship between economic value added and created shareholder value. *Journal of Asset Management, 7*(3), 242-254. doi:10.1057/palgrave.jam.2240216

Mishkin, F. S., Eakins, S. G., Jayakumar, T., & Puttnaik, R. K. (2017). *Financial markets and institutions*. (8th ed.). Noida, India: Pearson India

Mishkin, F. S. (2001). *The economics of money, banking, and financial markets.* (6th ed.). New York, NY: Addison-Wesley.

Miyagawa, T., Takizawa, M., & Edamura, K. (2015). Does the stock market evaluate intangible assets? An empirical analysis using data of listed firms in Japan. In *Intangibles, Market Failure and Innovation Performance* (pp. 113-138). Cambridge, MA: Springer.

Modigliani, E. F., & Miller, M. H. (1958). The Cost of Capital, Corporate Finance and the Theory of Investment. *The American Economist, 48*, 261-297. Retried from http://www.scirp.org/

Montibeller, G. & Winterfeldt, D (2015) Cognitive and motivational biases in decision and risk analysis. *Risk Anal, 35*, 1230–1251. doi:10.1111/risa.12360

Montibeller, G. & Winterfeldt, D. (2018). Individual and group biases in value and uncertainty judgments. In *Elicitation*. Cambridge, MA: Springer.

Moreira, T. (2013). Public debt, capital stock and economic growth: An analysis of fiscal sustainability in Brazil. *Journal of Economics and International Finance*, *5*(9), 343-356. doi:10.5897/JEIF2013.0532

Mudra, J. (2014). *International financial management.* (12th ed.). Cincinnati, OH: South-Western College Pub.

Nachmias, C. F., Nachmias, D., & DeWaard, J. (2014). *Research methods in the social sciences.* (8th ed.). New York, NY: Worth Publishers.

Nakhaei, H. (2016). Market value added and traditional accounting criteria: Which measure is a best predictor of stock return in Malaysian companies. *Iranian Journal of Management Studies, 9*(2), 433-455. Retrieved from https://ijms.ut.ac.ir/

NASDAQ. (2017). *Forecast 12-month forward P/EG ratio.* Retrieved from http://www.nasdaq.com/symbol/aapl/peg-ratio

Navarro, V. (2012). The crisis and fiscal policies in the peripheral countries of the Eurozone. *International Journal of Health Services, 42*(1), 1-7. doi:10.2190/HS.42.1.a

Ncube, G., & Kapingura. F. (2015). Stock market integration in Africa: The case of the Johannesburg stock exchange and selected African countries. *The International Business & Economics Research Journal (IBER)*, *14*(2), 367.

doi: 10.19030/iber.v14i2.9169.

Nguyen, N., & Nguyen, D. (2015). Hidden Markov model for stock selection. *Risks, 3*(4), 455-473. Retrieved from http://www.mdpi.com/journal/risks

Nittayakasetwat, A., & Buranasiri, J. (2014). The insight diversification characteristic of real estate security in capital market under Sharpe's asset class factor model: The case of Thai property funds. *International Journal of Trade, Economics and Finance, 5*(6), 472-476. doi:10.7763/IJTEO'ReillyF.2014.V5.418

Nogueira Reis, M. & Augusto, M. G. (2014). Determinants of firm terminal value: The perspective of North American and European financial analysts. *International Journal of Business and Economics Research (Online), 13*(4), 793-n/a. Retrieved from http://www.sciencepublishinggroup.com/journal/index?journalid=178

Noreen, E. W., Brewer, & Garrison, R. H. (2016). *Managerial accounting for managers*. (4th ed.). New York, NY: McGraw Hill.

O'Hara, M. (2014). High-frequency trading and its impact on markets. *Financial Analysts Journal, 70*(3), 18-27. Retrieved from http://www.cfapubs.org/loi/faj

O'Reilly, D. M. (2010). Do investors perceive the going-concern opinion as useful for pricing stocks? *Managerial Auditing Journal, 25*(1), 4-16. doi:10.1108/02686901011007270

Pachamanova, D. A., & Fabozzi, F. J. (2014). Recent trends in equity portfolio construction analytics. *Journal of Portfolio Management*, *40*(3), 137-151. doi: 10.3905/jpm.2014.40.3.137

Pak, O., & Mahmood, M. (2015). Impact of personality on risk tolerance and investment decisions. *International Journal of Commerce and Management*, *25*(4), 370-384. Retrieved from https://emeraldinsight.com/journal/ijcoma

Park, C. H., & Irwin, S. H. (2007). What do we know about the profitability of technical analysis? *Journal of Economic Surveys*, *21*(4), 786-826. doi:10.1111/j.1467-6419.2007.00519.x

Park, J. S., & Heaton, C. (2014). Technical trading rules in Australian financial market. *International Journal of Economics and Finance, 6*(10). doi:10.5539/ijef.v6n10p67

Parvaei, A., & Farhadi, S. (2013). The ability of explaining and predicting of economic value added (EVA) versus net income (NI), residual income (RI) & free cash flow (FCF) in Tehran stock exchange (TSE). *International Journal of Economics and Finance*, *5*(2), 67-77. doi:10.5539/ijef.v5n2p67

Pearson, K. (1905). The problem of the random walk. *Nature, 72*, 294. doi:10.1038/072294b0

Pedhazur, E. J. (1997). *Multiple regression in behavioral research*. (3rd ed.). Orlando, FL: Harcourt Brace.

Peng, C., Lai, K., Chen, M., & Wei, A. (2015). Investor sentiment, customer satisfaction and stock returns. *European Journal of Marketing, 49*(5), 827-850. Retrieved from http://www.emeraldinsight.com/loi/EJM

Peters, R. H., & Taylor, L. A. (2017). Intangible capital and the investment-q relation. *Journal of Financial Economics*, *123*(2), 251-272. Retrieved from https://www.journals.elsevier.com/journal-of-financial-economics/

Piketty, T. (2018). Capital in the 21st century. In *Inequality in the 21st century* (pp. 43-48). London, United Kingdom: Routledge.

Pirie, S. (2016). Following momentum and avoiding the 'Minsky Moment" evidence from investors on the financial instability hypothesis. *Quantitative Research in Financial Markets*, 8(3), 2005-217. doi: 10.1108/QRFM-08-2015-0034

Privitera, D., & Rieth, M. (2018). Monetary policy normalization in the euro area. DIW Roundup. *Politik im Fokus*, *119*. Retrieved from https://www.econstor.eu/handle/10419/175523

Qiming, Z., Weiyin, F., & Chen, F. (2017). Research advances on the valuation issue of private equity investment. *Nanjing Xinxi Gongcheng Daxue Xuebao, 9*(3), 332-340. doi:10.13878/j.cnki.jnuist.2017.03.012

Ragsdale, C. (2017). *Spreadsheet modeling & decision analysis: A practical introduction to business analytics.* (8th ed.). Boston, MA: Cengage Learning.

Repko, A. F., Szostak, R., & Buchberger, M. P. (2016). *Introduction to interdisciplinary studies*. Thousand Oaks, CA: Sage Publications.

Rich, R. C., Brians, C. L., Manheim, J. B., & Willnat, L. (2018). *Empirical political analysis*: Quantitative and qualitative research methods. (9th ed.). New York, NY: Routledge.

Ridley, D. (2008). *The literature review: A step-by-step guide for students.* Thousand Oaks, CA: Sage Publications.

Ripamonti, A., & Kazuo Kayo, E. (2016). Corporate governance and capital structure in Brazil: Stock, bonds and substitution. *Revista De Administração Mackenzie, 17*(5), 85-109. doi:10.1590/1678-69712016/administracao.v17n5p85-109

Rodrigues, B M. P., Navarro-Galera, A. N., Muñoz, L. A., & Lopez, S. M. D. (2015). Risk factors and drivers of financial sustainability in local government: An empirical study. *Local Government Studies, 42*(1), 29-51. doi: 10.1080/03003930.2015.1061506

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory*, *13*(3), 341-360. doi:10.1016/0022-0531(76)90046-6

Ross, S. A., Modigliani, F., Westerfield, R. W., Dockson, R. R., & Jaffe, J. (2015). *Corporate finance.* (11th ed.). New York, NY: McGraw-Hill Education.

Rossman, G. B., & Rallis, S. F. (2003). *Learning in the field: An introduction to* *qualitative research.* (2nd Ed.). Thousand Oaks, CA: Sage Publications Inc.

Rudestam, K. E., & Newton, R. R. (2007). *Surviving your dissertation: A comprehensive guide to content and process.* (3rd. ed.). Thousand Oaks, CA: Sage Publications.

Russell, M. (2016). The valuation of pharmaceutical intangibles. *Journal of Intellectual Capital, 17*(3), 484-506. Retrieved from https://emeraldinsight.com/journal/jic

Russo, A. (2016). Low-risk equity investment: From theory to practice. *Journal of Asset Management, 17*(4), 264-279. doi:10.1057/jam.2016.13

Ryack, K. N., Kraten, M., & Sheikh, A. (2016). Incorporating financial risk tolerance research into the financial planning process. *Journal of Financial Planning, 29*(10), 54-61. Retrieved from https://www.onefpa.org/journal/Pages/default.aspx

S&P Dow Jones Indices. (2018). *The S&P 500.* Retrieved from https://us.spindices.com/indices/equity/sp-500

Saad, M., & Zantout, Z. (2014). Over-investment in corporate R&D, risk, and stock returns. *Journal of Economics and Finance, 38*(3), 438-460. Retrieved from https://www.springer.com/economics/journal/12197

Sacui, V., & Szatmary, M. C. (2015). Intangible assets in business combinations. *Revista De Management Comparat International, 16*(3), 385-397. Retrieved from http://rmci.ase.ro/

Salamudin, N., Bakar, R., Ibrahim, M. K., & Hassan, F. H. (2010). Intangible assets valuation in the Malaysian capital market. *Journal of Intellectual Capital, 11*(3), 391-405. doi:10.1108.146919310110664608

Schauten, M. B. J., Stegink, R., & de Graaff, G. (2010). The discount rate for discounted cash flow valuations of intangible assets. *Managerial Finance, 36*(9), 799-811. doi:10.1108/03074351011064663

Sehgal, S., & Jain, K. (2015). Dissecting sources of price momentum: Evidence from India. *International Journal of Emerging Markets*, *10*(4), 801-819. Retrieved from https://emeraldinsight.com/journal/ijoem

Seibert, S. (2015). The bottom line: Earnings - A study of the S&P 500 operating earnings. *The Journal of Wealth Management, 18*(3), 68-72. doi:10.3905/jwm.2015.18.3.068

Sevil, G., Kamisli, M., & Kamisli, S. (2015). Asymmetry and leverage effect of political risk on volatility: The case of BIST sub-sector. *Journal of Applied Finance and Banking, 5*(6), 37-50. Retrieved from http://www.scienpress.com/journal_focus.asp?Main_Id=56

Shaikh, A. J., & Kashif, M. (2017). Asset growth anomaly and stock returns: An evidence of Karachi Stock Exchange (KSE) market. *Journal of Independent Studies & Research: Management & Social Sciences & Economics*, *15*(2).

Retrieved from http://jisr.szabist.edu.pk/

Shapiro, A. C. (2013). *Multinational financial management.* (10th ed.). New York, NY: Wiley.

Sherman, A. J. (2014). *Harvesting intangible assets: Andrew Sherman at TEDxUniversityofNevada* [Video file]. Retrieved from https://www.youtube.com/watch?v=n8RAgLdkw-s

Sherman, A. J. (2018). *Mergers and acquisitions from A to Z.* (4th ed.). Nashville, TN: AMACOM.

Sherman, H. D., & Young, S. D. (2018). The pitfalls of non-GAAP metrics. *MIT Sloan Management Review, 59*(2), 57-63. Retrieved from https://sloanreview.mit.edu/

Shiller, R. J. (2000). *Irrational exuberance.* (1st ed.). Princeton: NJ. Princeton University Press.

Shiller, R. J. (2005). Behavioral economics and institutional innovation. Retrieved from https://cowles.yale.edu/sites/default/files/files/pub/d14/d1499.pdf

Shiller, R. J. (2013). Capitalism and financial innovation. *Financial Analysts Journal*, *69*(1), 21-25. doi: 10.2307/23469452

Shiller, R. J. (2014). Speculative asset prices. *The American Economic Review, 104*(6), 1486-1517. doi:10.1257/aer.104.6.1486

Siegrist, M., & Sütterlin, B. (2014) Human and nature-caused hazards: The affect heuristic causes biased decisions. *Risk Anal, 34*,1482–1494. doi:10.1111/risa.12179

Sikalao-Lekobane, O., & Khaufelo Lekobane, K. R. (2014). Do macroeconomic variables influence domestic stock market price behavior in emerging markets? A Johansen cointegration approach to the Botswana stock market. *Journal of Economics and Behavioral Studies, 6*(5), 363-372. Retrieved from https://www.ifrnd.org/main/journals/jebs/

Simpson, T. D. (2014). *Financial markets, banking and monetary policy.* (1st ed.). New Hoboken, NJ: Wiley

Singh, J., & Kaur, K. (2014). Examining the relevance of Graham's criteria in Indian stock market. *Journal of Advances in Management Research, 11*(3), 273. Retrieved from http://www.emeraldinsight.com/journal/jamr

Singleton, R. A., & Straits, B. C. (2017). *Approaches to social research.* (6th ed.). New York, NY: Oxford University Press.

Sinha, P., & Agnihotri, S. (2015). Impact of non-normal return and market capitalization on estimation of VaR. *Journal of Indian Business Research, 7*(3), 222-242. doi: 10.1108/JIBR-12-2014-0090

Skare, M., & Lacmanovic, S. (2016). Human capital and economic growth: How strong is the nexus? *Amfiteatru Economic, 18*(43), 612-633. Retrieved from http://www.amfiteatrueconomic.ro/Home_EN.aspx

Smith, G. V., & Parr, R. L. (2000). *Valuation of intellectual property and intangible assets.* (3rd ed.). New York, NY: Wiley.

Smithers, A. (2009). *Wall Street: Imperfect markets and inept central bankers.* Hoboken, NJ: Wiley.

Smaling, A. (2003). Inductive, analytical and communicative generalization, International *Journal of Qualitative Methods, 2*(1), 52-57. doi:10.1177/160940690300200105

Smolič, G., & Skok, A. B. (2017). Value investing within the universe of S&P500 equities. *Economic and Business Review for Central and South - Eastern Europe, 19*(3), 347-363,420. doi:10.15458/85451.41

Srinivasan, R., & Umashankar, N. (2014). There's something in a name: Value relevance of congruent ticker symbols. *Customer Needs and Solutions, 1*(3), 241-252. doi:10.1007/s40547-014-0018-8

Stephen, E. A., & Okoro, E. G. (2014). Determinants of Stock Price Movement in Nigeria: Evidence from the Nigerian Stock Exchange. *Journal of Economics and Sustainable Development, 5*(3), 1-7. Retrieved from http://iiste.org/Journals/index.php/JEDS/index

Stern, J. M., & Willett, J. T. (2014). A look back at the beginning of EVA and value-based management. *Journal of Applied Corporate Finance, 26*(1), 39-46. doi:10.1111/jacf.12052

Su, W. H., & Wells, P. (2015). The association of identifiable intangible assets acquired and recognized in business acquisitions with post-acquisition firm performance. *Accounting & Finance*, *55*(4), 1171-1199. doi: 10.1111/acfi.12086

Sullivan P., Jr., & Sullivan P., Sr. (2000), Valuing intangibles companies: an intellectual capital approach, *Journal of Intellectual Capital*, *1*(4), 328-340. doi: 10.1108/14691930010359234

Sum, V. (2014). Dynamic effect of Tobin's q on price-to-earnings ratio. *Managerial Finance*, *40*(6), 634-643. doi:10.1108/MF-07-2013-0193

Sun, X., Shen, H., Cheng, X., & Zhang, Y. (2016). Market confidence predicts stock price: Beyond supply and demand. *PLoS One*, *11*(7) retrieved from http://journals.plos.org/plosone/

Tay, B., & Gan, P. (2016). The determinants of investment rewards: Evidence for selected developed and developing countries. *International Journal of Economics and Financial Issues*, *6*(3) Retrieved from https://doaj.org/

Thabet, E. H. (2014). Examining the long run relationship between the U.S. money supply (M2) and the Canadian stock market. *International Journal of Economics and Finance*, *6*(10), 180-190. Retrieved from http://www.ccsenet.org/journal/index.php/ijef

Thomas, L. B. (2006). *Money, banking and financial markets.* Mason, OH: Thomson

South-Western.

Tiwari, A. K., Dar, A. B., Bhanja, N., & Gupta, R. (2016). A historical analysis of the United States stock price index using empirical mode decomposition over 1791-2015. *Economics E-Journal, 10*(9), 1-16. doi:10.5018/economics-ejournal.ja.2016-9

Todorovic, M., Kalicanin, D., & Nojkovic, A. (2015). Practices of performance measurement in companies in the republic of Serbia. *Ekonomski Horizonti, 17*(1), 45-58. doi: 10.5937/ekonhor1501045t

Trinh, T., & Tran Ngoc Thao, L. (2017). Corporate valuation modeling for strategic financial decisions. *Asian Economic and Financial Review, 7*(12), 1153-1166. doi:10.18488/journal.aefr.2017.712.1153.1166

Tripathi, V. & Kumar, A. (2015). Do macroeconomic variables affect stock returns in BRICS markets? An ARDL approach. *Journal of Commerce & Accounting Research. 4*. doi: 10.21863/jcar/2015.4.2.008

Tsuji, C. (2006). Does EVA beat earnings and cash flow in Japan? *Applied Financial Economics, 16*, 1199-1219. doi:10.1080/09603100500447537

Tuttle, B. (2018). *Warren Buffett's net worth just dropped by $5 billion in a single day*. Retrieved from http://www.time.com/money/5134244/warren-buffett-jeff-bezos-net-worth-stock-market-crash/

U. S. Central Intelligence Agency. (2018). *The world facts*. Retrieved from https://www.cia.gov/library/publications/resources/the-world-factbook/geos/us.html

U. S. Department of Commerce. (2015). *Bureau of Economic Analysis.* Retrieved from http://www.bea.gov/

U. S. Department of Commerce. (2018). *Bureau of Economic Analysis. Industry data*. Retrieved from https://www.bea.gov/iTable/iTable.cfm?ReqID=51&step=1#reqid=51&step=51&isuri=1&5114=a&5102=15

U. S. Department of Commerce. (2018). *Bureau of Economic Analysis. National data*. Retrieved from https://www.bea.gov/iTable/iTable.cfm?reqid=19&step=3&isuri=1&1910=x&0=-9&1921=survey&1903=5&1904=1998&1905=2018&1906=q&1911=0#reqid=19&step=3&isuri=1&1910=x&0=-9&1921=survey&1903=5&1904=1998&1905=2018&1906=q&1911=0

U. S. Internal Revenue Service. (2018). *Transfer of property by and to foreign corporations.* Retrieved from https://www.irs.gov/irm/part4/irm_04-061-011

U. S. Office of Controller of the Currencies. (2015). *OCC's Quarterly Report on Bank Trading and Derivatives Activities First Quarter 2015.* Retrieved from http://www.occ.gov/topics/capital-markets/financial-markets/trading/derivatives/dq115.pdf

U.S. Securities and Exchange Commission. (2018a). *EDGAR Company filings*. Retrieved from https://www.sec.gov/edgar/searchedgar/companysearch.html

U.S. Securities and Exchange Commission. (2018b). *The role of the SEC*. Retrieved from https://www.investor.gov/introduction-investing/basics/role-sec

U.S. Securities and Exchange Commission. (2018c). *Frequently asked questions regarding the use of non-GAAP financial reporting.* Retrieved from https://www.sec.gov/divisions/corpfin/faqs/nongaapfaq.htm#ebit

U. S. Social Security Administration. (2015). *Portfolio theory, life-cycle investment and retirement income.* Retrieved from http://www.socialsecurity.gov/policy/docs/policybriefs/pb2007-02.html

U. S. Tax Court. (2018). *U.S. Tax Court*. Retrieved from https://www.ustaxcourt.gov/

Wang, Q., & Yang, HF. (2015). Earnings announcements, trading volume, and price discovery: Evidence from dual-class firms. *Review of Quantitative Finance and Accounting, 44*(4), 669-700. doi:10.1007/s11156-013-0422-4

Wang, Z. (2000). Meta-decision making: Concepts and paradigm. *Systemic Practice and Action Research,13*(1),111-115. doi:10.1023/A:1009527707143

Watson, M., Nelson, S., & Cacioppi, P. (2013). *Managerial analytics: An applied guide to principles, methods tools and best practices.* (1st ed.). New York, NY: Pearson.

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechrest, I. (1966). *Unobstructive measures: Nonreactive research in the social science.* Chicago, IL: Rand McNally.

Wei, Y., & Lin, C. Y. (2015). Intangible assets and decline: A population ecology perspective. *Journal of Management and Organization, 21*(6), 755-771. doi:10.1017/jmo.2014.83

Welch, S., & McIntyre, J. (2015). A multi-family office (MFO) 'Investment Manifesto'. *The Journal of Wealth Management, 17*(4), 9-20,5. doi: 10.3905/jwm.2015.17.4.009

Weygandt, J. J., Kimmel, P. D., & Kieso, D. E. (2016). *Financial accounting.* (10th ed.). Hoboken, NJ: Wiley.

World Bank. (2018a). *Stocks traded, total value (% of GDP).* Retrieved from https://data.worldbank.org/indicator/CM.MKT.TRAD.GD.ZS?end=2016&start=1975&view=chart

World Bank. (2018b). *Databank: World development indicators.* Retrieved from http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

World Federation of Exchanges. (2018). *WFE Annual statistics guide.* Retrieved from https://www.world-exchanges.org/home/index.php/statistics/annual-statistics

Yallwe, A. H., & Buscemi, A. (2014). An era of intangible assets. *Journal of Applied*

Finance and Banking, 4(5), 17-26. Retrieved from http://www.scienpress.com/journal_focus.asp?Main_Id=56

Yang, B. (2017). Stock market crash, new market failure theory and extremely great economic and financial crisis. *World Review of Political Economy, 8*(1), 4-34. doi: 10.13169/worlrevipoliecon.8.1.0004

Yin, Y., & Tian, R. (2015) Investor sentiment, financial report quality and stock price crash risk: Role of short-sales constraints, Emerging Markets. *Finance and Trade, 53*(3), 493-510, doi:10.1080/1540496X.2015.1093844

Yodmun, S., & Witayakiattilerd, W. (2016). Stock selection into portfolio by fuzzy quantitative analysis and fuzzy multi-criteria decision making. *Advances in Operations Research,* 1-14. doi:10.1155/2016/9530425

Yu, S. (2012). New empirical evidence on the investment success of momentum strategies based on relative stock prices. *Quantitative Financial Accounting, 39*,105–121. doi:10.1007/s11156-011-0242-3

Zikmund, W. G. 2003). *Business research methods.* (7th ed.). Mason, Ohio: Thompson South-Western.

Zhang, S. (2015). Investment in innovation and stock price behavior lessons from the United States financial crisis: Research findings. *Journal of Financial Management and Analysis, 28*(2), 1-20. Retrieved from http://www.scimagojr.com/journalsearch.php?q=17527&tip=sid

Zubac, A., Hubbard, G., & Johnson, L. W. (2010). The RBV and value creation: A managerial perspective. *European Business Review, 22*(5), 515-538. doi:10.1108/09555341011068921

Zumbrun, J. (2014). *Who owns stocks? It's not just the rich.* Retrieved from https://blogs.wsj.com/economics/2014/10/27/who-owns-stocks-its-not-just-the-rich/

Appendix

Table 36

56 Sample Corporations from the S&P 500

Ticker Symbol	Corporation
AAPL	Apple Inc
ADBE	Adobe Systems Inc
AMGN	Amgen Inc
AMT	American Tower Corp. A
AMZN	Amazon.com Inc
APC	Anadarko Petroleum Corp
APD	Air Products & Chemicals Inc
BA	Boeing Company
BAC	Bank of America Corp
BAX	Baxter International Inc
BBY	Best Buy Co. Inc
BLL	Ball Corp.
CAT	Caterpillar Inc
CBS	CBS Corp.
CSCO	Cisco Systems
CTL	CenturyLink Inc.
CTXS	Citrix Systems Inc
CVX	Chevron
DAL	Delta Airlines Inc
DIS	Disney World
DOV	Dover Corp
DUK	Duke Energy Corp
EBAY	eBay Inc
ED	Consolidated Edison Inc.
EQIX	Equinix Inc
FITB	Fifth Third Bancorp
GE	General Electric
HD	Home Depot
HIG	Hartford Financial Services Group
HON	Honeywell Int’l Inc.

Ticker Symbol	Corporation
HSY	The Hershey Company
IBM	International Business Machines
JNJ	Johnson & Johnson
JPM	JP Morgan Chase & Co
KO	Coco-Cola Company (The)
LLY	Lilly Eli & Co
MAA	Mid-American Apartment Communities Inc
MCD	MacDonald’s Corp.
MET	MetLife Inc.
MMM	3M Corporation
MRK	Merck & Co
MSFT	Microsoft
NIK	Nike
NOV	National Oilwell Varco Inc.
ORCL	Oracle Corp
PFE	Pfizer Inc.
PG	Proctor and Gambler
PNW	Pinnacle West Capital Corp.
PX	Praxair Inc.
RL	Polo Ralph Lauren
SCHW	Charles Schwab Corporation
SHW	Sherwin-Williams
T	AT&T Inc
VZ	Verizon Communications
WMT	Wal-Mart Stores