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Financial Indicators Predictability on Measures of Success During the Covid-19 Pandemic

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ABSTRACT

This paper evaluated the predictability of financial indicators on measures of success in the context of the COVID-19 pandemic within the consumer discretionary sector. Multiple Regression and Binary Logistic models are utilized to determine the significance of each indicator in predicting success. This study resulted in four financial indicators significantly predicting success for the Sharpe Ratio, Jensen's Alpha, and Economic Value Added. In the consumer discretionary space, large, undervalued companies with high sustainable growth ratios and less uniqueness were more likely to be successful during the COVID-19 pandemic. This study supports the thesis that financial indicators proven to predict and support financial success measures were applicable and accurate for consumer discretionary companies during the COVID-19 pandemic.

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Chapter 1

Introduction

This paper aims to examine traditional factors that predict successful financial performance during the 2-year period of the coronavirus pandemic from January 2020 to January 2022. This evaluation will utilize three measures of financial performance based on Johnson's 2003 study: Sharpe Ratio, Jensen's Alpha, and Economic Value Added. The Johnson study concluded that companies with large profitability, efficient working capital management, and uniqueness in business operations were the most successful during their period of study from 1982-1988 (2003). This study aims to contextualize these factors during the pandemic to see if the same factors hold true during a period of unprecedented uncertainty. In this paper, multiple regression and binary logistic models are used to evaluate significant relationships and predictability between the six factors and each performance measure.

On January 10th, 2020, the Centers for Disease Control published information regarding the novel coronavirus on its website for the first time. This virus originated in Wuhan, China and is known to spread quickly and be fatal. By March 11th, 2020, the World Health Organization declares the novel coronavirus outbreak to be a pandemic. What follows this announcement can only be described as unprecedented, as the pandemic produces shocks to global economies and healthcare networks. The United States and governments around the world impose quarantines on the nation's population and shut-down all non-essential business operations. Intense volatility and a stock market crash ensues, as the Dow Jones Industrial Average plummets 6,400 points or 26% in a matter of 4 days (Mazur et al.). Many businesses are forced to reduce their labor costs

by laying off employees, causing a ripple effect through the economy. Reduction in wages and delayed operations significantly impacts consumption, economic output, and expected future cash flows (Mazur et al.). Sectors hit the hardest by this initial crash include crude and petroleum, real estate, hospitality, and entertainment with market capitalization decreasing over 70% and daily volatility rising to around 20% (Mazur et al.).

By March 15th, 2020, the Federal Reserve lowers the federal funds rate an additional 100 basis points to 0-25 basis points. Soon after, the Federal Reserve establishes Special Purpose Vehicles like the Commercial Paper Funding Facility [1], the Primary Dealer Credit Facility [2], and the Money Market Liquidity Facility [3] to support the flow of credit to households and businesses (Fraser). Additionally, President Trump signs the Families First Coronavirus Response Act [4] into law and the Federal Reserve announces new tools to support the economy with open market purchases and credit facilities (Fraser).

The initial, and ultimately prolonged, shutdown of American business operations significantly impacts the labor force and consumer. By March 26th, 2020, initial unemployment insurance claims surpass 3.2 million, the highest level of initial claims in history (Fraser). The claims trigger responses from the government with the CARES Act [5], the largest single spending bill in US History, being signed into law to provide relief, grants, and capital to offset the impact of the pandemic (Fraser). Following a second historic rise in weekly unemployment claims of 6.6 million, the Small Business Administration announced the Paycheck Protection Program (PPP). The PPP's purpose is to provide loan forgiveness to businesses who keep all their employees on payroll for eight weeks and they utilize the funds provided for payroll, rent, mortgage interest, or utilities (Fraser). Despite many efforts by the government and the Federal

Reserve, there is no doubt that negative financial impacts from the fiscal and public health policies aimed at deterring the spread of COVID-19 harm businesses both small and large.

Chapter 2 is a literature review of previous academic publications comparing the same or similar factors used in this paper to financial success measures. Chapter 3 is a description of the six factors and three performance measures utilized and discusses the two regression models that are used in data analysis. Chapter 4 describes the data analysis methodology. Chapter 5 provides empirical results to the findings of this study. Chapter 6 is a summary of results and suggestions for further studies.

Chapter 2

Literature Review

There are research and theories on measuring financial success and shareholder value. Johnson and Soenen examines ten different indicators of success using three measures of financial performance: Sharpe index, Jensen's alpha, and Economic Value Added (EVA) (2003). The ten potential indicators outlined by the authors are: Book-to-market Ratio, size, sustainable growth rate, profitability, capital structure, liquidity, cash conversion cycle, earnings volatility, research and development expenditures, and advertising expenditures. In their methodology, Johnson and Soenen utilize an OLS regression model to determine which variables are most important to explain the levels of financial performance. Their regression proved that six indicators were especially significant where four of which have the same level of significance in explaining performance: size, sustainable growth rate, profitability, and cash conversion cycle. Their conclusion is that "especially large, profitable companies, with efficient working capital management (short cash conversion cycles) and certain degree of uniqueness (measured by advertising spending relative to sales) outperform the sample average on the three performance measures" (2003).

Research in comparison to Johnson and Soenen's conclusion by JHvH de Wet, and Y. Erasmus tested whether their findings for companies in the USA also applied to South African listed companies (2011). Their study used the same possible indicators of success and found that the relationships were less significant for South African companies. This is important to note as a measure of financial success listed in one country (USA) may not be applicable with the same metrics to indexes of other companies.

Narayan and Reddy examined the traditional and modern performance measures (ROA, ROE, ROIC, EVA) on stock returns to see if a relationship exists between these variables in today's world (2018). This is an important study to note as their results indicated a low negative relationship of EVA, ROA , ROE, and ROIC with stock returns. The evidence collected suggested that modern performance measures were more impactful on stock returns than traditional measures. The authors urged that traditional measures are more concerned with earnings and profitability whereas modern measures, like EVA, place more importance to shareholders value creation and company profits. Narayan and Reddy's study includes more present data from 2002 to 2017, but it is not directly applicable to this study as the chosen companies are Indian.

Tomal investigates stock market returns in the real estate sector during the various waves of the COVID-19 pandemic (2021). This study specifically focuses on volatility and utilizes the Garch model to evaluate the volatility shocks of the pandemic. Furthermore, Tomal's study focuses on the financial markets of the US, Australia, Turkey, Morocco, Jordan, and Poland. The results displayed that the pandemic's first wave negatively impacted stock returns solely in the US, whereas the second and third waves impacted Poland and Jordan. He urges that the pandemic crisis shows similarities to the financial crisis and the impact on US stock markets. This explains why there was significant influence of the pandemic on real estate stock returns. The study concluded that the real estate sector demonstrated high resiliency to the shock of the coronavirus pandemic.

This paper adds to the literature in several ways. First, unlike other available research, the focus of this paper is only on the S&P 500 Consumer Discretionary Sector (SRCD). Second, the time frame of this study is the 2-year focus of the coronavirus pandemic from January 2020 to

January 2022. Finally, this paper determines whether the six measures of financial success which

explain finance success measures in Johnson and Soenen also explain performance of consumer

discretionary companies during the COVID-19 pandemic (2003).

Chapter 3

Data Description

This chapter will provide an in-depth description of the data collection process and define the data factors and success indicators utilized in the regression model. As this paper focuses on consumer discretionary companies, a list of stocks from the S&P 500 Consumer Discretionary Index (SRCD) was pulled into Microsoft Excel from a Bloomberg terminal. Consumer discretionary classification is for companies that produce goods and services that are non-essential for consumers, but are desirable goods if income allows. Some examples of product types include durable goods, high-end apparel, entertainment, leisure activities, and automobiles (Scott). The list consists of 60 publicly traded companies from Advance Auto Parts Inc. to Yum! Brands Inc.

The six indicators used for selecting financially successful companies are chosen from the significance conclusion of Johnson and Soenen's research: book to market value, size, sustainable growth rate, profitability, cash conversion cycle, and advertising expenditures (2003). The common theme between the indicators are growth potential, profitability, and liquidity management. The three measures of financial success are the Sharpe ratio, Jensen's alpha, and Economic Value Added.

Book to Market

The book to market ratio (BTM) is utilized to measure a firm's value and growth opportunities. This ratio compares a firm's book value (assets minus liabilities) to its market value (price of shares multiplied by number of shares outstanding). The ratio tells investors whether its share is considered over or undervalued. A value above 1 indicates that investors are willing to pay more for the stock than its net assets are worth. This can indicate that there are future profit projections or growth estimates that investors are willing to pay for (Kenton). During the pandemic it is important to evaluate BTM as the

market capitalization of companies fluctuated with overall market volatility. BTM is computed using the average of FY 2020 and FY 2021 Bloomberg data pulls.

Total Assets (Size)

Size is computed for each company based on total assets for FY 2020 and FY 2021. Assets are anything with economic value that a corporation possesses and are purchased to add value or increase operations. Assets have benefits to firms as they can aid in cash flow generation and/or reduce expenses (Barone). In the context of the pandemic, obtaining a large amount of liquid assets in particular was increasingly important for firms to meet short-term interest payments and operating costs. During uncertain times, companies need liquidity above all to be flexible and able to withstand the crisis (Houlihan Lokey). Total assets were compiled for each company based on Bloomberg terminal data averaged from FY 2020 and FY 2021.

Sustainable Growth Rate

The sustainable growth rate (SGR) is used to display "the highest growth rate a firm can maintain without increasing its financial leverage" (Johnson and Soenen). The equation for sustainable growth rate is SG= r * ROE where r represents earnings retention rate and ROE represents Return on Equity. Earnings retention rate (r) is a ratio that measures the amount of earnings that are retained from net income after the company pays dividends out to its shareholders. The idea is to capture the growth potential of the company; the more the company retains of its net income, the higher reinvestment it makes into the business (Ready Ratios). A high sustainable growth rate allows a company to pursue organic growth opportunities or acquisitions without taking on more leverage (Johnson and Soenen). Earnings retention is important in the context of the pandemic as companies often cut dividends to have

more profit on hand. These funds could be used to reinvest into changing business operations and adapting to new product offerings. SGR is computed by taking the average of the product of Bloomberg data pulls of r and ROE for FY 2020 and FY 2021.

Profitability

To measure a firm's profitability, return on assets (ROA) is utilized. ROA is an asset utilization ratio which measures how effectively a firm utilizes and manages its assets to promote growth. The ratio aids investors in analyzing how well the company can convert its investments in assets into profits. ROA is necessary to consider during the pandemic to see how and to what extent successful companies can turn a profit during uncertain times. ROA is computed by taking the average of ROA values for FY 2020 and FY 2021 from Bloomberg terminal data.

Cash Conversion Cycle

The cash conversion cycle (CCC) produces the number of days that it takes a company to convert its investments into cash from sales. This metric accounts for time needed to sell inventory, receive payments, and cover costs of liabilities. Ultimately, the CCC measures how long receivables are held up until converted into liquid cash received. The measure is used to quantify the efficiency of company operations and cash management. The shorter or faster rate of decreasing CCC, the better in terms of a company exhibiting strong management (James). Accounting for strong management and liquidity risk during the pandemic is an important indicator of financial success. CCC is computed using FY 2020 and FY 2021 data pulled directly from Bloomberg and averaged.

Advertising Expenditures

Advertising expenditures is a unique factor to consider as it helps measure a firm's long-term investment and product ingenuity. Often, firms with more unique or specialized products find themselves in financial distress (Johnson and Soenen). Despite an initial decline in advertising spending at the beginning of the pandemic, digital advertising grew 12.2% in 2020 (Graham). As companies adjusted operations after the initial shock, online shopping became the norm and has even made a permanent impact in the way consumers shop (Geyser). For the purpose of this model, advertising expenditures were computed as a fraction of sales. Advertising expenditures and revenues were averaged between FY 2020 and FY 2021 and then divided. All data points were pulled from Bloomberg.

Sharpe Ratio

The Sharpe Ratio is used in this paper as a measure of financial success. This measure quantifies a company's returns relative to a risk-free rate and standard deviation of returns. The equation for the Sharpe ratio is: S= (Return of portfolio - risk free rate) / standard deviation of portfolio returns. The benefit of the Sharpe ratio for this study is its ability to compare risk adjusted returns of each company to the sample size average. The higher the Sharpe ratio, the better the returns are relative to investment risk. For this model, the 10-Year Treasury Note was utilized as the risk-free rate. The 10-year treasury note yields were averaged for the 2-year time window for this study and resulted in a rate of 1.16%. The Sharpe ratio for our sample size utilized the average return and standard deviation of the sample portfolio of consumer discretionary stocks.

Jensen's Alpha

Jensen's Alpha is a measure of success which evaluates a security's return relative to a portfolio and the market. The return is compared to the capital asset pricing model (CAPM) which utilizes beta as a measure of risk. Alpha can be defined as the measure of outperformance compared to a particular benchmark. The equation for Jensen's Alpha is: portfolio return – [risk free rate + Beta * (expected market return – risk free rate)]. If Jensen's Alpha is positive, then the investment is returning excess returns and beating the market. For this study, the portfolio return is the sample size of consumer discretionary stocks for our 2-year time-period which is 52.01%. The risk-free rate is the same as used for the Sharpe ratio, 1.16%. The beta is pulled from Bloomberg for each individual stock. The expected market return is the return of the S&P 500 for our desired time-period which is 47.57%. Unlike the Sharpe ratio, Jensen's Alpha compares the returns to a concerning benchmark, which is the S&P 500. Both measures provide risk-adjusted measurements or evaluations of returns (Ahem).

Economic Value Added

Economic Value Added (EVA) is the third and final measure of success for this study. EVA differs from the other two measures as it utilizes a residual income technique to indicate the profitability of a project or company. The premise of this measures is that profitability occurs when additional wealth is created for shareholders where the projects produce returns greater than their cost of capital. The equation for EVA is: Net Operating Profits After Tax (NOPAT) – (Weighted Average Cost of Capital * Equity and long-term debt). This calculation was pulled from Bloomberg for each company for FY 2020 and FY 2021 and averaged for a final value. The portfolio returns a negative average EVA of -274.53. Firms with high EVAs are likely to outperform others with lower or negative EVA over time (Corporate Finance Institute). A negative EVA for this sample size represents the hardship and lack of profitability for consumer discretionary companies during the pandemic.

Chapter 4

Data Analysis Methodology

Two regression model types are utilized in this study to measure the significance and explanatory factors of the six indicators on the three measures of success.

Multiple Regression

The multiple regression model predicts the outcome of a response variable by using several explanatory variables. In the case for this paper, three separate multiple regression models were ran based on the three different response variables: Sharpe Ratio, Jensen's Alpha, and EVA. The goal of these models is to outline the relationship between the explanatory variables and the response. This model allows the user to create predictions about a response variable based on the relationship and information known about the explanatory variables. The formula for multiple regression is:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots \beta_p x_{ip} + \epsilon$$

Where:

y_i is the dependent variable

x_i are the explanatory variables

β_0 is the y-intercept (constant term)

β_p is the slope coefficients for each explanatory variable

ϵ is the error term (residuals)

There are various assumptions that are necessary for the multiple regression model. First, there must be a linear relationship between the dependent and independent variables. Second, the independent variables are not highly correlated with one another. Third, the dependent variable data is selected

independently and randomly. Finally, the residuals of the regression should be normally distributed (Hayes).

In the outcome of the regression, the coefficient of determination (R-squared) is used to measure how much variation in the outcome of the model can be explained by the independent variables. For this regression, Adjusted R-squared is used instead, as it accounts for performance of the explanatory terms: adjusted R-squared will increase when a term improves the model more than expected, but will decrease when a predictor improves by less than expected.

For an accurate multiple regression model, there cannot be any blank values. In the data collection process, there were blank or missing values for some companies based on the Bloomberg data. The adjusted sample size accounts for companies in the consumer discretionary index that had values for all six indicators.

The three multiple regression models were computed in Microsoft Excel utilizing the SigmaXL statistical software add-in. SigmaXL utilizes a method of least squares to solve for the coefficients and constant term. The models with the highest adjusted R-squared explain the variance in the dependent variables based on the independent variables the best. The indicators with a p-value less than 0.05 are statistically significant.

Binary Logistic Regression

Three binary logistic models are run to evaluate the relationship between the six company indicators and the probability that a company's measure of success is above or below the average across the sample size. A binary logistic regression is used to analyze the relationship between one binary dependent variable (Y) and multiple independent variables (Xs). It is important to note that the Y variable is categorical and represents whether the company specific measure of success beats the sample size average amount. The response variable is 1 if yes, or 0 if no (SigmaXL).

The goal of this model is to comprehend the relationship between the independent and dependent variables. The model can assess how well the independent variables can predict the dependent variable. The model will provide a regular linear regression and a summary of accuracy based on the percent of predictions made from the model that will be correct.

In the outcome of the regression, the Likelihood Ratio p-value determines if and to what extent each indicator in the model is significant. A measure of less than .05 indicates significance. McFadden's Pseudo R-squared is used to measure how much variation in the outcome of the model can be explained by the independent variables. A value of .2 indicates a weak relationship, .2-.4 indicates a moderate relationship, and greater than .4 indicates a strong relationship. The model will also produce a percent correctly predicted value based on observed vs. predicted outcomes (SigmaXL).

For an accurate binary logistic model, there cannot be any blank values. In the data collection process, there were blank or missing values for each some companies based on the Bloomberg data. The adjusted sample size accounts for companies in the consumer discretionary index that had values for all six indicators.

The three binary logistical regression models were computed in Microsoft Excel utilizing the SigmaXL statistical software add-in. SigmaXL utilizes a method of maximum likelihood to solve for the coefficients and constant term. The models with the highest Pseudo R-squared and percent correctly predicted best explain the variance in the dependent variables based on the independent variables.

Chapter 5

Empirical Results

The regression outputs identified that the requirement for the data set to be normally distributed was not met. This resulted in inconclusive data interpretations between both models. The two outliers were identified by the studentized residuals and had high leverage. The outliers impacted the results of this study. The initial regression results and interpretation can be found in Appendix B. The following regression results are without the outliers Amazon Inc. (AMZN) and Tapestry Inc. (TPR).

Multiple Regression Results

The results of the multiple regression model for each financial success measure confirm four of the six indicators are significant amongst the three models. The results are analyzed first by how well the indicators explain the success measure (adjusted R-squared) and second, on an individual indicator basis through p-value significance levels. The cells in Table 1 contain the adjusted R-squared and p-value probabilities for each indicator.

Table 1: Multiple Regression Empirical Results

Variable	Sharpe Ratio		Jensen's Alpha		EVA	
Adjusted R-squared	53.87%		36.93%		69.93%	
	Coefficicent	Prob.	Coefficient	Prob	Coefficient	Prob.
Constant	0.000488856	0.98	0.56343291	0.32	267.874075	0.70
BTM	4.21972E-05	0.88	0.02210598	0.01	-8.4672535	0.41
TA	6.48849E-07	0.00	-1.125E-05	0.01	-0.031492	0.00
SGR	1.46665E-07	0.87	5.7894E-05	0.04	-0.0177943	0.59
ROA	0.000146958	0.90	-0.0187547	0.57	43.2945507	0.30
CCC	0.000112369	0.30	0.00115498	0.71	-0.5281138	0.89
ADV	-0.208735247	0.50	-20.236347	0.04	-1562.3366	0.89

The three regression models for each financial success measure can be significantly explained by the four indicators. The Sharpe Ratio model proves a moderate relationship and ability of the indicators to explain variance in the dependent variable, at an adjusted R-squared value of 53.87%. The p-value for TA (total assets) in the Sharpe Ratio regression proves significant at the .05 level. This indicates that there is strong evidence against the null hypothesis that there is no relationship between the total assets and the Sharpe Ratio. Jensen's Alpha proves a moderate relationship and ability to explain variance in the data at an adjusted R-squared level of 36.93%. BTM (Book to Market), TA (total assets), SGR (Sustainable Growth Rate), and ADV (Advertising Expenditures) all prove equally significant at the .05 level. For EVA, the regression model suggests there is a stronger than moderate relationship between the indicators and EVA as the adjusted R-squared is 69.93%. TA is significant at the .05 level.

The results of the multiple regression model suggest that four of the six independent variables (indicators) explain the variance in the dependent variables (success measures) as each model returned a moderate or strong relationship level of adjusted R-squared. The multiple regression models suggest that in the consumer discretionary space, large, undervalued companies with high sustainable growth ratios and less uniqueness were more likely to be successful during the COVID-19 pandemic.

Binary Logistic Regression Results

For the binary logistic regression model, the responsive variable is a dummy variable which represents whether the measure of financial success is greater than the average for the sample size. The Likelihood Ratio p-value and McFadden's Pseudo R-squared determine the presence of a significant model and how much variability in the dependent variable can be explained by the independent variables. Table 2 displays these values for each financial measure of success.

Table 2: Binary Logistic Model Summary of Results

Variable	Sharpe Ratio	Jensen's Alpha	EVA
Likelihood Ratio P-value	0.003	0.0756	0.003
McFadden's Pseudo R-squared	71.74%	36.51%	71.99%

For the binary logistic models, there is significance in the Sharpe Ratio and EVA, at Pseudo R-squared levels of 71.74% and 71.99% representing strong relationships. A weaker relationship at the .10 significance level exists for Jensen's Alpha as displayed by the 36.51% Pseudo R-squared level.

The Binary Logistic Model also returns a percent correctly predicted. This model will predict how many of the firms will under or outperform the average financial success measure. Sensitivity in this model is the probability that the model will predict underperformance among the firms who are observed to underperform (A/A+C). Specificity is the probability that the predicted number of firms who outperform are those who are observed to be outperforming (D/D+B). The summary of these results will be the "percent correctly predicted". A value greater than 50% means the model predicts better than a guess. Table 3 provides a visualization of observed results versus predicted outcomes. Table 4 provides observed and predicted outcomes for the Sharpe Ratio. Table 5 provides observed and predicted outcomes for Jensen's Alpha. Table 6 provides observed and predicted outcomes for EVA.

Table 3: Interpretation of observed vs. predicted outcomes

Observed Outcome	Predicted Outcome	
	$\hat{Y} = 0$	$\hat{Y} = 1$
Y = 0	True Underperformer (A)	False Outperformer (C)
Y = 1	False Underperformer (B)	True Outperformer (D)

Table 4: Observed vs. predicted outcomes: Sharpe Ratio

Observed Outcome	Predicted Outcome		Row Total
	$\hat{Y} = 0$	$\hat{Y} = 1$	
Y = 0	18	1	19
Y = 1	2	4	6
Column Total	20	5	25
Percent Correctly Predicted:	88.00%		

Table 5: Observed vs. predicted outcomes: Jensen's Alpha

Observed Outcome	Predicted Outcome		Row Total
	$\hat{Y} = 0$	$\hat{Y} = 1$	
Y = 0	6	2	8
Y = 1	0	17	17
Column Total	6	19	25
Percent Correctly Predicted:	92.00%		

Table 6: Observed vs. predicted outcomes: EVA

Observed Outcome	Predicted Outcome		Row Total
	$\hat{Y} = 0$	$\hat{Y} = 1$	
Y = 0	5	1	6
Y = 1	1	18	19
Column Total	6	19	25
Percent Correctly Predicted:	92.00%		

The high percent correctly predicted amongst all three of the financial success measures suggest that the model can predict better than a guess whether a firm will out of underperform. The model shows high sensitivity and specificity for all three financial success measures. The binary logistic regression models provide support for the importance of the four indicators in determining whether a firm will over or underperform amongst their sample size.

Chapter 6

Conclusion

This paper attempts to prove whether the six indicators determined to be significant for predicting financial success in Johnson and Soenen's paper applied to consumer discretionary companies during the height of the COVID-19 pandemic (2003). The success measures outlined in this paper are Sharpe Ratio, Jensen's Alpha, and EVA. Three multiple regression analyses are performed on the indicators and each respective measure to evaluate the existence of a significant relationship. Three binary logistic regression models are performed to test the indicators' ability to predict whether a company will under or outperform its sample size for each financial measure.

The analyses performed in this study conclude that four of the six indicators were significant in explaining all three financial measures. The multiple regression model suggests that book to market ratio, total assets, sustainable growth rate, and advertising expenses are all significant indicators at the 95% confidence level. The binary logistic model supports the multiple regression model conclusion by determining a high degree of predictability for the three financial measures. Together, both outcomes support the statement that during the COVID-19 pandemic, consumer discretionary companies that were large and undervalued with high sustainable growth ratios and less uniqueness were more likely to be successful.

While the outcome of this study did not support all six factors proven by Johnson and Soenen, the predominant outcome is that indicators of success predict consumer discretionary company performance during the pandemic.

Further research is needed on this subject. At the time of this paper's distribution, COVID-19 is still prevalent. Additionally, the scope of this paper may be expanded to account for companies across all sectors. Sample size was a limitation for this study and outliers impacted the initial regression model. Accounting for a larger sample size with more robust data collection techniques may reveal further

support for the six indicators. Additional indicators and financial success measures could be incorporated to evaluate other valuation and speculation theories.

Investors rely on the forecasting and relative valuation capabilities associated with financial success measures. This study supports the thesis that financial indicators proven to predict and support financial success measures were applicable and accurate for consumer discretionary companies during the COVID-19 pandemic.

Appendix A

Fiscal and Monetary Policy Tools

Commercial Paper Funding Facility

On March 17th, 2020, the Federal Reserve established the CPFF to support the flow of credit to households and businesses. The facility finances a range of products from auto loans, mortgages, and operating liquidity for struggling businesses (Board of Governors of the Federal Reserve System, "Commercial Paper Funding Facility").

Primary Dealer Credit Facility

On March 17th, 2020, the Federal Reserve established the PDCF to support credit needs of American household and businesses. This facility allowed primary dealers to continue their operations of supplying credit and smooth market functionality. The PDCF no longer extends credit as of March 31st, 2021 (Board of Governors of the Federal Reserve System, "Primary Dealer Credit Facility").

Money Market Mutual Fund Liquidity Facility

On March 18th, 2020, the Federal Reserve established the MMLF in order to expand its support of credit flow to households and businesses. Eligible institutions received funds from the Federal Reserve Bank of Boston, which were secured by high-quality assets. Families, businesses, and corporations utilize money market funds (MMFs) as common investment tools. Ensuring the functionality and ability of MMFs to meet redemptions was essential for broad economy operations. The MMLF no longer extends

credit as of March 31st, 2021 (Board of Governors of the Federal Reserve System, "Money Market Mutual Fund Liquidity Facility").

Families First Coronavirus Response Act

On March 18th, 2020, President Trump signed the Families First Coronavirus Response Act into law. The purpose of this act was to address the pandemic with seven meaningful divisions: preparedness and response, nutrition wavers, emergency family and medical leave expansion, emergency unemployment insurance stabilization and access, emergency paid sick leave act, health provisions, and tax credit for paid sick family and medical leave. The act provided $3.47bn in funding (Moss et al.).

CARES Act

On March 27th, 2020, President Trump signed the Coronavirus Aid, Relief, and Economic Security Act (CARES) into law. The $2.2 trillion economic stimulus bill was provided in response to the economic fallout of the pandemic. The act provided $367bn to a loan and grant program for small businesses, expanded unemployment benefits, provided direct payments to families, provided $130bn to healthcare systems, distributed $500bn in funding for loans to corporations, provided $32bn for airlines and airline related industries, banned stock buybacks for companies receiving loans, and distributed $1150bn to state and local governments (The Investopedia Team).

Appendix B

Regression Model Results with Outliers

Figures 1 and 2 provide an example of the non-normal distribution versus normal distribution with outliers. The regression analysis without outliers represents a normal distribution and satisfies the assumption for multiple regressions.

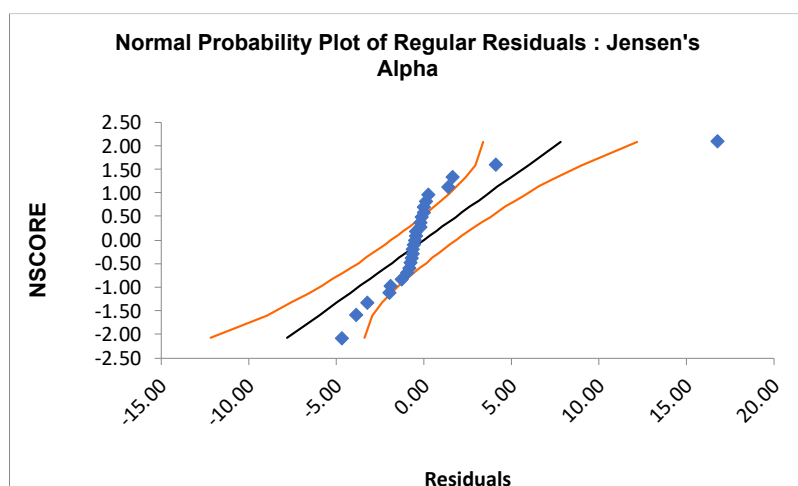*Figure 1: Normal Probability Plot of Jensen's Alpha – Outliers included*

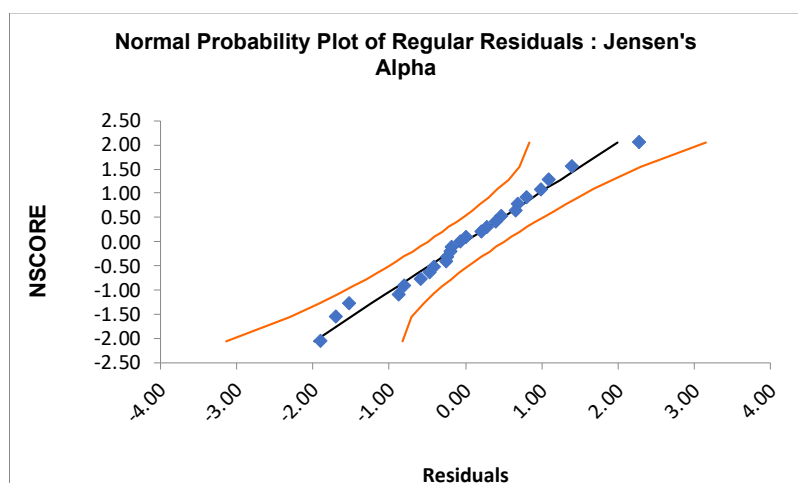*Figure 2 Normal Probability Plot of Jensen's Alpha – Outliers removed*

Table 7: Multiple Regression Empirical Results with Outliers

Variable	Sharpe Ratio		Jensen's Alpha		EVA	
Adjusted R-squared	18.29%		0.00%		0.00%	
	Coefficicent	Prob.	Coefficient	Prob	Coefficient	Prob.
Constant	0.01410255	0.56	0.63285771	0.76	-653.48115	0.62
BTM	-0.0001118	0.75	0.02038202	0.51	1.86198233	0.92
TA	2.9974E-07	0.01	-2.363E-06	0.81	-0.0068017	0.27
SGR	-2.114E-07	0.86	5.5113E-05	0.59	0.00635442	0.92
ROA	-0.0008248	0.56	-0.0510576	0.68	106.333551	0.18
CCC	0.00024419	0.07	0.00230938	0.84	-9.4051299	0.20
ADV	-0.3995358	0.31	3.58551104	0.92	13842.2445	0.52

Table 8: Binary Logistic Model Summary of Results with Outliers

Variable	Sharpe Ratio	Jensen's Alpha	EVA
Likelihood Ratio P-value	0.1881	0.0658	0.0001
McFadden's Pseudo R-squared	23.59%	36.06%	80.32%

Table 9: Observed vs. predicted outcomes outliers included: Sharpe Ratio

Observed Outcome	Predicted Outcome		Row Total
	$\hat{Y} = 0$	$\hat{Y} = 1$	
Y = 0	7	5	12
Y = 1	3	12	15
Column Total	10	17	27
Percent Correctly Predicted:	70.37%		

Table 10: Observed vs. predicted outcomes outliers included: Jensen's Alpha

Observed Outcome	Predicted Outcome		Row Total
	$\hat{Y} = 0$	$\hat{Y} = 1$	
Y = 0	18	1	19
Y = 1	2	6	8
Column Total	20	7	27
Percent Correctly Predicted:	88.89%		

Table 11: Observed vs. predicted outcomes outliers included: EVA

Observed Outcome	Predicted Outcome		Row Total
	$\hat{Y} = 0$	$\hat{Y} = 1$	
Y = 0	10	0	10
Y = 1	1	16	17
Column Total	11	16	27
Percent Correctly Predicted:	96.30%		

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International Perspective." *Journal of Risk and Financial Management*, vol. 14, no. 8,

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ACADEMIC VITA

Education

Pennsylvania State University – *Schreyer Honors College*   University Park, PA
Smeal College of Business | Bachelor of Science, Finance | Minor in International Business   Class of 2022
College of Liberal Arts | Bachelor of Science, Economics | Minor in Spanish
International Studies Institute Florence   Florence, Italy
Marketing Track | Brands, Brand Management, and Brands of Italy   May 2019 – Jul 2019

Relevant Experience

Citigroup   New York, New York
Incoming Full-Time Analyst, Sales & Trading Summer Analyst   Jun 2021 – Aug 2021
- Engaged in a selective 10-week rotational internship with Citigroup Global Markets in the Sales & Trading program
- Rotated within the Finance/Repo desk completing daily tasks of quoting specials pricing for brokers and clients, shadowing desk members, researching securities to pitch to our clients, and following Treasury auctions
- Completed a rotation within the Investment Grade Credit Sales desk and assisted with relative value pitches, morning client market updates, spread analysis while forming connections and networking across the desk and within global spread products
- Led two trade projects within Rates and Fixed-Income through establishing the group's market outlook and thesis

Leveraged Lion Capital   University Park, PA
Treasurer, Director of Outreach, Associate Analyst in Consumer & Retail Sector   April 2019 – Present
- Interviewed and selected for the nation's first student-run syndicated paper loan and high yield bond portfolio partnered with Bank of America Merrill Lynch, the Loan Syndications and Trading Association, and S&P Global
- Analyze prospective leveraged loans and high yield bond investments by performing credit analysis, evaluating credit agreements, examining capital structures, building out financial structures, and conducting ratio analysis
- Serve as a member of the executive board, mentoring and managing the organization while providing instruction on credit markets, technical analysis, and networking guidance
- Managed organizational relations and recruiting efforts to Penn State undergraduates interested in interviewing for LLC
- Co-managed the $15.56 million paper fund in the Consumer & Retail sector of the $125 million portfolio while striving to outperform the S&P/LSTA Leveraged Loan Index

Citi Early ID Program   University Park, PA
Women's Leadership Program Participant   Feb 2020 – Mar 2020
- Selected for an exclusive program aimed to identify, mentor, and hire diverse talent potentials for Citi
- Participated in a 5-week program with virtual technical training workshops and mentorship with Citi employees
- Developed knowledge in the markets, technical skills, women's diversity role in the workplace, and professional practices

Wall Street Bootcamp   University Park, PA
Graduate   Aug 2019 – Dec 2020
- Selected as one of the top students in the Smeal College of Business for an intensive 15-week training program with weekly information sessions that encompass meeting and learning from current and former Wall Street professionals

Penn State Fixed Income Association   University Park, PA
Portfolio Manager   Jan 2019 – April 2019
- Gained credit knowledge through weekly educational sessions with the goal of interviewing for Leveraged Lion Capital

Extracurricular Activities

Alpha Phi Sorority   University Park, PA
Primary THON Chair   Mar 2019 – Present
- Selected as Primary Chair for THON, a 46 hour no-sitting, no-sleeping dance marathon for children with pediatric cancer
- Plan, organize, and execute fundraisers and THON family relations with the 2020 fundraising goal of $100k
- Serve as a junior and senior chair, mentoring younger leaders while focusing on communication and support to families

Director of Internal and External Events
- Facilitate mutually beneficial events with other Greek organizations and amongst members of Alpha Phi
- Managed a budget and communicated with local businesses to sponsor related events for our chapter
- Provided risk-management support to the VP of Accountability in order to ensure the health and safety of chapter members

Recruitment Team, Slating Committee
- Market and execute recruitment plans and strategies to potential new members for the upcoming pledge class
- Voted in as a member of the Slating Committee, tasked to select the upcoming Executive Board for Gamma Rho chapter

Additional Information

Honors: Sam H. Wherry Honors Scholarship in Smeal College of Business, Penn State Schreyer Scholar, National Honors Society
Awards: President's Freshman Award, Phi Eta Sigma Honor Society, Dean's List, Recipient of the Newtown Swim Club Scholarship
Interests: cooking, THON, traveling, Penn State football, photography, *Criminal Minds*, yoga, softball, Spanish language