A COMPARISON OF FACTOR BASED AND TRADITIONAL INVESTING METHODS

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Honors Adviser

* Electronic approvals are on file.
ABSTRACT

The objective of a financial investing portfolio is to maximize returns and minimize risk. The portfolio construction is often dependent on the amount of risk willing to be undertaken. Factor-Based investing, a strategy which involves identifying factors that explain returns and risks within an asset class, has gained traction in investing practices. Factor-based investing derives its style by looking at historical data and identifying factors within markets that produce returns that statistically outperform the average. The purpose of this thesis is to examine popular factor-based investing strategies and explore the ideal factor ratio that outperforms the market over the long horizon; irrespective of market fluctuations.
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I want to thank my Thesis Supervisor Professor David Haushalter for supporting, motivating, and challenging me on this journey. Additionally, I want to thank Professor Brian Davis for helping me flesh out my idea and creating the structure.
Chapter 1

Literature Review

The purpose of the thesis is to examine different quantitative factors and the risk-adjusted return associated with those factors compared to their relative benchmarks. The first chapter of the thesis is the “Literature Review”; focusing on the history of factor-based investing, the efficient market hypothesis, and differences in factor-based investing. The second chapter is “Research and Methodology” detailing the methodology used for portfolio construction with data from FactSet. The third chapter is “Results and Conclusions” which compares growth and value portfolios, growth and the Russell 1000, and the MSCI KLD 400 Social vs the Russell 1000. The overall returns, risk-adjusted returns, and volatility metrics are used to compare the results of each portfolio. Finally, chapter four is “Future Research” which outlines the methodology of extending the findings from this research to conduct more complex analysis.

1.1 Introduction

The goal of portfolio management in equities is to maximize return while mitigating risk. Over the past 50 years, there has been a variety of investment strategies developed and implemented in hopes of seeking alpha or abnormal returns. Alpha is the excess return of an investment compared with a suitable risk-adjusted benchmark. Many of the original investment strategies centered around fundamental analysis of companies and examining the leadership within a corporation. As markets began to be understood at a more fundamental level,
quantitative investment strategies were applied for portfolio management. One prominent class of investment strategies that has evolved is factor-based investing.

Factor-based investing examines underlying characteristics of stocks for constructing portfolios that outperform the S&P 500 benchmark. In very simple words, BlackRock defines factor-based investing as “..an investment approach that involves targeting specific drivers of return across asset classes” (BlackRock n.d.). The investment strategy empirically investigates which factors drive future stock returns, and the look back horizon can vary anywhere from approximately 50 to 100 years; depending on data availability. Factor-based investing became mainstream with Fama’s and French’s initial findings (Fama and French 1992). In their paper “The Cross-Section of Expected Stock Returns”, they found that value stocks outperform growth stocks and small-cap stocks outperform large-cap stocks. The factors that are associated with returns were the size of the firm, and the firm’s relative valuation (Fama and French 1992). This represented the true beginning of factor-based investing.

Since that initial paper was published, many academics and asset management firms have conducted additional research and implemented factor-based investing. The next major breakthrough regarding factors came from Narasimhan Jegadeesh and Sheridan Titman referenced in their article “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency”. The core of the strategy involved buying stocks that performed well in the past and selling those that have poor performances over 3 to 12 month holding periods. The strategy consistently would generate excess returns (Jegadeesh and Titman 1993). In 1997, another prominent finance researcher published “On Persistence in Mutual Fund Performance” which clearly defined the momentum factor (Carhart 1997). Carhart showed that “hot hand”
managers are mostly explained by the one-year momentum effect of Jegadeesh and Titman (Carhart 1997). Eventually, the Carhart four-factor model was developed which is Fama and French’s three-factor model plus the momentum factor.

As more and more academic research has been published, models have become more complex with multiple combinations of factors being implemented instead of using a single factor. Some of the largest asset management companies in the world implement factor-based investing strategies. Within the past few years BlackRock as well as Vanguard have opened up quantitative divisions specializing in factor-based investing. The goal of this literature review is to examine the efficient market hypothesis, controversies of factor versus non-factor investing, differences within factor-based investing, an overview of the current state, and then a brief conclusion.

1.2 Efficient Market Hypothesis

A core aspect of investing is the outlook and economic view on the market. One of the most prominent economic theories, initially written about by Eugene Fama in the late 1960s, is the efficient market hypothesis (Nath 2015). The theory states that stock prices accurately reflect all possible information, therefore it is not possible to generate alpha returns (Kuepper 2019). The theory is very prominent among academics and is the basis of constructing portfolios. There are three primary types of market efficiency within the efficient market theory. Strong form is where all information, public, private and confidential, is reflected in share prices (Nath 2015). This means that no matter what information an investor has access to, her or she will not be able
to generate excess returns. Semi-strong efficiency proposes that stock prices reflect all publicly available information (Nath 2015). Implying that investors cannot generate alpha because stock prices reflect all public information. The last efficiency is weak form, which claims that all previous stock prices reflect today’s stock price; technical analysis is therefore not a productive instrument to seek alpha returns (Nath 2015).

Factor-based investing can coexist with the efficient market hypothesis because adding additional factors helps in the explanation of total returns.

1.3 Factor Based Investing vs. Non-Factor Based Investing

Investing is based on return and risk exposure preferences. Even though factor-based investing is based on empirical evidence, it is not without its controversies and criticisms. A recent article in Institutional Investor, entitled “Why Factor Investing Isn’t Working”, examines several common controversies with factor-investing (Segal 2019). For example, Northern Trust Asset Management analyzed over 500 different portfolios in the previous five years to determine the returns and risks of factor-based investing. Michael Hunstad, the head of quantitative strategies at NTAM, believes in much of the academic research surrounding factor-based investing but the implementation of those factors in portfolios is poor. In 2015, Hunstad published an article in the Journal of Index Investing that examined the risk being compensated for using factors. He found that the vast majority of risk undertaken by the most prominent factor-based investing strategies are unintended, with only 17% being compensated to the risks they are being exposed too in their strategy (Segal 2019). Another issue is that factor exposure is
being reduced because portfolio companies have so many different strategies that they cancel out each other, the result is getting index-like returns at much higher fees (Segal 2019).

Another issue that has arisen in the factor-based world involves the multitude of factors being implemented in portfolios. An article published by Zelia Cazalet and Thierry Roncalli in 2014 examined the “Fact and Fantasies about Factor Based Investing” (Cazalet and Roncalli 2014). They reached two main conclusions about the current state of factor-based investing. The first is that in recent years there has been a major increase in so-called factors that can predict alpha or abnormal returns. Researchers, however, challenged many of these new factors. The authors concluded that only a few number of risk factors and anomalies are consistently reliable. The second conclusion is that there is a big difference between academic research and successful implementation of factor-based strategy. In reality, aspects such as the asset universe, weighting scheme, and transaction costs can offset supposed returns of factor-based investing (Cazalet and Roncalli 2014). Another major issue is that factor-based investing in academia relies heavily on long/short positions, while the majority of portfolios used by asset managers are long only positions (Cazalet and Roncalli 2014).

One of the major controversies in factor-based investing is the difference between academic research and implementation. It seems that most critics of factor-based investing agree that certain factors are reliable predictors of stock returns, but in reality, it is very difficult to mimic in a portfolio. When factoring in costs, risk exposure, and diversification critics say that factor-based investing offers the same returns of index-funds at a much higher price.
1.4 Differences in Factor Based Investing

The biggest differences within the factor-based investing world involve the construction of portfolios. When asking students if they preferred Tesla or Google stock, they will have varying opinions based off of certain assumptions and outlooks on the market. Neither is right or wrong, but they have a goal of generating excess returns. The same is true in factor-based investing. A quick examination of the three largest asset management firms (Fidelity, BlackRock, and Vanguard) show that each firm uses different weights and have certain preferences for factors. Before exploring the original factors and development of multifactor models, it is important to understand the industry standard for common factors. According to Investopedia, there are five prominent factor themes. They are value, size, momentum, quality, and volatility (Chen 2019). Breaking down each of these factors show that they are based in empirical research and evidence, building off of much of the academic literature published within the previous fifty years.

Value investing is finding companies that have low relative valuations based on to book-to-market value; and ratios such as price-to-earnings (Chen 2019). Size, building off of Fama and French’s initial paper, shows that small-cap stocks outperform large-cap stocks. Momentum is similar to a ball rolling down a hill and generating more and more velocity, stocks that have performed well in the past are likely to perform well in the future. Quality is very similar to examining the fundamentals of the company and looking for attractive characteristics such as low debt, stable earnings, and consistent growth (Chen 2019). The final factor of volatility shows that low volatility stocks earn greater risk-adjusted returns that high volatility stocks (Chen
2019). All of these core principles are used by the prominent asset management firms, the differences come in the weighting and ratios used within a portfolio. Additionally, certain firms use less common factors such as shareholder yield.

Even with all these differences, the fundamental factors have shown excess returns when implemented correctly. A recent article in the *Journal of Portfolio Management*, by Marsh and Stauton, examined multiple strategies of factor-based investing and their correlated returns. In order to diversify and not extrapolate evidence from the same data set, the authors looked at all available information (up to 117 years) and across a variety of markets (up to 23). The findings showed long-term profitability of strategies are based on market capitalization, value versus growth, dividend yield, stock return momentum, and low volatility investing (Dimson, Marsh, and Stauton 2017).

It is clear from both an academic and implementation perspective that factor-based investing is effective in generating excess returns and outperforming the benchmark of the S&P 500. The rise in the popularity of factor-based investing has created a variety of single and multi-factor strategies. As mentioned before in the case of two students evaluating stocks, the optimal combination of factors is dependent upon the preference of risk and asset class.

### 1.5 Current State of Factor Based Investing

Factor-based investing has gone from a research topic in academia, to a handful of asset management companies, to finally become a mainstream investment strategy. One of the major differences in the style of investing is the long investment horizon. Firms judge the effectiveness
of the strategy not based on a specific quarter or even year, but the performance over a 5-to-10-year horizon. In a world dominated by news cycles and investors wanting quick returns, down periods make headlines. A recent article in Bloomberg examined the current state of the prominent factors, the performance of some of the largest factor-based firms such as AQR, and the outlook over the next few years. All the major five equity factors, mentioned previously, are down compared with the S&P 500 benchmark. Even the cross-sectional models are not accurately predicting which stocks will yield high returns (Lee 2019). The major issue arises in this latest cycle stock gyrations. The risk appetite of investors and economic growth expectations have not been strong enough to revive factors such as value. AQR’s Equity Market Neutral Fund and Vanguard’s Market Neutral Fund has seen losses in 2019. The counterargument to these losses is that this underperformance is not statistically out of the ordinary and the returns must be considered in the long-term. In the overall return of the portfolio, this will appear like a temporary blimp (Lee 2019).

AQR’s Cliff Asness says that he is going “to stick like grim death” to his beliefs and convey to investors why this is only a temporary issue. The experts interviewed in the article concluded that there is not a shift in the paradigm of the factors, but that the market is currently in a short-term weak factor environment.

In Capital Ideas Evolving, Paul Samuelson, an economic and finance theorist, believes and advocates for the long-term perspective. One of the errors he points out is that investors are often irrational in “their willingness to accept the volatility and kinds of risks that do average out to be profitable.” (Bernstein 2007). This statement is indicative of the perspective towards factor-based investing. When investors see consistent, or even a year, of losses they are very
skeptical and likely to advocate for change of the model. Yet, the academics and portfolio managers consistently try to show that these underperformance periods are only temporary and a short-term loss will lead to a long-term gain.
Chapter 2
Research and Methodology

To evaluate factor-based investing versus traditional methodology, portfolios were constructed each with their own unique factors. The back testing involved 10 years of historical data starting roughly at the end of the financial collapse in 2009. The portfolios were tested against their respective benchmark as well as compared with each other to see the best risk-adjusted performance. Additionally, analysis was completed to examine which portfolios offer the most gain or loss on an annual basis. The two factors examined were relative valuation (growth vs. value), and a composite of the environmental, social, governance, framework.

2.1 Data Universe

The core of factor investing is based on the analysis of historical data for companies. All data used in this study was obtained from FactSet. The companies examined were all from the Russell 1000 Index, which is an index of roughly the 1,000 largest companies in the U.S. equity market (Ganti 2019). The Russell 1000 Index was chosen over other possible benchmarks (S&P 500) due to its characteristics that are more inclusive for factor-based investing because the Russell 1000 includes a considerable amount of mid-cap stocks (Dierking 2019).

For the growth and value portfolios, the FactSet “Russell 1000 Growth” and “Russell 1000 Value” were used in testing. These are portfolios whose construction have a slight tilt toward the desired factor. For the environmental, social, governance factor, the MSCI KLD 400
Social Index was selected. This index is “designed to provide exposure to companies with high MSCI ESG Rating and exclude companies whose products may have negative social or environmental impact.” The index includes, large, mid, and small US companies and excludes companies with values that are inconsistent with ESG. The stocks are chosen from the MSCI USA IMI which is an index designed to measure the performance of large, mid, and small cap stocks of the US market. There are 2,383 constituents covering approximately 99% of the free float-adjusted market capitalization. The MSCI KLD is commonly used in academic literature because of its long track record (MSCI 2020). The returns, Sharpe ratio, and beta is directly from the MSCI KLD 400 ETF report, published by MSCI.

2.2 Benchmark

Growth, Value, and ESG portfolios were compared to the overall performance of the Russell 1000 Index. Annualized risk and return metrics were computed and compared over a ten-year period. Additionally, the total 10-year return and maximum gained/lost in a given year were compared. For risk, the standard deviation and Sharpe score were compared to find the best risk-adjusted return.

Although the ESG portfolio drew from an index of small, mid, and large cap stocks, the majority (over 90%) of stocks were mid or large cap. Because of this, the relative performance benchmark was the Russell 1000 due to its representation of the majority of companies found in MSCI KLD 400. The breakdown of exposure can be found in Appendix D.
2.3 Testing

The testing of the portfolios using FactSet involved two different tools in order to retrieve and compare the metrics of return and risk. The tool “Portfolio Analysis 3.0” is used to directly compare the annualized performance of each portfolio over the previous ten years. “SPAR 3.0” (Style, Performance, and Risk Analysis) is used to get key metrics on the Sharpe ratio and risk-adjusted return. As mentioned previously, the Sharpe ratio and beta for the MSCI KLD 400 is directly from MSCI.
Chapter 3

Results and Conclusions

The empirical findings provide interesting results linking the performance of portfolios to specific factors. The first test compares the performance of growth and value stocks over the last ten years. Growth stocks significantly outperformed value stocks on a risk-adjusted basis (Table 1 provides the relevant statistics).

The second analysis compares the MSCI KLD 400 Social with the Russell 1000 to see the effect that social, environmental, governance has on the performance of a portfolio. Using the ESG factor, the MSCI KLD 400 Social underperforms the Russell 1000 on an absolute and risk-adjusted return (Table 3 provides the relevant statistics).

3.1 Growth vs. Value

![Figure 1: Russell 1000 Growth vs Russell 1000 Value Total Return](image-url)
As shown in the graph above, the growth portfolio (blue) is compared with the value portfolio (green). It is clear and very noticeable to any observer that the growth portfolio outperforms the value portfolio on a cumulative total return basis. When examining the ten-year annual returns, the growth portfolio continues to outperform the value portfolio. During years of extreme price movement, growth continues to outperform value. From 2018 to 2019, the growth portfolio generated returns of 36.40% and the value portfolio returned 26.55%. This also holds true if the portfolios generate a negative return. In the down-period of 2019 to 2020, both portfolios had a negative return, but the growth portfolio only lost -8.24% while the value portfolio lost -19.64% (Appendix B.) It is clear that growth outperforms value from a total return perspective.

<table>
<thead>
<tr>
<th>Description</th>
<th>Annualized Return</th>
<th>Annualized Standard Deviation</th>
<th>Beta</th>
<th>Sharpe Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 Growth - Total Return</td>
<td>15.22</td>
<td>12.67</td>
<td>0.86</td>
<td>1.16</td>
</tr>
<tr>
<td>Russell 1000 Value - Total Return</td>
<td>11.80</td>
<td>12.26</td>
<td>1.00</td>
<td>0.92</td>
</tr>
</tbody>
</table>

From the table above, it is easy to see the major differences between the growth and value portfolios. The growth portfolio has a higher annualized return and standard deviation, showing that the portfolio offers greater returns but also came with greater risk. The Sharpe ratio provides the risk adjusted returns of the portfolio. The Sharpe ratio examines a portfolio return while factoring in the risk-free rate and standard deviation. The higher the Sharpe ratio, the better
the return for the risk. The growth portfolio had a Sharpe ratio of 1.16, outperforming the value portfolio which had a Sharpe ratio of 0.92.

One possible explanation for growth stocks outperforming value stocks in the last ten years is due to market characteristics as well as changes in industry. The previous 10 years have been the longest expansionary market in recent history. Companies are prioritizing growth; offering new products and services, actively seeking mergers and acquisitions, and expanding into new regions. Additionally, the implementation of technology across sectors have allowed businesses to become more efficient therefore increasing growth. Value on the other hand has lagged, even underperforming the Russell 1000 index.

3.2 Russell 1000 Growth vs. Russell 1000

Over the previous ten years, growth stocks outperformed value stocks on a risk-adjusted basis. Therefore, constructing an optimal portfolio results in choosing growth stocks based on a relative valuation. To see the performance of relative valuation versus the benchmark, the Russell 1000 Growth portfolio was compared to the Russell 1000.
The Russell 1000 Growth portfolio outperforms the benchmark of the Russell 1000. Over the previous 10 years, growth stocks have seen a greater risk-adjusted return than value stocks and the benchmark. The growth portfolio follows a similar trajectory compared with the benchmark, but is amplified in gains and minimized in losses.

**Table 2: Russell 1000 Growth vs. Russell 1000**

<table>
<thead>
<tr>
<th>Description</th>
<th>Annualized Return</th>
<th>Annualized Standard Deviation</th>
<th>Beta</th>
<th>Sharpe Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 Growth - Total Return</td>
<td>15.22</td>
<td>12.67</td>
<td>1.02</td>
<td>1.16</td>
</tr>
<tr>
<td>Russell 1000 - Total Return</td>
<td>13.54</td>
<td>11.93</td>
<td>1.00</td>
<td>1.09</td>
</tr>
</tbody>
</table>

The Growth Portfolio outperforms the Russell 1000 on an annualized return basis, as well as being a riskier investment with a higher standard deviation. However, even with the increases
in risk the growth factor has a higher Sharpe ratio at 1.16 and offers a better risk-adjusted return than the Russell 1000 index. The growth factor performs exceptionally well in this expansionary period with possible help from technology.

3.3 MSCI 400 KLD Social ETF vs Russell 1000

Figure 3: MSCI KLD 400 Social vs Russell 1000 Total Return

ESG is a relatively new trend that coincides with cultural shifts in investing. Over the previous few years, stakeholders actively search for companies that prioritize good economic and socially responsible practices. In response, companies have shifted decision making and practices to be inline with good ESG principles. The ESG factor looks to quantify these trends by ranking companies based on favorable environmental and social metrics.

The MSCI KLD 400 Social ETF underperforms the Russell 1000 from a risk and return perspective. It is important to note that the benchmark of the Russell 1000 was chosen because
the majority of stocks held are large-cap and mid-cap stocks (Appendix D). Stakeholders are very interested in environmental, social, governance and it is an important trend in today’s investing. Yet for investors, this trend is not correlated to increases in return. The MSCI KLD underperforms the Russell 1000 with a comparable standard deviation.

Table 3: MSCI KLD 400 vs Russell 1000

**Portfolio: MSCI KLD 400 Social - Total Return | Benchmark: Russell 1000 - Total Return**

<table>
<thead>
<tr>
<th>Description</th>
<th>Annualized Return</th>
<th>Beta</th>
<th>Sharpe Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI KLD 400 Social</td>
<td>12.12</td>
<td>0.94</td>
<td>0.90</td>
</tr>
<tr>
<td>Russell 1000</td>
<td>13.54</td>
<td>1.00</td>
<td>1.09</td>
</tr>
</tbody>
</table>

The MSCI KLD 400 Social ETF trails the Russell 1000 in all important metrics. The annual return and risk-adjusted return is less. Even though environmental, social, governance is an incredibly important trend that is gaining momentum for all companies and investors, however the markets are not rewarding it with higher returns. The Russell 1000 offers superior returns in comparison. Still, ESG investments are rising in popularity because they offer a different value to the stakeholder; instead of focusing on pure monetary returns, ESG is prioritizing value to society.

### 3.4 Final Conclusions

The study demonstrates that factor investing can be an effective and successful strategy when designing portfolios to outperform the benchmark. Looking at the past ten years, it is clear that growth is offering the best risk-adjusted returns by capturing industry trends. Value has been underperforming the benchmark with many potential ‘value stocks’ stagnating.
While the ESG factor is underperforming the benchmark, it is still a popular investment because it has desirable characteristics from a societal point of view. Investors are recognizing the importance of ESG, and the data shows they are willing to accept lower returns for the overall good.
Chapter 4 Future Research

There are three primary ways to build upon this research. The first is to change factors and see the relative performance and risk exposure. Different combinations of traditional factors could be used, either to simplify the model or add factors to diversify exposure to the market. The second way to build upon the data is to use a different trading universe. The Russell 1000 was chosen because of its optimal characteristics to the examined factors. However, if those factors were to change the universe could also be changed; for example, picking a trading universe with small-cap stocks because the targeted factors address small-cap stocks. The final way to build upon the data is to change the metrics and constraints used.
Appendix A

FactSet Portfolio Testing Guide

Part A: Portfolio Analysis 3.0

1. Open up FactSet
2. In the search bar, enter “@PA” to navigate to Portfolio Analysis 3.0
3. Enter the Portfolio Name in the first search box followed by the Portfolio Benchmark in the second box
4. On the left tab, navigate and select ‘Performance’
5. Click the date and select start date as ‘Ten Years Ago’ and Report Frequency as ‘Annually’
6. The total returns of each Portfolio will be listed in table form

Part B: SPAR 3.0

1. Open up FactSet
2. In the search bar, enter “@SP3” to navigate to SPAR 3.0
3. Enter the Portfolio Name in the first search box followed by the Portfolio Benchmark in the second box
4. Choose the Start Date ‘Ten Years Ago’ with the reporting as ‘Yearly’
5. On the left tab, navigate and select ‘Risk – Common Statistics’
6. Under “Multi-Statistic Summary Table” the key metrics are displayed
## Appendix B

### Russell 1000 Growth vs. Russell 1000 Value Data

<table>
<thead>
<tr>
<th>Total Returns</th>
<th>Russell 1000 Growth</th>
<th>Russell 1000 Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Return</td>
<td>Total Return Cumulative</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>397.45</td>
<td>397.45</td>
</tr>
<tr>
<td>09-APR-2010 to 31-DEC-2010</td>
<td>12.29</td>
<td>12.29</td>
</tr>
<tr>
<td>31-DEC-2010 to 30-DEC-2011</td>
<td>8.51</td>
<td>21.85</td>
</tr>
<tr>
<td>30-DEC-2011 to 31-DEC-2012</td>
<td>19.45</td>
<td>45.55</td>
</tr>
<tr>
<td>31-DEC-2012 to 31-DEC-2013</td>
<td>40.51</td>
<td>104.52</td>
</tr>
<tr>
<td>31-DEC-2013 to 31-DEC-2014</td>
<td>17.50</td>
<td>140.32</td>
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<tr>
<td>31-DEC-2014 to 31-DEC-2015</td>
<td>11.30</td>
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<td>31-DEC-2015 to 30-DEC-2016</td>
<td>9.94</td>
<td>194.05</td>
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<td>30-DEC-2016 to 29-DEC-2017</td>
<td>34.79</td>
<td>296.35</td>
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<td>29-DEC-2017 to 31-DEC-2018</td>
<td>0.28</td>
<td>297.45</td>
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<td>31-DEC-2018 to 31-DEC-2019</td>
<td>36.40</td>
<td>442.11</td>
</tr>
<tr>
<td>31-DEC-2019 to 10-APR-2020</td>
<td>-8.24</td>
<td>397.45</td>
</tr>
</tbody>
</table>
## Appendix C

### Russell 1000 Growth vs. Russell 1000

#### Multi-Statistic Summary Table

<table>
<thead>
<tr>
<th>Portfolio: Russell 1000 Growth - Total Return</th>
<th>Benchmark: Russell 1000 - Total Return</th>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>Annualized Return</td>
</tr>
<tr>
<td>Russell 1000 Growth - Total Return</td>
<td>15.22</td>
</tr>
<tr>
<td>Russell 1000 - Total Return</td>
<td>13.54</td>
</tr>
</tbody>
</table>

### Russell 1000 Growth vs. Russell 1000

#### USD

### Total Returns

<table>
<thead>
<tr>
<th>09-Apr-2010 - 10-Apr-2020</th>
<th>Russell 1000 Growth</th>
<th>Russell 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Return</td>
<td>Total Return Cumulative</td>
</tr>
<tr>
<td>Total</td>
<td>397.45</td>
<td>397.45</td>
</tr>
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<td>09-APR-2010 to 31-DEC-2010</td>
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<td>12.29</td>
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<td>8.51</td>
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<td>30-DEC-2011 to 31-DEC-2012</td>
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<td>31-DEC-2012 to 31-DEC-2013</td>
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<td>104.52</td>
</tr>
<tr>
<td>31-DEC-2013 to 31-DEC-2014</td>
<td>17.50</td>
<td>140.32</td>
</tr>
<tr>
<td>31-DEC-2014 to 31-DEC-2015</td>
<td>11.30</td>
<td>167.46</td>
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<tr>
<td>31-DEC-2015 to 30-DEC-2016</td>
<td>9.94</td>
<td>194.05</td>
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<td>30-DEC-2016 to 29-DEC-2017</td>
<td>34.79</td>
<td>296.35</td>
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<td>29-DEC-2017 to 31-DEC-2018</td>
<td>0.28</td>
<td>297.45</td>
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<tr>
<td>31-DEC-2018 to 31-DEC-2019</td>
<td>36.40</td>
<td>442.11</td>
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<tr>
<td>31-DEC-2019 to 10-APR-2020</td>
<td>-8.24</td>
<td>397.45</td>
</tr>
<tr>
<td>Annualized Return</td>
<td>16.61</td>
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<tr>
<td>Standard Deviation</td>
<td>15.30921667</td>
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</tbody>
</table>
Appendix D

MSCI KLD 400 Social vs. Russell 1000 USD

iShares Tr. - MSCI KLD 400 Social ETF vs. Russell 1000 USD

### Style Exposure

<table>
<thead>
<tr>
<th>Style &amp; Size</th>
<th>10-APR-2020</th>
</tr>
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<tbody>
<tr>
<td>Ticker</td>
<td>Port. Weight</td>
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<tr>
<td><strong>Total</strong></td>
<td>100.00</td>
</tr>
<tr>
<td>[Cash]</td>
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</tr>
<tr>
<td>Large - Core</td>
<td>27.86</td>
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<tr>
<td>Large - Growth</td>
<td>40.10</td>
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<tr>
<td>Large - Value</td>
<td>13.14</td>
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<tr>
<td>Mid - Core</td>
<td>6.47</td>
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<tr>
<td>Mid - Growth</td>
<td>3.88</td>
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<tr>
<td>Mid - Value</td>
<td>6.57</td>
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<tr>
<td>Small - Core</td>
<td>0.84</td>
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<td>Small - Growth</td>
<td>0.23</td>
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<td>Small - Value</td>
<td>0.71</td>
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<tr>
<td>Micro - Core</td>
<td>0.04</td>
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<tr>
<td>Micro - Growth</td>
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<tr>
<td>Micro - Value</td>
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</tr>
<tr>
<td>[Unassigned]</td>
<td>0.05</td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


https://www.investopedia.com/terms/e/efficientmarkethypothesis.asp.


# ACADEMIC VITA

**Nicholas Bhaskar** (nicholasbhaskar33@gmail.com)

## Education

<table>
<thead>
<tr>
<th>Institution</th>
<th>Degree</th>
<th>Class</th>
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<tbody>
<tr>
<td>The Pennsylvania State University</td>
<td>Bachelor of Science in Finance</td>
<td>Class of 2020</td>
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<tr>
<td></td>
<td>Smeal College of Business</td>
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</tr>
<tr>
<td>CIEE Global Institutes Study Abroad</td>
<td>London, Rome, Berlin</td>
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</table>

## Experience

### PricewaterhouseCoopers

**Technology Consulting | Financial Crimes Unit Intern**

- New York, NY
- **jun 2019 - aug 2019**
- Optimized Fisca Soft sanctions profile of ~40 algorithms based on the risk appetite of a major financial institution.
- Independently developed governance framework document for Manias Anti-Money Laundering system.
- Conducted additional research project on over 10 countries’ insider trading laws.

### Quensec Capital

**Quantitative Investment Intern**

- Pittsburgh, PA
- **Jun 2017 - Aug 2017**
- Developed stock portfolios for senior managers analyzing stock prices using SAS, Compustat, and WRDS.
- Research roughy 30 local financial managers to contextualize competitive landscape.

### Allegheny County Treasurers Office

**Summer Intern**

- Pittsburgh, PA
- **May 2018 - Jul 2018**
- Conducted cost-analysis for a change in an exemption program for 5000 senior Citizens.
- Organized an outreach program for citizens eligible for the Homestead Tax Exemption to increase participation.
- Updated the record database using macros improving efficiency on individual upload 45 seconds on average.

### Happy Valley Capital

**Investor Committee | Co-Director of Partnerships**

- State College, PA
- **Feb 2018 - Present**
- Taught 25 members on Venture Capital practices including evaluation, sourcing, and development of startups.
- Led team a team of two finance associates to source local companies and select candidates for in-house incubator.

### Global Business Brigade

**Executive Board | Vice-President**

- State College, PA
- **Feb 2017 - Present**
- Planned and executed outreach events to improve public image and increase recruitment by 60 percent.
- Supervised the collaboration between different 12 individuals to organize humanitarian trips to Honduras.
- Traveled to Honduras for one week to consult a local village setting up a micro-bank and financial business.

### The Wall Street Boot Camp I & II

**Certified Member**

- State College, PA
- **Aug 2018 - Present**
- Constructed a financial model including operating and discounted cash flows models and comparable analysis.
- Developed skills in Bloomberg, FactSet, and Microsoft Office to better analyze and interpret annual filings.

## Leadership

### Smeal Ambassadors

**Executive Board | Director of Membership Affairs**

- State College, PA
- **Dec 2017 - Dec 2018**
- Developed point system for tracking membership involvement and held 45 members accountable to RSVPs.
- Served as a student-representative during the Smeal Finance Board meeting of ~12 prominent alumni.

### Schreyer SHO Time Mentor

**Mentor**

- State College, PA
- **Aug 2017 - Present**
- Guided a group of 12 freshman Schreyer Scholars through a 3-day orientation and first-year college experience.
- Created an inviting and educational atmosphere helping students become acclimated to college.

## Honors/Skills/Interests

**Awards:** Schreyer Honors College Scholarship, PNC Leadership Development Center.

**Skills:** Business strategy implementation, rapport building and listening, philanthropy, and community outreach.

**Professional Interests:** Strategy implementation, project management, data analytics.

**Personal Interests:** Brother of Alpha Gamma Rho, lifting, reading, meditating.