NHH

FIN11: TERM PAPER

INVESTING IN HAPPINESS

Candidate number:

150, 161, 166, 200

The Correlation Between Employee Satisfaction and Stock Market Performance






Total pages: **43**
Word count ex. Abstract, TOC, Sources and Appendix: **6590**
Date: **10/12/2023**

Abstract

Historically, the economic and financial sectors have believed that investing in employee satisfaction negatively impacts shareholder earnings. Recent research, however, challenges this view, suggesting that high employee satisfaction might correlate with superior stock market performance. This paper builds upon these findings, exploring the potential of leveraging employee satisfaction as an effective trading strategy. We analyzed the stock market performance of companies featured in Fortune's "100 Best Companies to Work for" from 2012 to 2022, comparing their results to the S&P 500. Our findings indicate an average annual outperformance of 0,89% against the S&P 500. However, when assessing risk-adjusted returns using metrics like the Sharpe-ratio, Treynor-ratio, and Jensen's alpha, the results were mixed, suggesting a nuanced picture of performance. Further, the application of the Fama-French Three Factor Model provided mostly inconclusive results, primarily due to the low number of observations used in the regression. We also analyze a few alternative strategies to see if the viability of the strategy increases when adjusting the portfolio for sector or entry ranking. These alternative strategies, referred to in the text as *Tech Strategy, Top 10,* and *Top 20,* had an average annual return of 20,13%, 12,26%, and 13,21%, respectively. The analysis has a few assumptions and weaknesses, to simplify the data work and keep within the word count bounds. This paper underscores the potential link between employee satisfaction and financial performance, opening possibilities for further research, such as combining employee satisfaction to other company attributes.

Table of Contents

Abstract **2**

1. Introduction **4**

2. Theoretical Framework **4**

2.1 Employee Satisfaction and Organizational Performance *5*

2.2 Market Efficiency and Intangible Assets *6*

2.3 Anomalies *6*

2.4 Thematic Investment & Portfolio Management *7*

2.5 Transaction costs *7*

3. Assumptions and Delimitations **8**

4. Methodology **9**

4.1 Approach *9*

4.2 Data Collection *9*

4.3 Methods for Analysis *11*
4.3.1 Backtesting 11
4.3.2 Benchmark Comparison 11

5. Analysis **12**

5.1 Performance of the 100 Best Companies to Work For *12*
5.1.2 Backtest 13
5.1.3 Benchmark Comparison 13
5.1.4 Risk-Adjusted Performance 15

5.2 Alternative Strategies *19*
5.2.1 Technology Sector Portfolio 19
5.2.2 Ranking Based Portfolios 22
5.2.3 Fama-French Three Factor Model – Alternative Strategies 24

6. Reflection and weaknesses **25**

7. Conclusion/Summary **26**

8. Sources **28**

9. Appendix **30**

9.1 Financial Performance Metrics *30*
9.1.1 Sharpe-Ratio 30
9.1.2 Treynor Ratio 30
9.1.3 Jensen's Alpha 31
9.1.4 Fama-French Three Factor Model 32

9.2 Company Data *33*

9.3 Regression Outputs and Code *38*
9.3.1 *100 Best* - Fama-French Three Factor Regression 38
9.3.2 Technology Strategy - Fama-French Three Factor Regression 39
9.3.3 Top 10 Strategy – Fama-French Three Factor Regression 41
9.3.4 Top 20 Strategy – Fama-French Three Factor Regression 42

1. Introduction

In 2012, Alex Edmans studied the relationship between job satisfaction and firm value. Edmans' findings indicate that job satisfaction is a critical yet often undervalued asset by the market (Edmans, 2012). Three significant implications emerge from this study: (I) Human Resource Management (HRM) theories suggest that employee satisfaction leads to enhanced organizational performance, (II) some aspects of Corporate Social Responsibility (CSR) have the potential to boost stock returns, (III) the market often undervalues intangible assets, even if they are confirmed by reputable surveys. These intangibles only impact stock prices when they are reflected in tangible outcomes valued by the market, like earnings reports.

Building on Edmans' findings, this study aims to explore whether the positive correlation between job satisfaction and firm value persists in today's business environment. By using Fortune 100 Best Companies to Work For (hereby referred to as "*100 Best*"), we will delve deeper into the performance of companies with high degree of employee satisfaction over the last ten years. Furthermore, we will construct an investment strategy involving these companies and try to answer the following research question:

> *Is an investment strategy based upon Fortune 100 Best Companies to Work For capable of consistently beating the market?*

Initially, the paper will establish the theoretical framework, which will be the fundamental basis of our research and analysis. Following this, assumptions and delimitations in our data research will be outlined. Subsequently, methodology is presented to explain how we worked with the data. Next, we will present our analysis, revealing the insights derived from our data and further present alternative investment strategies. Then, weaknesses of our analysis will be discussed. Finally, the paper will conclude with our findings and directly answer our research question.

2. Theoretical Framework

When constructing a strategy, it is necessary to understand the fundamental concepts that our strategy will be built upon. The theoretical framework is a blend of HRM theories relating to employee satisfaction and its impact on organizational performance, coupled with financial theories concerning market efficiency, anomalies, and portfolio performance evaluation.

2.1 Employee Satisfaction and Organizational Performance

The relationship between employee satisfaction and organizational performance has long been subject of discussion. Historically, the conventional view from the economic and financial community has been that a dollar spent on your employees, is a dollar taken away from shareholders (Friedman, 1970). So, companies aim to maximize profits by paying their employees the minimum necessary to keep them, given the premise that increasing the satisfaction would be costly for shareholders (Edmans, 2012). Deutsche Bank analyst Bill Dreher showcased this view in his 2004 article *About Costco's Wages* in Business Week (Dreher, 2004). Costco paid their employees better than Walmart, raising concerns among the investors. Dreher explained why he wouldn't invest in Costco: "At Costco, it's better to be an employee or a customer than a shareholder", reiterating Wall Street's zero-sum view on employee satisfaction.

However, with the increased focus on ESG in finance, the traditional view on corporate governance has been challenged. A 1995 study on high performance workplace systems (HPWS) found that strategic HRM practices are associated with decreased employee turnover, as well as increased sales, market value and profits on a per-employee basis (Huselid, 1995). A more recent study from 2018 found a statistically significant link between firms experiencing improvements in crowdsourced employer ratings and stock returns (Green, Huang, Wen, & Zhou, 2018). A 2020 study by Chamberlain and Munyikwa on "What's culture worth?" found that companies named on Glassdoor's best places to work list substantially outperformed the overall S&P 500 from 2009 through 2019 (Chamberlain & Munyikwa, 2020).

Another list measuring job satisfaction is the *100 Best.* This list was first published in a book in March 1984 (Levering, Moskowitz, & Katz, 1984). Since 1998 the list has been updated and published annually in Fortune magazine and overseen by the Great Place to Work Institute in San Francisco. In Edmans' study from 2012, it was found that companies named on the list generated 2,3% - 3,8% higher stock returns per year than their peers from 1984 through 2011. This further solidifies the notion that employee satisfaction can be used to predict future stock performance.

It is based upon these finding that we wish to construct our trading strategy.

2.2 Market Efficiency and Intangible Assets

To construct a trading strategy able to consistently outperform the market, we will be reliant on the fact that the market in question is not fully efficient.

Market efficiency describes the degree to which stock prices reflect all available, relevant information. The Efficient Market Hypothesis (EMH) outlines three efficiency levels: weak, semi-strong, and strong (Fama, 1969). The weak form of market efficiency asserts that stock prices include all past trading data, making technical analysis ineffective. The semi-strong form states that prices immediately reflect public information, rendering fundamental analysis ineffective for predicting stock price movements. The strong form adds that even insider information is accounted for, preventing consistent excess returns by insiders. While the EMH is a cornerstone of modern financial theory, most empirical research states markets are weak-form efficient (Harris, 2003, p. 240).

Market efficiency hinges on the idea that stock prices integrate all available information, yet valuing intangible assets such as brand equity, human capital, and goodwill pose a challenge to this principle. These assets are often hard to quantify and omitted from financial statements, leading to value discrepancies and market mispricing. This may suggest market inefficiencies, providing an avenue for those with a sophisticated understanding of intangible assets to potentially outperform the market.

2.3 Anomalies

In economics and finance, an anomaly occurs when real outcomes differ from those predicted by a model. In finance we distinguish between two categories, market- and pricing anomalies. Market anomalies, like the January effect (Wachtel, 1942) and Days of the Week anomaly (Cross, 1973), are return distortions that contradict the efficient market hypothesis.

Another notable market anomaly is known as the “Dogs of the Dow” (DOD). This strategy, popularized in the early 1990s, involves investing in the ten highest dividend-yielding stocks of the Dow Jones Industrial Average (DJIA). Despite its simplicity and initial evidence of outperforming the DJIA by 3,06% annually from 1946 to 1995 (McQueen, Shields, & Thorley, 1997), sceptics pointed out its high transaction costs and tax burdens. By 2000, the strategy’s advantage had waned, with research finding that from 1990 to 1998, the DOD’s performance fell behind the DJIA by 2,13% (Hirschey , 2000).

These findings demonstrate the fact that investment anomalies can vanish unexpectedly, especially once they become public knowledge. Arbitrageurs often quickly exploit and neutralize these opportunities, preventing their reoccurrence (Simpson, 2023).

2.4 Thematic Investment & Portfolio Management

When constructing a portfolio based on the *100 Best*, we engage in a form of thematic investing that focuses on employee satisfaction and great workplace culture. This approach is anchored in the belief that certain qualitative factors of a company can have a significant impact on a firm's performance long term. The investment strategy aligns with the principles of ESG investing, which is investing based on a company's environmental, social, and governance practices, particularly emphasizing on the governance part.

Our strategy employs dynamic portfolio management, adjusting annually with Fortune's new listings. Unlike the common market-cap-weighted method, we equally distribute investments across all stocks, diminishing concentration risk. This safeguard protects against substantial losses from major company downturns. By allocating investments evenly across all firms, regardless of market cap, we lessen the effect of any individual company's poor performance on the entire portfolio, enhancing resilience. Additionally, this method potentially capitalizes on growth opportunities from smaller, typically underrepresented firms in market-cap-weighted portfolios.

2.5 Transaction costs

Our portfolio's performance will be affected by transaction costs, and we will have to estimate these costs to evaluate the potential for profit. In fact, investing ideas with great potential may not be profitable if the transaction costs are too big (Harris, 2003, p. 420). Transaction costs refers to all costs that comes with trading and is divided into three categories: Explicit, implicit, and missed trade opportunity costs. Explicit costs are related to commission fees paid to brokers and taxes to government. Implicit costs are the costs of the bid-ask spread. Missed trade opportunity costs arises when traders do not execute their orders on time.

Considering the assumptions given in part three, our analysis will only take implicit transaction costs into account. Phil Mackintosh's research from 2015 to 2021 reveals that, on average, the bid-ask spread for large-cap firms ranged between 0,043% and 0,0625%, while for small-cap firms, it varied from 0,36% to 0,525% in a round-trip transaction (Mackintosh, 2021). For the

companies in the *100 Best* we assume bid-ask spreads close to the range of 0,043% - 0,0625% given their large market capitalizations.

3. Assumptions and Delimitations

To be able to conduct our analysis within the given time frame and data access limitations, we established some key assumptions and delimitations.

Assumptions

(I) The *100 Best* lists were released prior to market open on the days in question allowing us to use the open prices as reference for trade price on the execution day.

(II) We are acting as a retail investor using a zero-commission brokerage firm.

Technical delimitations

(I) Data analysis limited to period of 19/01/2012 to 04/04/2023.

(II) Only companies listed on a U.S. stock exchange were considered.

(III) Subsidiaries on the list were excluded. However, if the companies accounted for a *major* part of the group, we still included them.

Financial delimitations

(I) Dividend payments and transactions costs were not included in our analysis.

(II) Missed trade opportunity costs were excluded as they are much less obvious, harder to measure, and lack publicly available data.

Commission free trading for retail traders has been the industry standard since 2019 (Carey, 2022). This would leave us with seven years of paying commissions. However, as our stock returns do not include dividends as per explained in the “Data Collection” part, not including transaction costs would act as a counterweight to the lost gains of not including dividends.

4. Methodology

4.1 Approach

In addressing our research problem, we adopted a quantitative approach, primarily due to the objective nature and specificity of financial data involved in our study. This method allows for precise measurement and analysis of numerical data related to stock market performance, which is essential for evaluating the effectiveness of trading strategies.

4.2 Data Collection

In the quantitative phase of our research, we gathered every annual list of the *100 Best* from 2012 through 2022. The data acquisition process consisted of several key steps. Initially, we retrieved the release dates for each annual list, which provided a chronological framework for our analysis. Subsequently, a systematic verification was conducted to determine which companies were publicly traded on a U.S. Stock Exchange at the time of the list's publication. The data collected through this process formed the backbone of our analysis.

To assess stock performance, we calculated period returns for each *100 Best* company. Using Excel's "=STOCKHISTORY()" function, we gathered opening stock prices on each list's release date and the subsequent year's release date. This method, shown in figure 1, facilitated annual return calculations for our specified timeframe. Our annual return calculations are excluding the effect of dividend payments, as the values provided by the "=STOCKHISTORY()" does not include them. Where the function was insufficient, we manually collected data from Bloomberg, Yahoo Finance, and Investing.com for dataset completeness and accuracy. Company beta for each year, was collected using the Bloomberg API in Excel.

	A	B	C	D	E	F
1	Rank	Company	Ticker	12/04/2021	11/04/2022	Return
2	1	Cisco Systems	CSCO	=STOCKHISTORY(C2;D1;D1;0;0;2)	=STOCKHISTORY(C2;E1;E1;0;0;2)	=E2/D2-1

Figure 1 - Excel function used.

Annual periodization allowed us to find the stock's performance across a cycle, directly correlating with each company's period on Fortune's list. We then aggregated these individual stock returns to estimate the overall portfolio return for the companies listed each year. This aggregation provided us with the annualized return of our hypothetical investment strategy,

enabling a year-by-year comparison of its efficiency. All the collected stock information is provided in the appendix.

Simultaneously with the analysis of individual stocks, we also collected data on the S&P 500 index for the corresponding periods from Bloomberg. This was done to benchmark the performance of the stocks from the *100 Best* against the broader market. By comparing the returns of these stocks with the S&P 500 index returns over the same intervals, we aimed to provide a comprehensive view of their market performance relative to a well-known market index.

To sort all our companies into their respective sector, we downloaded a complete list of every U.S. listed company and their corresponding sector from StockAnalysis.com and paired them to our existing data. Furthermore, we obtained the index values for the S&P Technology Select Sector Index (IXT) (S&P Global, 2023). This index was selected to provide an industry-specific performance benchmark for our technology analysis. The S&P website only provided information for the past 10 years, for the remaining two years (2012 and 2013) we used the Bloomberg terminal.

The data used in our Fama-French Three Factor Model was collected on French's Data Library. There we found the market Small Minus Big (SMB) and High Minus Low (HML) factors, as well as the 1-month risk-free-rate and market return. This information was downloaded in a csv file. We used the daily data and found the average in our given time frames (for example 19/01/2012-16/01/2013). This resulted in only 11 observations for our regression analysis since we were working with annual return data.

Lastly, we used the U.S. 10-year Treasury yield to determine our risk-free rate for calculation of financial metrics. This data was sourced from the U.S. Department of the Treasury's official website (U.S Department of the Treasury, 2023). By finding the daily Treasury yield curve rates, we were able to obtain an accurate risk-free-rate for the corresponding periods of our analysis.

4.3 Methods for Analysis

When conducting our analysis, we used several methodologies. We started by backtesting our data from the year of 2012 to 2023. Then we used a benchmark comparison to both the S&P 500's performance and IXT. Lastly, we used several financial performance metrics such as the *Sharpe-ratio*, *Treynor-ratio*, *Jensen's alpha,* and *Fama-French Three Factor Model*, which are all described in further detail in the Appendix. Collectively, these diverse methodologies establish a comprehensive framework for our analysis.

4.3.1 Backtesting

To evaluate our investment strategy we used a backtest, a technique that assesses a strategy's effectiveness using historical data (Chen, 2021). Backtesting reveals a model's strengths and weaknesses without real-world application. To give our analysis more credibility we had to abide by our model's set rules, even though they may impact our performance negatively. A model's success in a backtest does not guarantee future performance, as something that happened in the past is never bound to happen again. Therefore, a backtest of our strategy will only be an indicator of whether the strategy works or not.

Using the price information mentioned in the data collection, we imagined an initial $1 million investment in 2012. At the end of the year, we reinvested our gains, thereby including the compounding interest.

Using Public Stocks from 100 Best Companies				
Year	**Invested amount**	**Average annual return**	**Return in cash**	**Result End-of-period**
2012	1 000 000	10,65%	106 496	1 106 496
2013	1 106 496	26,37%	291 815	1 398 312

Figure 2 - Shows how compounding returns were included in the backtest. The End-of-period returns were reinvested evenly at the start of each year.

4.3.2 Benchmark Comparison

Benchmarking is a standard performance metric in finance, enabling direct performance comparisons to a chosen reference over time (Rosen, 2022). In the U.S. the most used benchmark is the Standard & Poor's 500 Index (Kenton, 2023), considered the best reflection of the U.S. economy (Rosen, 2022). Our U.S.-focused investment strategy naturally aligns with the S&P 500 for comparative analysis. We also benchmarked an alternative strategy against the

IXT. Benchmarking highlights how much of our strategy's success is attributable to market trends, enriching our analysis with insights into significant market movements.

5. Analysis

Our analysis unfolds into two distinct segments. First, we will delve into the stock performance for the companies listed in the *100 Best* from 2012-2022. This examination includes a comparative analysis with the predefined benchmark. The latter segment of our analysis concentrates on examining distinct variations of our strategic approach. This involves tailoring the portfolio composition, guided by specific criteria aimed at potentially maximizing returns. We will utilize the Sharpe Ratio, Treynor Ratio, Jensen's alpha and Fama-French Three Factor Model as key performance metrics to evaluate our strategies.

5.1 Performance of the 100 Best Companies to Work For

To accurately evaluate the former performance of the investment strategy using the *100 Best* list, we used both backtesting and a benchmark comparison. The backtest shows the returns that we would have gained through employing this investment strategy from 2012 until the final release date in 2023. The only days of actively trading would be the publication dates for the *100 Best* list in Fortune Magazine. The release dates for each year in this time span are shown in Figure 3.

List Release Dates 2012-2023

Year	Publication Date
2012	19/01
2013	16/01
2014	16/01
2015	05/03
2016	03/03
2017	09/04
2018	16/02
2019	14/02
2020	20/02
2021	12/04
2022	11/04
2023	04/04

Figure 3 – The release dates for "Fortune 100 Best Places to Work" from 2012 through 2023.

5.1.2 Backtest

We found the average annual return for each of the traded companies and simulated an initial investment of $1 million. The investment strategy's cash flow is shown in Figure 4.

Using Public Stocks from 100 Best Companies				
Year	**Invested amount**	**Average annual return**	**Return in cash**	**Result End-of-period**
2012	1 000 000	10,65%	106 496	1 106 496
2013	1 106 496	26,37%	291 815	1 398 312
2014	1 398 312	17,01%	237 887	1 636 198
2015	1 636 198	-10,47%	-171 267	1 464 932
2016	1 464 932	18,12%	265 431	1 730 363
2017	1 730 363	27,16%	469 889	2 200 252
2018	2 200 252	2,36%	51 868	2 252 120
2019	2 252 120	24,02%	540 860	2 792 980
2020	2 792 980	25,50%	712 185	3 505 165
2021	3 505 165	2,74%	95 919	3 601 084
2022	3 601 084	-6,41%	-230 962	3 370 123
			Initial Investment	1 000 000
			Balance 2023	**3 370 123**
			Total Increase (%)	237,01%

Figure 4 - The backtest of the 100 Best investment strategy.

The initial investment of $1 million grew to over 3 million using this strategy. This results in a total increase of 237% over the course of 10 years.

5.1.3 Benchmark Comparison

In this analytical section, we examine the performance of our investment strategy, set against the benchmark S&P 500 index. The evaluation is grounded on the data illustrated in Figures 4 and 5, which present the annual returns of the *100 Best* in contrast to the S&P 500.

Annual return compared to S&P 500			
Period	**Average return**	**S&P 500**	**Difference**
19/01/2012 - 16/01/2013	10,65%	12,56%	-1,91%
16/01/2013 - 16/01/2014	26,37%	25,51%	0,86%
16/01/2014 - 05/03/2015	17,01%	13,56%	3,45%
05/03/2015 - 03/03/2016	-10,47%	-5,38%	-5,09%
03/03/2016 - 09/03/2017	18,12%	19,03%	-0,91%
09/03/2017 - 16/02/2018	27,16%	15,39%	11,77%
16/02/2018 - 14/02/2019	2,36%	0,60%	1,76%
14/02/2019 - 20/02/2020	24,02%	23,22%	0,80%
20/02/2020 - 12/04/2021	25,50%	22,02%	3,48%
12/04/2021 - 11/04/2022	2,74%	8,19%	-5,45%
11/04/2022 - 04/04/2023	-6,41%	-7,49%	1,08%
Average	**12,46%**	**11,56%**	**0,89%**

Figure 5 - The annual return of the Best 100 compared to the S&P 500 Index within the given time frame.

In the initial year, 2012, the *100 Best* marginally underperforms against the S&P 500 by -1,91%. This trend of close alignment continues, with the *100 Best* swinging around the benchmark's returns, sometimes underperforming, as in 2015 and 2021, and sometimes achieving substantial outperformance, as in 2017.

The *100 Best* showed a significant underperformance in 2015. This year was marked by several economic events that could have affected investment strategies. Notably, the Chinese stock market experienced a turbulent year, with a sharp selloff in the summer known as the 2015 China stock market crash (Best, 2023). Additionally, the anticipation and eventual decision by the Federal Reserve to raise interest rates in December, for the first time since 2006, led to increased volatility in U.S. equity markets (Timiraos, 2021). These factors, among others, might have contributed to the *100 Best*'s -5,09% underperformance relative to the S&P 500 during this period.

While not intentional, the *100 Best* has benefited from the robust performance of technology stocks, as these companies have frequently appeared on Fortune's list. Their presence within the portfolio and subsequent growth, particularly evident in the year 2017 with an 11,77% outperformance, highlights the tech sector's expanding impact on the corporate landscape.

The COVID-19 pandemic in 2020 presented significant challenges to businesses worldwide. However, the *100 Best* managed to outperform the S&P 500 by 3,48%. This may be indicative of the inherent resilience and adaptability of companies that excel in employee relations and workplace culture, traits that could translate into effective crisis management and operational agility. This continued success, despite a passive investment approach, suggests that companies making Fortune's list possess certain qualitative factors that allow them to endure and thrive, even in adverse market conditions (Wen & Arbogast, 2021).

It's essential to note that the standout performance of the *100 Best* in 2017, where it outperformed the S&P 500 by 11,77%, significantly affects the overall assessment of the strategy. If we were to exclude this exceptional year, the *100 Best's* returns would not appear substantially different from those of the S&P 500. This suggests that without such an anomalous year, the investment strategy would bring the *100 Best's* average returns much closer to that of the S&P 500, indicating that the superior performance of the list is not as consistent as it may seem at first glance.

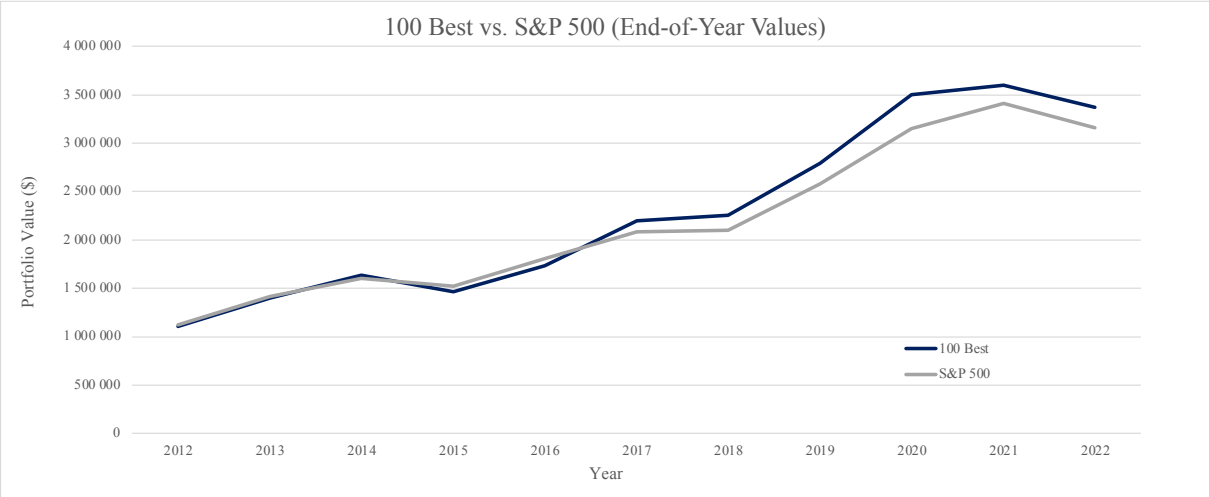


Figure 6 - A line chart showing the growth of the $1 million investments made into the 100 Best and the S&P 500. The values used are the end-of-year values.

Figure 6 presents a visual comparison between the *100 Best's* investment returns and the S&P 500 over a span from 2012 to 2022. The graph traces the portfolio value of the *100 Best* (shown in blue) alongside the S&P 500 (shown in grey), offering insights into the investment strategy's performance relative to the market benchmark.

From the first investments in 2012, the *100 Best* and the S&P 500 exhibit parallel growth trajectories, with the *100 Best* mimicking the benchmark. As we proceed through the timeline, the *100 Best's* portfolio value shows a consistent upward trend, although with a notable dip in 2015, which aligns with the broader market downturn reflected in the S&P 500's movement.

Post-2015, Figure 6 indicates a period of recovery and expansion for the *100 Best*, with the portfolio value outpacing the S&P 500, particularly from 2017 and onwards. This suggests that the companies have capitalized on the positive market conditions more effectively than the market as a whole.

5.1.4 Risk-Adjusted Performance

Sharpe Ratio Analysis

Within the comprehensive analysis of our investment strategy, a key component lies in assessing the risk-adjusted returns through the Sharpe Ratio. For the period spanning from 2012

to 2022, *100 Best* was compared to the S&P 500 to evaluate its performance from a risk-reward perspective.

Sharpe Ratio (2012-2022)		
	100 Best	**S&P 500**
Average Risk-free-rate	2,25%	2,25%
Average Annual Return	12,46%	11,56%
Standard Deviation	0,136	0,114
Sharpe Ratio	*0,751*	*0,818*

Figure 7 - Sharpe ratio calculation for the 100 Best and S&P 500. The standard deviation is based upon the average price changes.

The Sharpe Ratio for the *100 Best*, calculated using an average risk-free rate of 2,25%, was found to be 0,751, and using the average annual return of 12,46% and a standard deviation of 0,136. In comparison, the S&P 500 showed a Sharpe Ratio of 0,818, with an average annual return of 11,56% and a standard deviation of 0,114. The results show that on a risk-adjusted basis, the S&P 500 beats the *100 Best*. Given that our strategy consists of a significantly smaller and more concentrated selection of companies relative to the S&P 500, a higher degree of volatility and a lower Sharpe Ratio were anticipated.

Despite this increased volatility, our strategy did not fall far behind the S&P 500 in terms of risk-adjusted returns, and it surpassed the benchmark in average annual returns. This outcome illustrates well known investment theory - greater returns often come hand-in-hand with greater risks. Our strategy's concentration in fewer companies, while introducing more risk, has remained partially efficient when measuring the excess return per unit of risk.

Treynor Ratio and Jensen's Alpha

The beta coefficient is a measure of volatility, or systematic risk, of a portfolio in comparison to the market as a whole (Liberto, 2023). A beta greater than 1, as consistently observed in the *100 Best* portfolio, indicates a higher sensitivity to market movements. For instance, in 2016 and 2022, with betas of 1,182 and 1,227 respectively. This means that the portfolio's returns were more susceptible to market swings. The elevated beta may imply that in bullish markets,

we could expect the *100 Best* to outperform the S&P 500, but conversely, in bearish markets, the portfolio may suffer greater losses.

Risk-adjusted Performance Compared with S&P 500						
Year	**Beta**	**Portfolio Return**		**Treynor Ratio**		**Jensen's Alpha**
	100 Best	100 Best	S&P	100 Best	S&P	100 Best
2012	1,070	10,65%	12,56%	0,081	0,105	-2,65%
2013	1,047	26,37%	25,51%	0,234	0,237	-0,25%
2014	1,045	17,01%	13,56%	0,135	0,107	2,97%
2015	1,017	-10,47%	-5,38%	-0,124	-0,075	-4,96%
2016	1,182	18,12%	19,03%	0,138	0,172	-4,04%
2017	1,121	27,16%	15,39%	0,219	0,128	10,22%
2018	1,043	2,36%	0,60%	-0,005	-0,023	1,86%
2019	1,145	24,02%	23,22%	0,187	0,206	-2,18%
2020	1,078	25,50%	22,02%	0,223	0,205	1,89%
2021	1,097	2,74%	8,19%	0,010	0,065	-6,08%
2022	1,227	-6,41%	-7,49%	-0,075	-0,103	3,33%
Average	**1,097**	**12,46%**	**11,56%**	**0,093**	**0,093**	**0,01%**

Figure 8 - The risk-adjusted performance for both the 100 Best and the S&P 500. Metrics presented are the beta, Treynor Ratio and Jensen's alpha.

The *100 Best*'s Treynor Ratio in 2017 stands at 0,219, exceeding that of the S&P 500, which suggests that for the level of systematic risk taken, the *100 Best* provided a more substantial excess return. This efficiency in generating returns, despite the inherent risk, is reflective of the robust fundamentals of the companies included in the *100 Best*. Negative values, such as those in 2015 and 2022, point towards a performance that failed to compensate for the risk taken, possibly due to adverse market conditions disproportionately affecting the selected companies.

The *100 Best* had a large range of Jensen's alphas in the given time frame. It also had a few great years, such as the striking 10,22% in 2017, something that underscores that the *100 Best* not only surpassed the expected return but did so by a significant margin. On the other hand, the negative alphas in 2015 and 2021 underline years when the portfolio underperformed relative to its risk profile. The negative alpha suggests that even after adjusting for the beta, the portfolio failed to achieve the expected returns, indicating that some of the companies within the *100 Best* have encountered specific challenges, such as the increased interest rates in 2015.

The beta, Treynor Ratio, and Jensen's alpha provide a clear view of the 100 Best's risk-adjusted performance. Showcasing success across different market cycles but with instability, including

years of both notable outperformance and disappointing returns. This underscores the need for ongoing strategy reassessment and adjustments to stay aligned with market shifts and ensure favorable risk-adjusted returns.

Fama-French Three Factor Model

To assess if the *100 Best* surpassed market performance, accounting for SMB and HML factors, we employed the Fama-French Three Factor Model. The regression was conducted using Excel and Python, with both methods producing identical results (Python code and output can be found in the Appendix).

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,976
R Square	0,952
Adjusted R Square	0,932
Standard Error	0,036
Observations	11

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,178	0,059	46,502	5,44692E-05
Residual	7	0,009	0,001		
Total	10	0,187			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-0,020	0,017	-1,191	0,273	-0,061	0,020	-0,061	0,020
Mkt-RF	2,832	0,261	10,847	0,00001	2,214	3,449	2,214	3,449
SMB	-0,546	0,362	-1,510	0,175	-1,401	0,309	-1,401	0,309
HML	-0,481	0,285	-1,684	0,136	-1,155	0,194	-1,155	0,194

Figure 9 – The Excel results from the Fama-French Three Factor Model regression. Numbers were rounded to three decimals where it did not affect the results.

Our analysis, as outlined in the data collection part, only includes 11 observations (average annual returns). The National Library of Medicine suggests a minimum 8 observations for reliable straight-line regression results with low variance data (Jenkins & Quintana-Ascencio, 2020). With our observations yielding an average variance of just 0,664%, our regression analysis is expected to give statistically significant insight. The intercept coefficient of -0,02 implies that our returns are close to expected, but not exceeding them. However, with a p-value of 27%, this result lacks statistical significance at a 95% confidence level, suggesting caution in interpretation. The only statistically significant coefficient was the market beta, at 2,83, indicating a strong correlation between the *100 Best* and market movements. This beta differs notably from Bloomberg's reported 1,097, with several factors potentially explaining the discrepancy.

Firstly, our regression analysis was based on a dataset with only 11 observations, potentially skewing results due to any single value's exaggerated influence on the coefficient. In contrast, Bloomberg calculates its beta using weekly data within each year, producing a more precise beta coefficient (Brigham Young University, 2023). Furthermore, the Bloomberg beta is based upon the S&P 500 movements, whereas French's beta includes stocks from NYSE, NASDAQ, and AMEX (French, 2023). Additionally, the adjusted R-squared is notably high at approximately 93%, indicating that the regression "explains" about 93% of market movements. Lastly, we conducted a multicollinearity test on the Mkt-RF, SMB, and HML factors, confirming low covariance with Variance Inflation Factor (VIF) results between 1 and 2,5 (detailed VIF results are in the Appendix).

5.2 Alternative Strategies

It is established that our strategy historically outperforms the benchmark over time. Now, we will aim to refine it for even better returns, testing different variations of the strategy. Initially we will focus on the technology sector, as it was the largest and best performing sector of the *100 Best*, to investigate the potential for excess returns. This will be followed by a detailed analysis of the Top 10 and 20 highest ranked placements within the *100 Best*. Lastly, different performance metrics will be used to determine the most promising variant of our strategy.

5.2.1 Technology Sector Portfolio

In our sector-based analysis, the technology sector notably outperformed others. The technology sector also made up the largest part of our portfolio, comprising around 30% annually. This prompted us to explore the performance of a portfolio solely consisting of technology companies, comparing it with our original strategy and relevant benchmarks (hereby referred to as *Tech Strategy*).

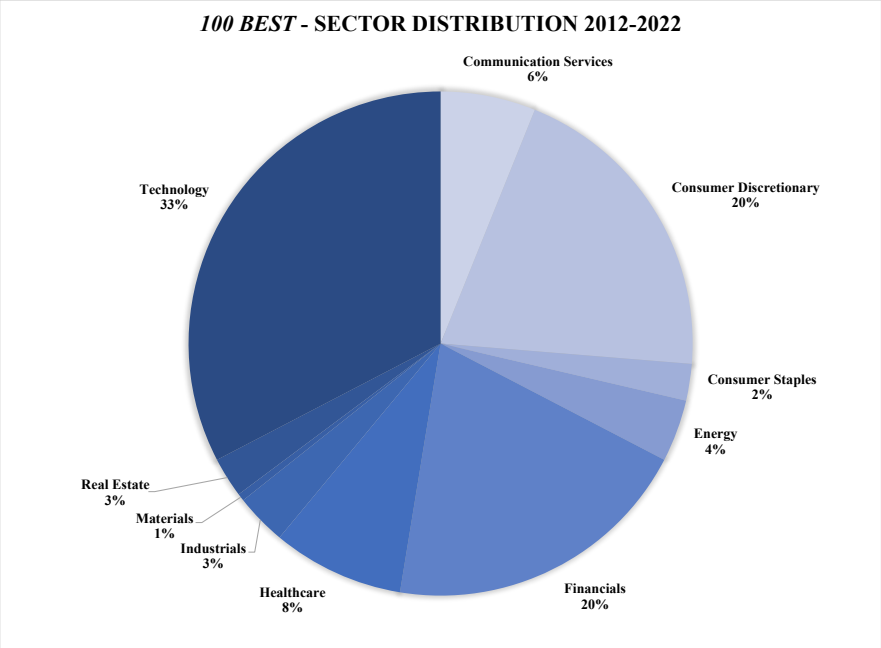


Figure 10 - Pie chart showing the sectors included in the 100 Best list from 2012 through 2022.

Doing this resulted in a huge increase compared to the *100 Best*. The *100 Best* saw a 237% increase throughout the 10-year period, compared to the *Tech Strategy's* return of 572,6%. This new strategy also outperformed the S&P 500 with over 357 percentage points. However, this would seem to be an unfair comparison as the S&P includes companies from all sectors, and the technology sector has been subject to a lot of growth in the past decade (Divine, 2019). Therefore, we compared this strategy to the S&P Technology Selected Sector Index (IXT).

Average Annual Return			
Year	**Technology Strategy**	**IXT**	**Difference**
2012	13,94%	9,61%	4,33%
2013	28,12%	22,59%	5,53%
2014	12,63%	19,11%	-6,48%
2015	-4,36%	-1,46%	-2,90%
2016	31,50%	25,07%	6,43%
2017	44,34%	27,30%	17,04%
2018	24,41%	2,92%	21,49%
2019	24,34%	47,36%	-23,02%
2020	46,19%	39,24%	6,95%
2021	8,08%	5,22%	2,86%
2022	-7,80%	1,01%	-8,81%
Average	*20,13%*	*18,00%*	*2,13%*
Total Increase	**572,62%**	**463,58%**	**109,04%**

Figure 11 - The Tech Strategy alongside the benchmark S&P Technology Select Sector Index (IXT). The total increase includes compounding interest.

We can see that our technology stocks still outperform the IXT by over 100 percentage points through the 10-year period. On an annual basis, the average return of our *Tech Strategy* is 2,1% higher.

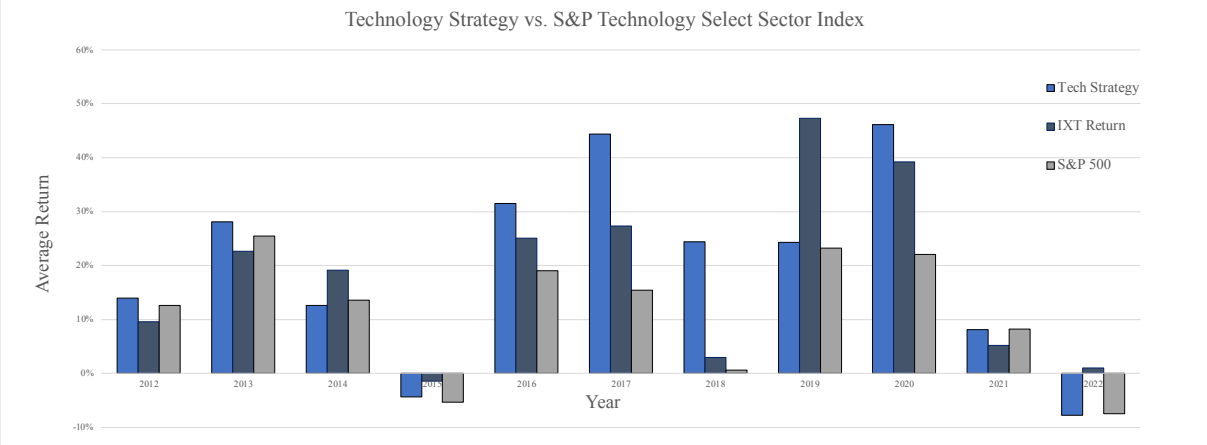


Figure 12 - Average yearly return for the Tech Strategy compared to the benchmarks S&P 500 and IXT. Values are average changes in price from start-of-year to end-of-year.

Figure 12 illustrates the returns of the *Tech Strategy* against the IXT and S&P 500. In years where our strategy outperforms the benchmark, such as 2016, 2017, and 2018, it does so by a notable margin. However, in other years our strategy largely followed the market.

The performance of this portfolio, comprising just a handful of companies, is significantly impacted by each one. For instance, in the years after 2017, Nvidia entered the list and averaged a 64% increase annually for the remaining years. In 2017 and 2019, Nvidia's returns were an impressive 151% and 105% respectively, but in 2018 they fell by 38%. This substantial impact of individual companies is therefore a double-edged sword, as it can be both beneficial and detrimental to portfolio returns.

The portfolio now comprising approximately 10-15 companies annually, is exposed to significantly higher unsystematic risk compared to the original strategy. However, one can achieve about 90% of achievable reduction in risk by diversifying the portfolio in 8 stocks (Fisher & Lorie, 1970, p. 117). This indicating that the portfolio achieves partial diversification, but there is still a considerable risk level. To determine if the increased returns justify the added risk, we calculated the Sharpe ratio, the Treynor ratio, and Jensen's alpha.

Risk-Adjusted Performance Technology Strategy vs. S&P Technology Select Sector Index (IXT)								
Year	**Average Beta**		**Portfolio Return**		**Treynor Ratio**		**Jensen's Alpha**	
	Strategy	*IXT*	*Strategy*	*IXT*	*Strategy*	*IXT*	*Strategy*	IXT
2012	1,218	1,028	13,94%	9,61%	0,098	0,074	-0,92%	-3,24%
2013	0,991	0,985	28,12%	22,59%	0,265	0,211	2,82%	-2,57%
2014	1,185	1,050	12,63%	19,11%	0,082	0,155	-2,90%	5,02%
2015	1,091	1,192	-4,36%	-1,46%	-0,059	-0,030	1,70%	5,36%
2016	1,248	1,040	31,50%	25,07%	0,238	0,223	8,20%	5,35%
2017	1,279	1,086	44,34%	27,30%	0,326	0,227	25,38%	10,81%
2018	1,429	1,121	24,41%	2,92%	0,151	0,000	24,79%	2,59%
2019	1,363	1,245	24,34%	47,36%	0,159	0,359	-6,34%	19,11%
2020	1,040	0,985	46,19%	39,24%	0,429	0,383	23,35%	17,53%
2021	1,430	1,307	8,08%	5,22%	0,045	0,027	-2,90%	-4,96%
2022	1,484	1,211	-7,80%	1,01%	-0,071	-0,015	4,67%	10,67%
Average	**1,251**	**1,114**	**20,13%**	**18,00%**	**0,151**	**0,147**	**7,08%**	**5,97%**

Figure 13 - Shows the risk-adjusted performance of the technology strategy compared to the IXT.

This strategy significantly enhances risk-adjusted performance compared to the original one. Although the betas are relatively similar, the technology strategy's average beta is 0,137 higher, meaning that slightly greater returns are required for satisfactory metrics. Regarding these metrics, the technology strategy's Treynor ratio is 0,004 higher, and its Jensen's alpha exceeds the IXT's by an average of 1,1%. This suggests that the returns sufficiently compensate for the risks taken. Additionally, as illustrated in Figure 13, the Tech Strategy outperforms the IXT in the Sharpe ratio by 0,03, further indicating a favorable return-to-risk ratio.

Sharpe Ratio (Tech. Strategy and IXT)		
	Tech. Strategy	**IXT**
Average Risk-free-rate	2,25%	2,25%
Average Annual Return	20,13%	18,00%
Standard Deviation	0,176	0,161
Sharpe Ratio	*1,01*	*0,98*

Figure14 - Sharpe ratio calculation for the Tech Strategy and the IXT.

5.2.2 Ranking Based Portfolios

As shown, a portfolio comprised of the *100 Best* has consistently outperformed the market over the past decade. Next, we'll explore whether using a subset of the list, specifically portfolios of the top 10 and top 20 tradeable entries each year, yields even better results benchmarking against the S&P 500.

Top 10

The top 10 entries of the 100 Best list (hereby known as *Top 10*) has a marginally lower annual return of -0,20% compared to the *100 Best*. Despite this, it excels in risk-adjusted metrics. Its higher Treynor Ratio suggests a more effective risk compensation than the *100 Best.*

Furthermore, *Top 10* has a notably higher Jensen's alpha, indicating its enhanced capability to produce excess returns over the benchmark. However, its slightly elevated beta also means it is more sensitive to market fluctuations.

Top 10						
	Beta	**Risk free rate**	**Portfolio Return**	**Market return**	**Treynor ratio**	**Jensen's Alpha**
2012	1,047	2,01%	12,61%	12,56%	0,101	-0,44%
2013	0,924	1,84%	23,71%	25,51%	0,237	-0,01%
2014	1,077	2,86%	3,89%	13,56%	0,010	-10,49%
2015	1,118	2,11%	-12,51%	-5,38%	-0,131	-6,24%
2016	1,204	1,83%	14,24%	19,03%	0,103	-8,30%
2017	1,074	2,60%	31,20%	15,39%	0,266	14,86%
2018	1,083	2,87%	16,90%	0,60%	0,130	16,49%
2019	1,036	2,66%	19,81%	23,22%	0,166	-4,14%
2020	1,159	1,52%	21,87%	22,02%	0,176	-3,41%
2021	1,250	1,69%	10,08%	8,19%	0,067	0,27%
2022	1,371	2,79%	-6,91%	-7,49%	-0,071	4,40%
Average	**1,122**	**2,25%**	**12,26%**	**11,56%**	**0,096**	**0,27%**

Figure 15 - The performance of the Top 10, alongside their collective Treynor ratio and Jensen's alpha.

Top 20

The top 20 entries (*Top 20*) achieved an average annual return of 13,27%, beating both the market and our original strategy by 0,81% and 1,71%, respectively. This higher return is attributed to the increased risk taken, as evidenced by its beta, which is higher than that of the *100 Best* and indicates greater market sensitivity. Despite this risk, as shown by the Treynor ratio, *Top 20* has provided better risk compensation compared to *100 Best*. Furthermore, *Top 20* has an alpha score of 0,63%, significantly outperforming *100 Best's* 0,01%, showcasing its strong ability to generate excess returns over the S&P 500.

Top 20						
	Beta	**Risk free rate**	**Portfolio Return**	**Market return**	**Treynor ratio**	**Jensen's Alpha**
2012	1,116	2,01%	13,95%	12,56%	0,107	0,16%
2013	0,997	1,84%	25,31%	25,51%	0,235	-0,13%
2014	1,059	2,86%	20,31%	13,56%	0,165	6,12%
2015	1,074	2,11%	-16,92%	-5,38%	-0,177	-10,98%
2016	1,213	1,83%	15,93%	19,03%	0,116	-6,76%
2017	1,179	2,60%	31,99%	15,39%	0,249	14,31%
2018	1,112	2,87%	9,65%	0,60%	0,061	9,31%
2019	1,149	2,66%	23,85%	23,22%	0,184	-2,43%
2020	1,180	1,52%	31,92%	22,02%	0,258	6,22%
2021	1,191	1,69%	1,38%	8,19%	-0,003	-8,05%
2022	1,298	2,79%	-11,38%	-7,49%	-0,109	-0,83%
Average	**1,143**	**2,25%**	**13,27%**	**11,56%**	**0,099**	**0,63%**

Figure 16 - The performance of the top 20 companies in the 100 Best list, alongside their collective Treynor ratio and Jensen's alpha.

Sub-conclusion

In conclusion, the evaluation of portfolios consisting of the *100 Best*, *Top 10*, and *Top 20* companies in the list reveals distinct characteristics and performance dynamics. This emphazises the subtle trade-offs between return, risk, and risk-adjusted performance in investment strategy.

Overall, *Top 20* stands out for its high returns and strong performance on a risk-adjusted basis, though with higher market volatility. *Top 10* presents a more balanced profile with moderately high returns and above-average risk-adjusted performance. *100 Best* offers a return in the relative middle ground, while having the lowest volatility. The choice between these portfolios would depend on the investor's return objectives and risk tolerance. Those seeking higher returns and willing to accept greater volatility might prefer *Top 20* while investors favoring stability might lean towards the *100 Best. Top 10* offers a middle ground, balancing moderate returns with manageable risk levels.

5.2.3 Fama-French Three Factor Model – Alternative Strategies

When applying the Fama-French Three Factor Model to our alternative strategies, it resulted in mixed results. As explained in 5.1.4, the low number of observations are likely impacting the regression.

	Tech Strategy		Top 10		Top 20	
	Coefficients	*P-value*	*Coefficients*	*P-value*	Coefficients	P-value
Intercept	0,0634	0,2356	0,0065	0,8845	-0,0293	0,3733
Mkt-RF	2,7726	0,0074	2,2771	0,0103	3,1694	0,0003
SMB	0,8158	0,4547	-0,2750	0,7705	-0,3910	0,5664
HML	-0,5451	0,5243	-0,2303	0,7570	-0,7931	0,1659
Adjusted R Squared	*0,6691*		*0,5347*		*0,8478*	

Figure 17 - The key-takeaways from the Fama-French Three Factor Regression for the alternative strategies. The numbers chosen were the coefficients and their corresponding p-value, as well as adjusted R squared. Adjusted R squared was chosen as the model uses multiple factors.

According to the model's intercept, the *Tech Strategy* and *Top 10* both beat the market when taking SMB and HML into account, but not the *Top 20*. However, these results all have a high p-value and are therefore not statistically significant. As for the Market-RF coefficient, all the strategies have a high beta, and they seem to correlate highly with market movements. These coefficients also have a very low p-value and are therefore significant with a 95% confidence

level. Neither of the strategies seem to be heavily affected by the SMB and HML factors, but they all have very high p-values and it would require further analysis to conclude with this statement. The adjusted R squared shows that the model explains about 50-85% of the strategies returns. This is likely because of the low number of stocks in the portfolios, as the firm-specific risks are more prevalent in the portfolios.

6. Reflection and weaknesses

In contrast to the previous research done on the correlation between employee satisfaction and stock performance, our strategy does not perform as well as expected. The *100 Best* average annual return of 12,5% and average difference from the S&P 500 of 0,89% is not as good as the results presented in Alex Edmans' research (Edmans, 2012). There are many possible reasons for this change in performance. Like in the case of the "Dogs of the Dow", when an investment strategy is more commonly known, the prices are more likely to reflect the true underlying value. After Edmans' paper was released, the value of the intangible asset "Employee satisfaction" is possibly known to a wider extent, resulting in a less effective trading strategy basing oneself upon the *100 Best*. However, Glassdoor's best places to work list from 2009 to 2019 outperformed the S&P 500 with significant margin (Chamberlain & Munyikwa, 2020). This is however a different list, where the companies do not match 100%, resulting in a different outcome. The reasons for the strategy's underperformance could be a paper on its own, as it would require extensive research to figure out.

It is also important to discuss how our assumptions and delimitations leave room for a few weaknesses and limitations in our analysis. The exclusion of dividend payments can be seen as our main weakness. Due to Excel, and the STOCKHISTORY function not returning values adjusted for dividends, we did not have time to manually add the dividend yields for the period. Looking at the S&P 500 and Russel 1000, they had an average dividend yield of 1,98% from 2009 to 2019, and 2,20% from 2013 to 2023 respectively (Ross, 2023; Seeking Alpha, 2023). This gives us a gauge on the dividend yield our portfolio could have achieved in the period, indicating that in "reality" our returns are substantially better than shown in the analysis. To offset some of these lost returns, we decided to not include transaction costs in our analysis.

The presented investment strategy is entirely dependent on the *100 Best* list. This results in a major limitation. Should the list and/or survey it bases itself upon end, will the viability of our strategy be non-existent. Despite this, the correlation shown between employee satisfaction and stock performance will still be relevant. The increasing prevalence of ESG focus in investing will most likely increase the interest in such lists, rather than decrease. In other words, the likelihood of this happening will be relatively low.

7. Conclusion/Summary

The term paper focused on an investment strategy that invested in all tradeable companies from the "Fortune 100 Best Companies to Work For" list. This strategy showed significant growth over a ten-year period, with an initial investment of $1 million returning over $3,37 million, a total increase of 237%. However, when compared to the S&P 500, the investment strategy based on the *100 Best* displayed mixed performance. There were years of both underperformance and substantial outperformance. A focused examination of the technology sector within the portfolio revealed an outperformance compared to the broader *100 Best* strategy. This sector-specific portfolio outperformed the S&P 500 and a relevant technology index (IXT), demonstrating the potential of a sector-specific strategy.

In terms of risk-adjusted performance, metrics like the Sharpe Ratio, Treynor Ratio, and Jensen's alpha were used to evaluate the efficiency and risk profile of the investment strategies. On a risk-adjusted basis, the *100 Best* did not beat the S&P 500, suggesting that the greater risks were not properly compensated.

The paper also explored strategies based on the top 10 and top 20 companies from the *100 Best*. These variations showed different characteristics in terms of return, risk, and risk-adjusted performance, with the *Top 20* portfolio particularly notable for its high returns and strong performance on a risk-adjusted basis.

However, the paper acknowledges certain limitations, such as the exclusion of transaction fees and dividend payments in its analysis. These factors could impact the real-world applicability of the strategies.

Conclusively, this paper suggests that while the *100 Best* investment strategy offers potential for high returns, it also entails greater risks. The overall best investment strategy was the *Tech Strategy*, giving both the highest return and the best risk-adjusted performance. However, this strategy is only based on a handful of companies, meaning that the historical outperformance does not in any way guarantee future gains. The performance of portfolios based on subsets of the list (*Top 10* and *Top 20*) suggests a trade-off between return, risk, and risk-adjusted performance. The choice of strategy would depend on an investor's return objectives and risk tolerance.

8. Sources

Best, R. (2023). China's Intervention During the 2015 Stock Market Crash. Retrieved from Investopedia: https://www.investopedia.com/articles/investing/022716/4-consequences-government-intervention-chinas-markets.asp

Brigham Young University. (2023, August 24). Bloomberg Guide: Beta. Retrieved from BYU Library: https://guides.lib.byu.edu/bloomberg/Beta

Carey, T. W. (2022, 10 17). Who Wins a Brokerage Price War? Retrieved from Investopedia: https://www.investopedia.com/who-wins-a-brokerage-price-war-4773406

Chamberlain, D., & Munyikwa, Z. (2020). What's Culture Worth? . Glassdoor Economic Research.

Chen, J. (2020). What Is Jensen's Measure (Alpha), and How Is It Calculated? Retrieved from Investopedia: https://www.investopedia.com/terms/j/jensensmeasure.asp

Chen, J. (2021). Backtesting: Definition, How It Works, and Downsides. Retrieved from Investopedia: https://www.investopedia.com/terms/b/backtesting.asp

Cross, F. (1973). The Behavior of Stock Prices on Fridays and Mondays. Financial Analysts Journal, 67-69.

Divine, J. (2019). U.S.News. Retrieved from Decade in Review: 'Big Tech' Gains Enormous Power: https://money.usnews.com/investing/stock-market-news/articles/2019-12-02/decade-in-review-big-tech-gains-enormous-power

Dreher, B. (2004, March). The Costco Way. Business Week.

Edmans, A. (2012). The Link Between Job Satisfaction and Firm Value, With Implications for Corporate Social Responsibility. Articles, 1-19. Retrieved from http://faculty.london.edu/aedmans/RoweAMP.pdf

Fama, E. F. (1969). Efficient Capital Markets: A Review of Theory and Empirical Work. The Journal of Finance, 383-417.

Fernando, J. (2023). Sharpe Ratio: Definition, Formula, and Examples. Retrieved from Investopedia: https://www.investopedia.com/terms/s/sharperatio.asp#toc-what-the-sharpe-ratio-can-tell-you

Fisher, L., & Lorie, J. H. (1970). Some Studies of Variability of Returns on Investments in Common Stocks. The Journal of Business, 99-134. Retrieved from Some Studies of Variability of Returns on Investments in Common Stocks: https://www.jstor.org/stable/2352105?seq=1

French, K. R. (2023, October 31). Description of Fama/French Factors. Retrieved from Dartmouth.edu: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html

Friedman, M. (1970, 9 13). The Social Responsibility of Business Is to Increase Its Profits. The New York Times , pp. 17-18.

Green, C. T., Huang, R., Wen, Q., & Zhou, D. (2018). Crowdsourced Employer Reviews and Stock Returns. Journal of Financial Economics.

Harris, L. (2003). Trading and Exchanges - Market Microstructure for Practitioners. Oxford University Press Inc.

Hayes, A. (2022, May 31). Fama and French Three Factor Model Definition: Formula and Interpretation. Retrieved from Investopedia: https://www.investopedia.com/terms/f/famaandfrenchthreefactormodel.asp

Hirschey , M. (2000). The "Dogs of the Dow" Myth. Financial Review, 1-16.

Huselid, M. A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. Retrieved from Academy of

Management Journal: https://www.markhuselid.com/pdfs/articles/1995_AMJ_HPWS_Paper.pdf
Jenkins, D. G., & Quintana-Ascencio, P. F. (2020, February 21). A solution to minimum sample size for regressions. PLoS One.
Jensen, M. C. (1967). The Performanc of Mutual Funds in the Period 1945-1964. Journal of Finance, 389-416.
Kenton, W. (2020). Treynor Ratio: What It Is, What It Shows, Formula To Calculate It. Retrieved from Investopedia: https://www.investopedia.com/terms/t/treynorratio.asp
Kenton, W. (2023). S&P 500 Index: What It's for and Why It's Important in Investing. Retrieved from Investopedia: https://www.investopedia.com/terms/s/sp500.asp
Levering, R., & Moskowitz, M. (1993). The 100 Best Companies to Work for in America. Doubleday Business.
Levering, R., Moskowitz, M., & Katz, M. (1984). The 100 Best Companies to Work for in America. Addison-Wesley.
Liberto, D. (2023). What Beta Means When Considering a Stock's Risk. Retrieved from Investopedia: https://www.investopedia.com/investing/beta-know-risk/
Mackintosh, P. (2021, Oktober 14). Have Spreads Changed Over Time? Retrieved from Nasdaq: https://www.nasdaq.com/articles/have-spreads-changed-over-time-2021-10-14#:~:text=But%20over%20the%20last%20decade%2C,spreads%20might%20actually%20be%20widening
McQueen, G., Shields, K., & Thorley, S. R. (1997). Does the "Dow-10 Investment Strategy" Beat the Dow Statistically and Economically? Financial Analyst Journal, 66-72.
Rosen, R. (2022). Using Benchmarks in Investing. Retrieved from Investopedia: https://www.investopedia.com/articles/investing/032516/how-use-benchmark-evaluate-portfolio.asp
Ross, S. (2023, 11 29). A History of the S&P 500 Dividend Yield. Retrieved from Investopedia: https://www.investopedia.com/articles/markets/071616/history-sp-500-dividend-yield.asp
S&P Global. (2023). S&P Sectors. Retrieved from S&P Global: https://www.spglobal.com/spdji/en/index-family/equity/us-equity/sp-sectors/#overview
Seeking Alpha. (2023, 12 10). IWD iShares Russell 1000 Value ETF. Retrieved from Seeking Alpha : https://seekingalpha.com/symbol/IWD/dividends/yield
Simpson, S. D. (2023, 6 15). 7 Market Anomalies Every Investor Should Know. Retrieved from Investopedia: https://www.investopedia.com/articles/financial-theory/11/trading-with-market-anomalies.asp
Timiraos, N. (2021). Fed Raised Interest Rates in 2015 Despite Concerns Over Growth, Inflation. Retrieved from Wall Street Journal: https://www.wsj.com/articles/fed-raised-interest-rates-in-2015-despite-concerns-over-growth-inflation-11610140778
U.S Department of the Treasury. (2023). Daily Treasury Par Yield Curve Rates. Retrieved from U.S Department of the Treasury: https://home.treasury.gov/resource-center/data-chart-center/interest-rates/TextView?type=daily_treasury_yield_curve&field_tdr_date_value=2022
Wachtel, S. B. (1942). Certain Observations on Seasonal Movements in Stock Prices. The Journal of Business of the University of Chicago, 184-193.
Wen, Y., & Arbogast, I. (2021). How COVID-19 Has Impacted Stock Performance by Industry. Retrieved from Federal Reserve Bank of St. Louis: https://www.stlouisfed.org/on-the-economy/2021/march/covid19-impacted-stock-performance-industry

9. Appendix

9.1 Financial Performance Metrics

9.1.1 Sharpe-Ratio

The Sharpe Ratio, a financial metric developed by economist William Sharpe in 1966, measures the risk-adjusted returns of an investment portfolio (Fernando, 2023). It is calculated using the following formula:

$$S = \frac{R_p - R_f}{\sigma_p}$$

$R_p = Portfolio\ return$
$R_f = Risk - free\ rate$
$\sigma_p = Standard\ deviation\ of\ the\ portfolio's\ excess\ return$

This formula calculates the excess return of the portfolio over the risk-free rate, relative to its volatility. The risk-free rate typically reflects the yield on a government bond or similar low-risk investment. A higher Sharpe Ratio indicates better risk-adjusted performance of the portfolio. It is particularly useful for comparing portfolios with different risk levels or evaluating the performance of active managers (Fernando, 2023).

9.1.2 Treynor Ratio

The Treynor ratio assesses the amount of excess return a portfolio has produced per unit of risk. This metric is particularly useful for comparing the risk-adjusted returns of different portfolios (Kenton, 2020). Instead of adjusting the portfolio returns using standard deviation like the Sharpe Ratio, the Treynor ratio uses the beta. This means that the ratio relies on the systematic risk of the portfolio, which makes it particularly applicable for our portfolio, as the relevancy of unsystematic risk is minimal. A higher Treynor ratio suggests that the portfolio has achieved a greater return for each unit of systematic risk, typically the preferred outcome. It is calculated using the following formula:

$$Treynor\ Ratio = \frac{R_p - R_f}{\beta_p}$$

$R_p = Portfolio\ return$
$R_f = Risk - free\ rate$
$\beta_p = Beta\ of\ the\ portfolio$

A limitation with the ratio relying on the beta is that it is derived from historical data, operating under the assumption that the market conditions will remain stable (Kenton, 2020). Furthermore, when discussing the Treynor Ratio, it is crucial to mention that a negative value presents a challenge in interpretation. There are two primary paths to a negative Treynor Ratio: either through negative portfolio returns or a negative beta. Contrary to what one might assume, a higher negative value doesn't necessarily indicate better performance. In fact, when comparing two investments with identical negative returns, the portfolio with the higher beta will get a better Treynor Ratio, leading to potential misinterpretations of its risk-adjusted performance.

9.1.3 Jensen's Alpha

Jensen's alpha is a performance measure adjusted for risk that represents the average return on an investment, above or below what is predicted by the Capital Asset Pricing Model (CAPM) (Chen, 2020). The measure was originally invented by Michael Jensen to estimate fund managers' ability to forecast the market contributes to fund performance (Jensen, 1967). Jensen's alpha can be calculated by first finding the capital asset expected return using CAPM, then a final formula to find Jensen's alpha:

1. $E(R_p) = R_f + \beta_p(E(R_m) - R_f)$

2. $Jensen's\ Alpha = R_p - E(R_p)$

$R_p = Portfolio\ Return$

$E(R_p) = Expected\ Portfolio\ Return$

$R_f = Risk\ free\ rate$

$\beta_p = Portfolio\ beta$

$E(R_m) = Expected\ market\ return$

Critics of this metric say that if the Efficient Market Hypothesis (EMH) is correct, the performance of investors with a positive alpha is mostly derived from luck and not skill (Chen, 2020). In their opinion, a high alpha is difficult to keep up over a longer period of time, and therefore in part arbitrary.

9.1.4 Fama-French Three Factor Model

Another expansion on the CAPM model is the Fama-French Three Factor Model, developed in 1992 by Eugene Fama and Kenneth French (Hayes, 2022). This model adds size- and value-risk to the existing market risk, to better predict expected return. The model is the result of an econometric regression of historical stock prices. Size risk is based upon the small minus big factor (SMB), where French has compared the returns of companies with larger market caps to companies with a smaller market cap. Value risk is measured with the high minus low factor (HML), where the returns of companies with a higher book to market ratio are compared to the returns of those with a lower book to market ratio. These factors are based on the underlying assumptions that smaller companies regularly outperform larger companies, and that companies with a lower book to market ratio (value stocks) regularly outperform those with a higher book to market ratio (growth stocks). The model's formula is:

$$E(R_p) = R_f + \beta_1(r_m - r_f) + \beta_2(SMB) + \beta_3(HML) + \epsilon$$

Where:

$E(R_p) = Expected\ return$

$R_f = Risk\text{-}free\ rate$

$\beta_1, \beta_2, \beta_3 = Factor's\ coefficient$

$SMB\ (Small\ Minus\ Big) = Historic\ excess\ returns\ of\ small\text{-}cap\ companies\ over\ large\text{-}cap\ companies$

$HML\ (High\ Minus\ Low) = Historic\ excess\ returns\ of\ value\ stocks\ over\ growth\ stocks$

When examining the regression coefficients, a value greater than 0 indicates that the portfolio has a preference for the relevant factor. For instance, if the SMB coefficient is 1, this suggests that the portfolio is inclined towards small capitalization stocks. It is also important to take the p-value of the coefficient into account, as it must be within a given confidence interval to be of statistical significance. Other results from the regression are also important to consider, such as the explanatory R^2 and Adjusted R^2.

9.2 Company Data

100 Best Companies to Work for 2012-2022 (US Listed Companies)								
2012								
RANK	**Company**	**Exchange**	**Ticker**	**Sector**	**Open 19/01/2012**	**Open 16/01/2013**	**Change in Price (%)**	**Beta**
1	Google	NASDAQ	GOOGL	Communication Services	$ 16,04	$ 18,08	12,70%	0,865
6	NetApp	NASDAQ	NTAP	Technology	$ 35,11	$ 33,59	-4,33%	1,295
7	Camden Property Trust	NYSE	CPT	Real Estate	$ 58,15	$ 66,36	14,12%	0,558
15	NuStar Energy	NYSE	NS	Energy	$ 57,44	$ 48,86	-14,94%	0,592
19	Intuit	NASDAQ	INTU	Technology	$ 56,53	$ 62,80	11,09%	1,074
23	Qualcomm	NASDAQ	QCOM	Technology	$ 57,71	$ 64,54	11,84%	1,233
25	Ultimate Software	NASDAQ	ULTI	Technology	$ 68,61	$ 96,81	41,10%	1,116
27	Salesforce.com	NYSE	CRM	Technology	$ 27,84	$ 43,50	56,26%	1,366
28	Devon Energy	NYSE	DVN	Energy	$ 64,53	$ 53,54	-17,03%	1,248
32	Whole Foods Market	NASDAQ	WFM	Consumer Staples	$ 38,81	$ 44,74	15,28%	1,120
33	Goldman Sachs	NYSE	GS	Financials	$ 106,25	$ 138,94	30,77%	1,528
40	SVB Financial Group	NASDAQ	SIVB	Financials	$ 55,70	$ 60,15	7,99%	#N/A
41	Adobe	NASDAQ	ADBE	Technology	$ 29,91	$ 38,12	27,45%	1,168
43	Novo Nordisk	NYSE	NVO	Healthcare	$ 12,03	$ 17,52	45,62%	0,568
45	National Instruments	NASDAQ	NATI	Technology	$ 26,56	$ 27,20	2,41%	1,186
46	Intel	NASDAQ	INTC	Technology	$ 25,52	$ 21,91	-14,15%	1,091
52	Autodesk	NASDAQ	ADSK	Technology	$ 34,43	$ 36,76	6,77%	1,689
57	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 34,03	$ 38,96	14,49%	1,412
60	American Express	NYSE	AXP	Financials	$ 50,71	$ 60,82	19,94%	1,130
61	Nordstrom	NYSE	JWN	Consumer Discretionary	$ 46,48	$ 51,87	11,61%	0,975
62	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 8,06	$ 4,38	-45,66%	0,582
63	General Mills	NYSE	GIS	Consumer Staples	$ 41,04	$ 40,83	-0,51%	0,411
69	Umpqua Bank	NASDAQ	COLB	Financials	$ 19,64	$ 17,56	-10,58%	1,264
72	EOG Resources	NYSE	EOG	Energy	$ 52,85	$ 62,42	18,11%	1,754
73	Starbucks	NASDAQ	SBUX	Consumer Discretionary	$ 23,99	$ 27,05	12,73%	0,920
75	FactSet Research Systems	NYSE	FDS	Financials	$ 89,25	$ 91,06	2,03%	0,862
76	Microsoft	NASDAQ	MSFT	Technology	$ 28,16	$ 27,15	-3,59%	1,117
77	Aflac	NYSE	AFL	Financials	$ 22,78	$ 26,37	15,76%	1,488
79	Mattel	NASDAQ	MAT	Consumer Discretionary	$ 28,76	$ 36,97	28,55%	0,907
80	Stryker	NYSE	SYK	Healthcare	$ 51,54	$ 59,45	15,35%	0,966
82	Hasbro	NASDAQ	HAS	Consumer Discretionary	$ 33,20	$ 37,21	12,08%	0,893
84	Booz Allen Hamilton	NYSE	BAH	Industrials	$ 15,13	$ 12,34	-18,44%	0,652
89	Morningstar	NASDAQ	MORN	Financials	$ 59,38	$ 65,20	9,80%	0,594
90	Cisco	NASDAQ	CSCO	Technology	$ 19,68	$ 20,91	6,25%	1,070
91	CarMax	NYSE	KMX	Consumer Discretionary	$ 33,15	$ 37,85	14,18%	1,154
92	Accenture	NYSE	ACN	Technology	$ 55,25	$ 69,71	26,17%	1,213
98	Capital One	NYSE	COF	Financials	$ 49,39	$ 61,41	24,34%	1,340
99	Darden Restaurants	NYSE	DRI	Consumer Discretionary	$ 41,33	$ 40,53	-1,93%	0,989
100	Intercontinental Hotels Group	NYSE	IHG	Consumer Discretionary	$ 29,52	$ 38,88	31,70%	1,276
2013								
RANK	**Company Name**	**Exchange**	**Ticker**	**Sector**	**Open 16/01/2013**	**Open 16/01/2014**	**Change in Price (%)**	**Beta**
1	Google, Inc.	NASDAQ	GOOGL	Communication Services	$ 18,08	$ 28,76	59,07%	0,946
6	NetApp	NASDAQ	NTAP	Technology	$ 33,59	$ 43,23	28,70%	0,813
9	Ultimate Software	NASDAQ	ULTI	Technology	$ 97,56	$ 152,86	56,68%	0,987
10	Camden Property Trust	NYSE	CPT	Real Estate	$ 66,36	$ 57,24	-13,74%	0,715
11	Qualcomm	NASDAQ	QCOM	Technology	$ 64,54	$ 74,47	15,39%	0,758
19	salesforce.com	NYSE	CRM	Technology	$ 43,50	$ 59,49	36,76%	1,352
22	Intuit, Inc.	NASDAQ	INTU	Technology	$ 62,80	$ 76,46	21,75%	0,787
27	Devon Energy	NYSE	DVN	Energy	$ 53,54	$ 59,11	10,40%	1,156
35	National Instruments	NASDAQ	NATI	Technology	$ 27,13	$ 32,39	19,39%	1,240
38	NuStar Energy L.P.	NYSE	NS	Energy	$ 48,86	$ 50,17	2,68%	0,487
42	Cisco	NASDAQ	CSCO	Technology	$ 20,91	$ 22,85	9,28%	0,877
44	FactSet Research Systems Inc.	NYSE	FDS	Financials	$ 91,06	$ 107,75	18,33%	0,876
51	American Express	NYSE	AXP	Financials	$ 60,82	$ 88,00	44,69%	1,135
54	Autodesk, Inc.	NASDAQ	ADSK	Technology	$ 36,76	$ 53,22	44,78%	1,252
61	Stryker	NYSE	SYK	Healthcare	$ 59,45	$ 78,23	31,59%	0,918
64	Marriott International, Inc.	NASDAQ	MAR	Consumer Discretionary	$ 38,96	$ 49,89	28,05%	1,180
65	Darden Restaurants	NYSE	DRI	Consumer Discretionary	$ 40,53	$ 46,49	14,69%	0,968
68	Intel Corporation	NASDAQ	INTC	Technology	$ 21,91	$ 26,64	21,59%	0,874
71	Whole Foods Market	NASDAQ	WFM	Consumer Staples	$ 44,45	$ 53,26	19,82%	1,141
72	EOG Resources, Inc.	NYSE	EOG	Energy	$ 62,42	$ 85,05	36,27%	1,480
74	CarMax	NYSE	KMX	Consumer Discretionary	$ 37,85	$ 44,74	18,20%	1,425
75	Microsoft Corporation	NASDAQ	MSFT	Technology	$ 27,15	$ 36,69	35,14%	0,919
78	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 4,38	$ 8,80	100,91%	1,446
84	Aflac, Inc.	NYSE	AFL	Financials	$ 26,37	$ 32,40	22,85%	1,059
87	Capital One	NYSE	COF	Financials	$ 61,41	$ 77,10	25,55%	1,085
88	Nordstrom, Inc.	NYSE	JWN	Consumer Discretionary	$ 51,87	$ 56,63	9,16%	0,969
91	Accenture	NYSE	ACN	Technology	$ 69,71	$ 83,54	19,84%	1,041
92	Hasbro, Inc.	NASDAQ	HAS	Consumer Discretionary	$ 37,21	$ 51,98	39,69%	0,950
93	Goldman Sachs Group, Inc.	NYSE	GS	Financials	$ 138,94	$ 178,75	28,65%	1,398
94	Starbucks	NASDAQ	SBUX	Consumer Discretionary	$ 27,05	$ 37,91	40,17%	1,180
96	Mattel, Inc.	NASDAQ	MAT	Consumer Discretionary	$ 36,97	$ 44,24	19,66%	0,873
97	Aéropostale, Inc.	NYSE	ARO	Consumer Discretionary	$ 13,20	$ 7,86	-40,45%	#N/A
98	FedEx Corporation	NYSE	FDX	Industrials	$ 98,49	$ 141,92	44,10%	1,159
99	Grainger	NYSE	GWW	Industrials	$ 207,60	$ 263,73	27,04%	1,104

2014								
RANK	**NAME**	**Exchange**	**Ticker**	**Sector**	**Open 16/01/2014**	**Open 05/03/2015**	**Change in Price (%)**	**Beta**
1	Google	NASDAQ	GOOGL	Communication Services	$ 28,76	$ 28,98	0,78%	1,155
7	salesforce.com	NYSE	CRM	Technology	$ 59,49	$ 65,12	9,46%	1,671
8	Intuit	NASDAQ	INTU	Technology	$ 76,46	$ 97,58	27,62%	1,075
11	Camden Property Trust	NYSE	CPT	Real Estate	$ 57,24	$ 69,25	20,98%	0,438
20	Ultimate Software	NASDAQ	ULTI	Technology	$ 152,86	$ 163,90	7,22%	1,529
26	NuStar Energy	NYSE	NS	Energy	$ 50,17	$ 62,75	25,07%	0,587
28	The Container Store	NYSE	TCS	Consumer Discretionary	$ 39,90	$ 18,61	-53,36%	1,482
32	Qualcomm	NASDAQ	QCOM	Technology	$ 74,47	$ 71,20	-4,39%	0,957
33	NetApp	NASDAQ	NTAP	Technology	$ 43,23	$ 37,82	-12,51%	0,942
42	Stryker	NYSE	SYK	Healthcare	$ 78,23	$ 92,35	18,05%	0,934
44	Whole Foods Market	NASDAQ	WFM	Consumer Staples	$ 53,26	$ 56,15	5,43%	0,690
45	Goldman Sachs Group	NYSE	GS	Financials	$ 178,75	$ 190,13	6,37%	1,195
50	FactSet Research Systems	NYSE	FDS	Financials	$ 107,75	$ 152,56	41,59%	0,973
52	Credit Acceptance	NASDAQ	CACC	Financials	$ 136,58	$ 187,78	37,48%	0,942
54	CarMax	NYSE	KMX	Consumer Discretionary	$ 44,74	$ 64,69	44,59%	1,327
55	Cisco	NASDAQ	CSCO	Technology	$ 22,85	$ 29,47	28,97%	0,957
56	Devon Energy	NYSE	DVN	Energy	$ 59,11	$ 61,64	4,28%	1,354
57	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 49,89	$ 83,29	66,95%	1,100
58	Aflac	NYSE	AFL	Financials	$ 32,40	$ 31,28	-3,46%	0,890
63	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 8,80	$ 20,69	135,11%	0,989
64	General Mills	NYSE	GIS	Consumer Staples	$ 48,30	$ 53,35	10,46%	0,642
66	National Instruments	NASDAQ	NATI	Technology	$ 32,39	$ 31,26	-3,49%	1,240
67	American Express	NYSE	AXP	Financials	$ 88,00	$ 80,66	-8,34%	1,149
70	Autodesk	NASDAQ	ADSK	Technology	$ 53,22	$ 62,50	17,44%	1,429
72	Novo Nordisk	NYSE	NVO	Healthcare	$ 19,15	$ 23,46	22,51%	0,674
74	Darden Restaurants	NYSE	DRI	Consumer Discretionary	$ 46,49	$ 56,35	21,21%	0,845
77	Bright Horizons Family Solutions	NYSE	BFAM	Consumer Discretionary	$ 37,07	$ 50,30	35,69%	0,749
79	Discovery Communications	NASDAQ	DISCA	Communication Services	$ 37,77	$ 32,20	-14,75%	1,107
83	Adobe Systems	NASDAQ	ADBE	Technology	$ 61,59	$ 77,60	25,99%	1,251
84	Intel	NASDAQ	INTC	Technology	$ 26,64	$ 34,26	28,60%	1,092
85	Capital One	NYSE	COF	Financials	$ 77,10	$ 78,65	2,01%	1,038
86	Microsoft	NASDAQ	MSFT	Technology	$ 36,69	$ 43,07	17,39%	1,068
89	Nordstrom	NYSE	JWN	Consumer Discretionary	$ 56,63	$ 74,70	31,93%	0,899
90	Accenture	NYSE	ACN	Technology	$ 83,54	$ 91,31	9,30%	1,012
92	The Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 47,22	$ 47,23	0,02%	0,714
95	Hyatt Hotels	NYSE	H	Consumer Discretionary	$ 50,11	$ 60,94	21,61%	1,164
97	EOG Resources	NYSE	EOG	Energy	$ 85,05	$ 89,85	5,64%	1,402
2015								
RANK	**NAME**	**Exchange**	**Ticker**	**Sector**	**Open 05/03/2015**	**Open 03/03/2016**	**Change in Price (%)**	**Beta**
1	Google	NASDAQ	GOOGL	Communication Services	$ 28,98	$ 36,97	27,58%	1,083
8	salesforce	NYSE	CRM	Technology	$ 65,12	$ 70,05	7,57%	1,283
10	Camden Property Trust	NYSE	CPT	Real Estate	$ 69,25	$ 74,68	7,83%	0,761
18	NuStar Energy	NYSE	NS	Energy	$ 62,75	$ 36,45	-41,91%	1,268
19	Stryker	NYSE	SYK	Healthcare	$ 92,35	$ 102,00	10,45%	0,838
21	Ultimate Software	NASDAQ	ULTI	Technology	$ 163,90	$ 177,10	8,05%	1,181
22	Workday	NASDAQ	WDAY	Technology	$ 82,72	$ 71,80	-13,20%	1,351
24	Twitter	NYSE	TWTR	Communication Services	$ 47,59	$ 18,53	-61,06%	1,093
27	The Container Store	NYSE	TCS	Consumer Discretionary	$ 18,61	$ 5,42	-70,88%	1,120
31	Intuit	NASDAQ	INTU	Technology	$ 97,58	$ 98,06	0,49%	1,205
35	NetApp	NASDAQ	NTAP	Technology	$ 37,82	$ 25,76	-31,89%	0,953
37	Credit Acceptance	NASDAQ	CACC	Financials	$ 187,78	$ 200,57	6,81%	0,820
38	Devon Energy	NYSE	DVN	Energy	$ 61,64	$ 21,39	-65,30%	1,707
48	FactSet Research Systems	NYSE	FDS	Financials	$ 152,56	$ 154,12	1,02%	0,902
49	Aflac Incorporated	NYSE	AFL	Financials	$ 31,28	$ 30,63	-2,06%	0,920
50	Goldman Sachs Group	NYSE	GS	Financials	$ 190,13	$ 154,00	-19,00%	1,265
51	American Express	NYSE	AXP	Financials	$ 80,66	$ 57,16	-29,13%	0,724
52	Autodesk	NASDAQ	ADSK	Technology	$ 62,50	$ 54,09	-13,46%	1,178
53	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 83,29	$ 68,57	-17,67%	1,156
55	Whole Foods Market	NASDAQ	WFM	Consumer Staples	$ 56,15	$ 32,22	-42,62%	0,665
59	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 20,69	$ 13,72	-33,69%	0,668
64	CarMax	NYSE	KMX	Consumer Discretionary	$ 64,69	$ 47,66	-26,33%	1,140
65	VMware	NYSE	VMW	Technology	$ 86,03	$ 49,20	-42,81%	0,647
66	Novo Nordisk	NYSE	NVO	Healthcare	$ 23,46	$ 25,88	10,32%	0,846
70	Cisco Systems	NASDAQ	CSCO	Technology	$ 29,47	$ 26,95	-8,55%	1,024
71	Cadence	NASDAQ	CDNS	Technology	$ 18,48	$ 22,10	19,59%	0,993
78	Hyatt Hotels Corporation	NYSE	H	Consumer Discretionary	$ 60,94	$ 47,27	-22,43%	0,995
80	General Mills	NYSE	GIS	Consumer Staples	$ 53,35	$ 59,49	11,51%	0,716
82	Bright Horizons Family Solutions	NYSE	BFAM	Consumer Discretionary	$ 50,30	$ 64,58	28,39%	0,807
88	The Cheesecake Factory Incorporated	NASDAQ	CAKE	Consumer Discretionary	$ 47,23	$ 50,44	6,80%	0,708
90	Adobe Systems	NASDAQ	ADBE	Technology	$ 77,60	$ 88,50	14,05%	1,124
91	Capital One Financial	NYSE	COF	Financials	$ 78,65	$ 68,97	-12,31%	1,228
93	Nordstrom	NYSE	JWN	Consumer Discretionary	$ 74,70	$ 52,54	-29,67%	0,759
96	Activision Blizzard	NASDAQ	ATVI	Communication Services	$ 23,29	$ 31,81	36,58%	1,057
98	Accenture	NYSE	ACN	Technology	$ 91,31	$ 102,45	12,20%	1,060
99	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 414,93	$ 406,23	-2,10%	1,366

2016								
RANK	**NAME**	**Exchange**	**Ticker**	**Sector**	**Open 03/03/2016**	**Open 09/03/2017**	**Change in Price (%)**	**Beta**
1	Alphabet (Google)	NASDAQ	GOOGL	Communication Services	$ 36,97	$ 42,68	15,44%	0,994
9	Camden Property Trust	NYSE	CPT	Real Estate	$ 74,68	$ 79,98	7,10%	0,385
14	The Container Store	NYSE	TCS	Consumer Discretionary	$ 5,42	$ 4,35	-19,74%	2,222
15	Ultimate Software	NASDAQ	ULTI	Technology	$ 177,10	$ 195,39	10,33%	1,332
19	NuStar Energy	NYSE	NS	Energy	$ 36,45	$ 51,81	42,14%	1,059
21	Stryker	NYSE	SYK	Healthcare	$ 102,00	$ 129,17	26,64%	0,818
23	Salesforce	NYSE	CRM	Technology	$ 70,05	$ 83,19	18,76%	1,103
27	Credit Acceptance	NASDAQ	CACC	Financials	$ 200,57	$ 196,40	-2,08%	1,457
31	Workday	NASDAQ	WDAY	Technology	$ 71,80	$ 82,87	15,42%	1,655
34	Intuit	NASDAQ	INTU	Technology	$ 98,06	$ 125,93	28,42%	1,012
40	VMware	NYSE	VMW	Technology	$ 49,20	$ 89,29	81,48%	1,088
45	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 13,72	$ 8,75	-36,22%	0,562
47	Hyatt Hotels	NYSE	H	Consumer Discretionary	$ 47,27	$ 50,99	7,87%	1,316
50	Aflac	NYSE	AFL	Financials	$ 30,63	$ 36,17	18,09%	0,976
51	Goldman Sachs	NYSE	GS	Financials	$ 154,00	$ 251,22	63,13%	1,552
52	Cadence	NASDAQ	CDNS	Technology	$ 22,10	$ 31,26	41,45%	1,079
54	Autodesk	NASDAQ	ADSK	Technology	$ 54,09	$ 83,22	53,85%	1,901
55	Novo Nordisk	NYSE	NVO	Healthcare	$ 25,88	$ 16,66	-35,65%	0,944
56	Hilton Worldwide	NYSE	HLT	Consumer Discretionary	$ 64,05	$ 56,31	-12,08%	1,279
72	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 406,23	$ 383,18	-5,67%	1,520
75	Whole Foods Market	NASDAQ	WFM	Consumer Staples	$ 32,22	$ 29,35	-8,91%	0,546
77	Activision Blizzard	NASDAQ	ATVI	Communication Services	$ 31,81	$ 48,67	53,00%	1,161
82	Cisco Systems	NASDAQ	CSCO	Technology	$ 26,95	$ 34,04	26,31%	1,081
83	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 68,57	$ 86,44	26,06%	1,194
84	Accenture	NYSE	ACN	Technology	$ 102,45	$ 124,37	21,40%	1,012
85	CarMax	NYSE	KMX	Consumer Discretionary	$ 47,66	$ 64,28	34,87%	1,610
87	Adobe Systems	NASDAQ	ADBE	Technology	$ 88,50	$ 119,82	35,39%	1,221
88	Capital One Financial	NYSE	COF	Financials	$ 68,97	$ 92,77	34,51%	1,544
89	FactSet Research Systems	NYSE	FDS	Financials	$ 154,12	$ 176,68	14,64%	1,127
92	Nordstrom	NYSE	JWN	Consumer Discretionary	$ 52,54	$ 45,05	-14,26%	1,337
94	First American	NYSE	FAF	Financials	$ 37,74	$ 37,66	-0,21%	0,861
95	GoDaddy	NYSE	GDDY	Technology	$ 32,11	$ 36,50	13,67%	1,242
96	American Express	NYSE	AXP	Financials	$ 57,16	$ 79,19	38,54%	1,178
98	The Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 50,44	$ 61,72	22,36%	0,804
2017								
RANK	**NAME**	**Exchange**	**Ticker**	**Sector**	**Open 09/03/2017**	**Open 16/02/2018**	**Change in Price (%)**	**Beta**
1	Google	NASDAQ	GOOGL	Communication Services	$ 42,68	$ 54,67	28,08%	1,339
7	Ultimate Software	NASDAQ	ULTI	Technology	$ 195,39	$ 245,62	25,71%	1,102
8	Salesforce	NYSE	CRM	Technology	$ 83,19	$ 112,84	35,64%	1,116
13	Intuit	NASDAQ	INTU	Technology	$ 125,93	$ 169,02	34,22%	1,092
17	Capital One	NYSE	COF	Financials	$ 92,77	$ 98,27	5,93%	1,357
18	Workday	NASDAQ	WDAY	Technology	$ 82,87	$ 123,55	49,09%	1,348
19	Stryker	NYSE	SYK	Healthcare	$ 129,17	$ 158,23	22,50%	0,998
22	Camden Property Trust	NYSE	CPT	Real Estate	$ 79,98	$ 83,19	4,01%	0,517
26	Hilton	NYSE	HLT	Consumer Discretionary	$ 56,31	$ 84,46	49,99%	1,057
32	Hyatt	NYSE	H	Consumer Discretionary	$ 50,99	$ 79,96	56,82%	0,820
33	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 86,44	$ 140,76	62,84%	1,139
34	Pinnacle Financial Partners	NASDAQ	PNFP	Financials	$ 67,85	$ 64,35	-5,16%	1,110
37	NuStar Energy	NYSE	NS	Energy	$ 51,81	$ 24,45	-52,81%	1,642
39	Nvidia	NASDAQ	NVDA	Technology	$ 24,48	$ 61,35	150,64%	2,111
42	VMware	NYSE	VMW	Technology	$ 89,29	$ 122,84	37,57%	1,593
43	Credit Acceptance	NASDAQ	CACC	Financials	$ 196,40	$ 321,26	63,57%	1,176
48	The Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 61,72	$ 46,85	-24,09%	0,963
49	The Container Store	NYSE	TCS	Consumer Discretionary	$ 4,35	$ 5,04	15,86%	0,979
59	SAP	NYSE	SAP	Technology	$ 94,86	$ 104,61	10,28%	0,928
60	Adobe Systems	NASDAQ	ADBE	Technology	$ 119,82	$ 202,52	69,02%	1,191
62	Goldman Sachs	NYSE	GS	Financials	$ 251,22	$ 265,99	5,88%	1,375
63	Delta Air Lines	NYSE	DAL	Industrials	$ 47,69	$ 52,87	10,86%	1,285
66	Activision Blizzard	NASDAQ	ATVI	Communication Services	$ 48,67	$ 70,19	44,22%	1,595
67	Cisco	NASDAQ	CSCO	Technology	$ 34,04	$ 43,89	28,92%	1,309
69	American Express	NYSE	AXP	Financials	$ 79,19	$ 96,37	21,69%	1,194
71	Autodesk	NASDAQ	ADSK	Technology	$ 83,22	$ 113,58	36,48%	1,523
73	Novo Nordisk	NYSE	NVO	Healthcare	$ 16,66	$ 26,09	56,62%	0,916
76	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 8,75	$ 9,15	4,57%	0,933
77	CarMax	NYSE	KMX	Consumer Discretionary	$ 64,28	$ 64,27	-0,02%	1,058
81	Cadence	NASDAQ	CDNS	Technology	$ 31,26	$ 39,11	25,11%	1,143
82	First American Financial Corporation	NYSE	FAF	Financials	$ 37,66	$ 57,56	52,84%	0,735
85	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 383,18	$ 334,00	-12,83%	0,841
88	Accenture	NYSE	ACN	Technology	$ 124,37	$ 160,96	29,42%	0,896
90	Bright Horizons Family Solutions	NYSE	BFAM	Consumer Discretionary	$ 69,32	$ 95,81	38,21%	0,641
91	Aflac	NYSE	AFL	Financials	$ 36,17	$ 44,04	21,76%	0,641
93	AT&T	NYSE	T	Communication Services	$ 31,61	$ 27,93	-11,66%	0,848
94	Nordstrom	NYSE	JWN	Consumer Discretionary	$ 45,05	$ 51,13	13,50%	1,025
99	FedEx	NYSE	FDX	Industrials	$ 192,70	$ 244,00	26,62%	1,067

2018								
RANK	**NAME**	**Exchange**	**Ticker**	**Sector**	**Open 16/02/2018**	**Open 14/02/2019**	**Change in Price (%)**	**Beta**
1	Salesforce	NYSE	CRM	Technology	$ 112,84	$ 159,47	41,32%	1,599
3	Ultimate Software	NASDAQ	ULTI	Technology	$ 245,43	$ 331,78	35,18%	1,231
7	Workday	NASDAQ	WDAY	Technology	$ 123,55	$ 186,98	51,34%	1,557
9	Hyatt	NYSE	H	Consumer Discretionary	$ 79,96	$ 72,84	-8,90%	0,932
13	Intuit	NASDAQ	INTU	Technology	$ 169,02	$ 227,65	34,69%	1,294
16	Stryker	NYSE	SYK	Healthcare	$ 158,23	$ 185,00	16,92%	0,983
17	Capital One Financial	NYSE	COF	Financials	$ 98,27	$ 79,45	-19,15%	1,020
22	Pinnacle Financial Partners	NASDAQ	PNFP	Financials	$ 64,35	$ 56,48	-12,23%	0,781
23	American Express	NYSE	AXP	Financials	$ 96,37	$ 107,00	11,03%	1,004
24	Camden Property Trust	NYSE	CPT	Real Estate	$ 83,19	$ 98,81	18,78%	0,430
26	Adobe Systems	NASDAQ	ADBE	Technology	$ 202,52	$ 259,40	28,09%	1,675
27	The Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 46,85	$ 46,23	-1,32%	0,503
30	NVIDIA	NASDAQ	NVDA	Technology	$ 61,35	$ 38,21	-37,72%	1,999
33	Hilton Worldwide	NYSE	HLT	Consumer Discretionary	$ 84,46	$ 79,68	-5,66%	0,964
34	CarMax	NYSE	KMX	Consumer Discretionary	$ 64,27	$ 60,85	-5,32%	0,847
35	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 140,76	$ 118,14	-16,07%	1,035
38	Cadence Design Systems	NASDAQ	CDNS	Technology	$ 39,11	$ 51,32	31,22%	1,102
39	VMware	NYSE	VMW	Technology	$ 122,84	$ 166,16	35,27%	1,084
44	Synchrony Financial	NYSE	SYF	Financials	$ 36,74	$ 30,96	-15,73%	0,923
48	Cisco	NASDAQ	CSCO	Technology	$ 43,89	$ 48,85	11,31%	1,281
49	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 334,00	$ 412,00	23,35%	1,138
55	Build-A-Bear Workshop	NYSE	BBW	Consumer Discretionary	$ 9,15	$ 4,97	-45,68%	0,560
60	Accenture	NYSE	ACN	Technology	$ 160,96	$ 157,72	-2,01%	1,161
61	Credit Acceptance	NASDAQ	CACC	Financials	$ 321,26	$ 438,70	36,56%	0,868
63	First American Financial Corporation	NYSE	FAF	Financials	$ 57,56	$ 51,17	-11,10%	0,798
72	NuStar Energy	NYSE	NS	Energy	$ 24,45	$ 25,88	5,85%	0,981
78	Progressive	NYSE	PGR	Financials	$ 56,59	$ 70,31	24,24%	0,903
80	Autodesk	NASDAQ	ADSK	Technology	$ 113,58	$ 158,84	39,85%	1,733
82	Alliance Data Systems/Bread Financial Holdings	NYSE	BFH	Financials	$ 191,83	$ 134,48	-29,90%	1,125
84	Activision Blizzard	NASDAQ	ATVI	Communication Services	$ 71,97	$ 44,09	-38,74%	1,266
85	Aflac	NYSE	AFL	Financials	$ 44,04	$ 48,63	10,42%	0,712
86	T-Mobile U.S.	NASDAQ	TMUS	Communication Services	$ 60,63	$ 69,10	13,97%	0,825
88	Nordstrom	NYSE	JWN	Consumer Discretionary	$ 51,13	$ 44,04	-13,87%	0,767
89	Goldman Sachs	NYSE	GS	Financials	$ 265,99	$ 192,21	-27,74%	1,131
92	Devon Energy	NYSE	DVN	Energy	$ 34,63	$ 26,80	-22,61%	1,350
93	The Container Store	NYSE	TCS	Consumer Discretionary	$ 5,04	$ 6,31	25,20%	0,794
94	FedEx	NYSE	FDX	Industrials	$ 244,00	$ 184,54	-24,37%	1,257
95	Novo Nordisk	NYSE	NVO	Healthcare	$ 26,09	$ 24,88	-4,64%	0,548
97	AbbVie	NYSE	ABBV	Healthcare	$ 115,23	$ 80,45	-30,18%	1,044
98	Delta Air Lines	NYSE	DAL	Industrials	$ 52,87	$ 50,07	-5,30%	0,983
100	AT&T	NYSE	T	Communication Services	$ 27,93	$ 22,43	-19,69%	0,589

2019								
RANK	**NAME**	**tock Exhang**	**Ticker**	**Sector**	**Open 14/02/2019**	**Open 20/02/2020**	**Change in Price (%)**	**Beta**
1	Hilton	NYSE	HLT	Consumer Discretionary	$ 79,68	$ 112,32	40,96%	1,078
2	Salesforce	NYSE	CRM	Technology	$ 159,47	$ 194,00	21,65%	1,132
4	Workday	NASDAQ	WDAY	Technology	$ 186,98	$ 196,00	4,82%	1,296
6	Cisco	NASDAQ	CSCO	Technology	$ 48,85	$ 46,09	-5,65%	1,350
11	Stryker	NYSE	SYK	Healthcare	$ 185,00	$ 225,10	21,68%	0,860
13	American Express	NYSE	AXP	Financials	$ 107,00	$ 136,41	27,49%	1,107
19	Camden Property Trust	NYSE	CPT	Real Estate	$ 98,81	$ 117,86	19,28%	0,315
22	Adobe	NASDAQ	ADBE	Technology	$ 259,40	$ 384,00	48,03%	1,295
24	Intuit	NASDAQ	INTU	Technology	$ 227,65	$ 304,39	33,71%	1,215
25	The Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 46,23	$ 39,80	-13,91%	0,710
27	Pinnacle Financial Partners	NASDAQ	PNFP	Financials	$ 56,48	$ 62,20	10,13%	1,270
31	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 118,14	$ 147,53	24,88%	1,264
32	Hyatt Hotels	NYSE	H	Consumer Discretionary	$ 72,84	$ 90,00	23,56%	0,982
33	CarMax	NYSE	KMX	Consumer Discretionary	$ 60,85	$ 100,74	65,55%	0,930
38	NVIDIA	NASDAQ	NVDA	Technology	$ 38,21	$ 78,19	104,64%	2,220
39	Capital One Financial	NYSE	COF	Financials	$ 79,45	$ 101,25	27,44%	1,387
42	Dropbox	NASDAQ	DBX	Technology	$ 25,53	$ 18,28	-28,40%	1,293
49	T-Mobile US	NASDAQ	TMUS	Communication Services	$ 69,10	$ 100,10	44,86%	0,820
51	Synchrony Financial	NYSE	SYF	Financials	$ 30,96	$ 33,24	7,36%	1,305
59	Credit Acceptance	NASDAQ	CACC	Financials	$ 438,70	$ 434,36	-0,99%	1,155
61	Accenture	NYSE	ACN	Technology	$ 157,72	$ 215,88	36,88%	0,963
62	Goldman Sachs Group	NYSE	GS	Financials	$ 192,21	$ 236,41	23,00%	1,352
63	AbbVie	NYSE	ABBV	Healthcare	$ 80,45	$ 93,93	16,76%	0,933
64	HubSpot	NYSE	HUBS	Technology	$ 163,50	$ 197,81	20,98%	1,365
66	Bright Horizons Family Solutions	NYSE	BFAM	Consumer Discretionary	$ 120,25	$ 174,80	45,36%	0,631
69	Zillow Group	NASDAQ	Z	Communication Services	$ 35,76	$ 62,47	74,69%	1,301
70	Atlassian	NASDAQ	TEAM	Technology	$ 104,74	$ 152,09	45,21%	1,421
73	Cadence Design Systems	NASDAQ	CDNS	Technology	$ 51,32	$ 79,46	54,83%	1,600
75	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 412,00	$ 399,90	-2,94%	1,103
76	Progressive	NYSE	PGR	Financials	$ 70,31	$ 80,72	14,81%	0,895
80	Workiva	NYSE	WK	Technology	$ 43,38	$ 48,41	11,60%	1,192
83	First American Financial Corp.	NYSE	FAF	Financials	$ 51,17	$ 65,06	27,14%	0,518
90	Novo Nordisk	NYSE	NVO	Healthcare	$ 24,88	$ 32,06	28,88%	0,575
92	Bank of America	NYSE	BAC	Financials	$ 28,36	$ 34,46	21,51%	1,357
93	Box	NYSE	BOX	Technology	$ 23,89	$ 16,26	-31,94%	1,375
95	FedEx	NYSE	FDX	Industrials	$ 184,54	$ 161,07	-12,72%	1,481
96	Activision Blizzard	NASDAQ	ATVI	Communication Services	$ 44,09	$ 64,02	45,20%	1,350
97	Delta Air Lines	NYSE	DAL	Industrials	$ 50,07	$ 58,20	16,24%	1,115

2020								
RANK	**NAME**	**Exchange**	**Ticker**	**Sector**	**Open 20/02/2020**	**Open 12/04/2021**	**Change in Price (%)**	**Beta**
1	Hilton	NYSE	HLT	Consumer Discretionary	$ 112,32	$ 124,48	10,83%	0,898
4	Cisco	NASDAQ	CSCO	Technology	$ 46,09	$ 52,07	12,97%	0,964
5	Workday	NASDAQ	WDAY	Technology	$ 196,00	$ 255,09	30,15%	1,016
6	Salesforce	NYSE	CRM	Technology	$ 194,00	$ 229,52	18,31%	1,054
8	Stryker	NYSE	SYK	Healthcare	$ 225,10	$ 252,00	11,95%	1,127
9	American Express	NYSE	AXP	Financials	$ 136,41	$ 147,26	7,95%	1,439
11	Intuit	NASDAQ	INTU	Technology	$ 304,39	$ 415,53	36,51%	1,218
12	The Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 39,80	$ 59,00	48,24%	1,576
14	Pinnacle Financial Partners	NASDAQ	PNFP	Financials	$ 62,20	$ 90,93	46,19%	1,300
18	Camden Property Trust	NYSE	CPT	Real Estate	$ 117,86	$ 112,67	-4,40%	1,002
20	CarMax	NYSE	KMX	Consumer Discretionary	$ 100,74	$ 131,25	30,29%	1,116
24	Capital One Financial	NYSE	COF	Financials	$ 101,25	$ 133,72	32,07%	1,563
27	Nvidia	NASDAQ	NVDA	Technology	$ 78,19	$ 142,90	82,75%	1,342
28	Hyatt Hotels	NYSE	H	Consumer Discretionary	$ 90,00	$ 84,19	-6,46%	1,028
30	HubSpot	NYSE	HUBS	Technology	$ 197,81	$ 516,00	160,86%	1,239
35	Adobe	NASDAQ	ADBE	Technology	$ 384,00	$ 499,29	30,02%	1,109
38	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 147,53	$ 148,47	0,64%	1,062
41	Accenture	NYSE	ACN	Technology	$ 215,88	$ 285,97	32,47%	1,055
42	T-Mobile US	NASDAQ	TMUS	Communication Services	$ 100,10	$ 128,49	28,36%	0,850
44	Synchrony	NYSE	SYF	Financials	$ 33,24	$ 42,81	28,79%	1,638
49	Progressive Insurance	NYSE	PGR	Financials	$ 80,72	$ 95,80	18,68%	0,717
51	Pluralsight	NASDAQ	PS	Technology	$ 19,96	$ 22,45	12,47%	1,203
58	Workiva Inc.	NYSE	WK	Technology	$ 48,41	$ 93,57	93,29%	0,850
63	Dropbox	NASDAQ	DBX	Technology	$ 18,28	$ 26,99	47,65%	0,782
67	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 399,90	$ 481,78	20,48%	0,557
68	Credit Acceptance Corporation	NASDAQ	CACC	Financials	$ 434,36	$ 365,65	-15,82%	1,076
71	Box	NYSE	BOX	Technology	$ 16,26	$ 21,68	33,33%	0,753
74	Novo Nordisk	NYSE	NVO	Healthcare	$ 32,06	$ 34,75	8,37%	0,563
75	Bright Horizons Family Solutions	NYSE	BFAM	Consumer Discretionary	$ 174,80	$ 164,82	-5,71%	1,074
76	First American Financial Corp.	NYSE	FAF	Financials	$ 65,06	$ 60,00	-7,78%	0,985
77	Bank of America	NYSE	BAC	Financials	$ 34,46	$ 39,99	16,05%	1,366
82	Cadence	NASDAQ	CDNS	Technology	$ 79,46	$ 144,54	81,90%	1,119
84	Nutanix	NASDAQ	NTNX	Technology	$ 37,63	$ 27,14	-27,88%	1,276
85	Atlassian	NASDAQ	TEAM	Technology	$ 152,09	$ 225,11	48,01%	0,626
86	NuStar Energy	NYSE	NS	Energy	$ 26,90	$ 18,19	-32,38%	1,166
87	AbbVie	NYSE	ABBV	Healthcare	$ 93,93	$ 107,82	14,79%	0,709
94	Goldman Sachs Group	NYSE	GS	Financials	$ 236,41	$ 332,67	40,72%	1,230
99	Delta Air Lines	NYSE	DAL	Industrials	$ 58,20	$ 49,06	-15,70%	1,299
2021								
RANK	**NAME**	**tock Exhang**	**Ticker**	**Sector**	**Open 12/04/2021**	**Open 11/04/2022**	**Change in Price (%)**	**Beta**
1	Cisco Systems	NASDAQ	CSCO	Technology	$ 52,07	$ 53,92	3,55%	0,846
2	Salesforce	NYSE	CRM	Technology	$ 229,52	$ 194,21	-15,38%	1,503
3	Hilton Worldwide Holdings	NYSE	HLT	Consumer Discretionary	$ 124,48	$ 144,30	15,92%	1,214
5	Rocket Companies	NYSE	RKT	Financials	$ 22,75	$ 9,49	-58,29%	1,152
8	Camden Property Trust	NYSE	CPT	Real Estate	$ 112,67	$ 168,06	49,16%	0,593
9	Capital One Financial	NYSE	COF	Financials	$ 133,72	$ 131,95	-1,32%	1,161
10	American Express	NYSE	AXP	Financials	$ 147,26	$ 181,06	22,95%	1,212
11	Intuit	NASDAQ	INTU	Technology	$ 415,53	$ 478,37	15,12%	1,501
12	Nvidia	NASDAQ	NVDA	Technology	$ 142,90	$ 222,14	55,45%	2,431
14	Target	NYSE	TGT	Consumer Staples	$ 205,28	$ 233,26	13,63%	0,884
15	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 148,47	$ 161,96	9,09%	1,266
16	Hyatt Hotels	NYSE	H	Consumer Discretionary	$ 84,19	$ 86,65	2,92%	1,418
18	Adobe	NASDAQ	ADBE	Technology	$ 499,29	$ 438,81	-12,11%	1,564
21	Comcast	NASDAQ	CMCSA	Communication Services	$ 53,46	$ 47,65	-10,87%	0,744
22	Bank of America	NYSE	BAC	Financials	$ 39,99	$ 39,48	-1,28%	1,010
26	Pinnacle Financial Partners	NASDAQ	PNFP	Financials	$ 90,93	$ 85,53	-5,94%	1,228
35	Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 59,00	$ 35,23	-40,29%	1,231
36	CarMax	NYSE	KMX	Consumer Discretionary	$ 131,25	$ 101,04	-23,02%	1,245
37	Synchrony Financial	NYSE	SYF	Financials	$ 42,81	$ 36,21	-15,42%	1,188
40	Progressive	NYSE	PGR	Financials	$ 95,80	$ 118,59	23,79%	0,436
43	Horizon Therapeutics	NASDAQ	HZNP	Healthcare	$ 91,00	$ 113,27	24,47%	0,611
44	Accenture	NYSE	ACN	Technology	$ 285,97	$ 336,10	17,53%	1,101
46	Atlassian	NASDAQ	TEAM	Technology	$ 225,11	$ 267,59	18,87%	1,728
47	Zillow Group	NASDAQ	Z	Communication Services	$ 143,90	$ 46,92	-67,39%	1,331
50	Regeneron Pharmaceuticals	NASDAQ	REGN	Healthcare	$ 481,78	$ 736,64	52,90%	0,485
51	T-Mobile US	NASDAQ	TMUS	Communication Services	$ 128,49	$ 133,28	3,72%	0,595
54	Splunk	NASDAQ	SPLK	Technology	$ 142,77	$ 130,65	-8,49%	1,211
58	AbbVie	NYSE	ABBV	Healthcare	$ 107,82	$ 174,90	62,21%	0,380
61	Workiva	NYSE	WK	Technology	$ 93,57	$ 109,00	16,49%	1,659
64	Bright Horizons Family Solutions	NYSE	BFAM	Consumer Discretionary	$ 164,82	$ 132,31	-19,72%	0,599
65	Cadence Design Systems	NASDAQ	CDNS	Technology	$ 144,54	$ 157,20	8,76%	1,622
69	Burlington Stores	NYSE	BURL	Consumer Discretionary	$ 321,52	$ 194,19	-39,60%	1,269
71	Elevance Health	NYSE	ELV	Healthcare	$ 360,16	$ 521,13	44,69%	0,728
72	IBM	NYSE	IBM	Technology	$ 135,02	$ 127,95	-5,24%	0,467
75	PulteGroup	NYSE	PHM	Consumer Discretionary	$ 54,60	$ 40,14	-26,48%	1,404
77	ServiceNow	NYSE	NOW	Technology	$ 529,18	$ 507,87	-4,03%	1,742
78	Robert Half	NYSE	RHI	Industrials	$ 81,02	$ 109,90	35,65%	1,152
80	L3Harris Technologies	NYSE	LHX	Industrials	$ 208,34	$ 259,50	24,56%	0,273
81	CrowdStrike Holdings	NASDAQ	CRWD	Technology	$ 201,53	$ 213,77	6,07%	1,437
82	HP	NYSE	HPQ	Technology	$ 32,98	$ 38,44	16,56%	1,204
85	Mastercard	NYSE	MA	Financials	$ 378,08	$ 350,64	-7,26%	1,232
88	Stryker	NYSE	SYK	Healthcare	$ 252,00	$ 267,51	6,15%	1,037
89	Twilio	NYSE	TWLO	Communication Services	$ 365,68	$ 144,26	-60,55%	1,833
93	First American Financial	NYSE	FAF	Financials	$ 60,00	$ 59,19	-1,35%	0,877
96	NuStar Energy	NYSE	NS	Energy	$ 18,19	$ 15,40	-15,34%	0,751
99	Dow	NYSE	DOW	Materials	$ 63,60	$ 61,35	-3,54%	0,788
100	Merck	NYSE	MRK	Healthcare	$ 72,82	$ 88,32	21,28%	0,206

2022								
RANK	NAME	Exchange	Ticker	Sector	Open 11/04/2022	Open 04/04/2023	Change in Price (%)	Beta
1	Cisco Systems	NASDAQ	CSCO	Technology	$ 53,92	$ 52,03	-3,51%	0,840
2	Hilton Worldwide Holdings	NYSE	HLT	Consumer Discretionary	$ 144,30	$ 140,06	-2,94%	1,086
4	Salesforce	NYSE	CRM	Technology	$ 194,21	$ 198,15	2,03%	1,419
5	Nvidia	NASDAQ	NVDA	Technology	$ 222,14	$ 279,66	25,89%	2,087
6	Accenture	NYSE	ACN	Technology	$ 336,10	$ 284,44	-15,37%	1,219
7	Rocket Companies	NYSE	RKT	Financials	$ 9,49	$ 9,18	-3,27%	1,666
8	American Express	NYSE	AXP	Financials	$ 181,06	$ 165,01	-8,86%	1,130
10	Capital One Financial	NYSE	COF	Financials	$ 131,95	$ 97,45	-26,15%	1,409
11	Intuit	NASDAQ	INTU	Technology	$ 478,37	$ 440,15	-7,99%	1,657
12	Target	NYSE	TGT	Consumer Staples	$ 233,26	$ 165,71	-28,96%	1,197
16	Comcast	NASDAQ	CMCSA	Communication Services	$ 47,65	$ 37,95	-20,36%	0,807
19	Hewlett Packard Enterprise	NYSE	HPE	Technology	$ 16,02	$ 16,35	2,06%	1,035
20	Workiva	NYSE	WK	Technology	$ 109,00	$ 101,43	-6,94%	1,578
23	Marriott International	NASDAQ	MAR	Consumer Discretionary	$ 161,96	$ 165,15	1,97%	1,108
25	Synchrony Financial	NYSE	SYF	Financials	$ 36,21	$ 29,66	-18,09%	1,405
26	Camden Property Trust	NYSE	CPT	Real Estate	$ 168,06	$ 104,27	-37,96%	0,763
28	Pinnacle Financial Partners	NASDAQ	PNFP	Financials	$ 85,53	$ 54,30	-36,51%	1,108
29	Bank of America	NYSE	BAC	Financials	$ 39,48	$ 28,55	-27,68%	0,971
31	HubSpot	NYSE	HUBS	Technology	$ 433,74	$ 424,71	-2,08%	2,081
32	Adobe	NASDAQ	ADBE	Technology	$ 438,81	$ 382,24	-12,89%	1,390
38	Cadence Design Systems	NASDAQ	CDNS	Technology	$ 157,20	$ 212,19	34,98%	1,223
43	PulteGroup	NYSE	PHM	Consumer Discretionary	$ 40,14	$ 58,87	46,66%	1,269
46	Keysight Technologies	NYSE	KEYS	Technology	$ 148,74	$ 161,36	8,48%	1,097
47	Atlassian	NASDAQ	TEAM	Technology	$ 267,59	$ 164,64	-38,47%	2,060
48	Box	NYSE	BOX	Technology	$ 28,44	$ 26,50	-6,82%	0,975
49	Credit Acceptance	NASDAQ	CACC	Financials	$ 561,48	$ 431,97	-23,07%	1,520
50	First American Financial	NYSE	FAF	Financials	$ 59,19	$ 55,86	-5,63%	1,015
51	Progressive	NYSE	PGR	Financials	$ 118,59	$ 144,68	22,00%	0,623
57	Elevance Health	NYSE	ELV	Healthcare	$ 521,13	$ 475,00	-8,85%	0,513
58	Cheesecake Factory	NASDAQ	CAKE	Consumer Discretionary	$ 35,23	$ 34,98	-0,71%	1,229
59	Horizon Therapeutics	NASDAQ	HZNP	Healthcare	$ 113,27	$ 108,97	-3,80%	0,855
62	Jamf	NASDAQ	JAMF	Technology	$ 33,25	$ 19,10	-42,56%	1,598
65	Splunk	NASDAQ	SPLK	Technology	$ 130,65	$ 94,95	-27,32%	1,753
69	Stryker	NYSE	SYK	Healthcare	$ 267,51	$ 288,29	7,77%	0,997
70	Hyatt Hotels	NYSE	H	Consumer Discretionary	$ 86,65	$ 110,59	27,63%	1,108
72	AbbVie	NYSE	ABBV	Healthcare	$ 174,90	$ 160,51	-8,23%	0,353
83	ServiceNow	NYSE	NOW	Technology	$ 507,87	$ 475,44	-6,39%	1,569
86	W.W. Grainger	NYSE	GWW	Industrials	$ 517,79	$ 681,97	31,71%	0,875
94	Zillow Group	NASDAQ	Z	Communication Services	$ 46,92	$ 45,00	-4,09%	1,727
96	T-Mobile US	NASDAQ	TMUS	Communication Services	$ 133,28	$ 145,59	9,24%	0,707
97	CrowdStrike Holdings	NASDAQ	CRWD	Technology	$ 213,77	$ 137,50	-35,68%	1,639
98	CarMax	NYSE	KMX	Consumer Discretionary	$ 101,04	$ 64,92	-35,75%	1,479
99	Dow	NYSE	DOW	Materials	$ 61,35	$ 55,09	-10,20%	0,849
100	FedEx	NYSE	FDX	Industrials	$ 199,61	$ 228,55	14,50%	1,000

9.3 Regression Outputs and Code

9.3.1 *100 Best* - Fama-French Three Factor Regression

Python Code:

```
import pandas as pd
import statsmodels.api as sm
import matplotlib.pyplot as plt
from statsmodels.stats.outliers_influence import
variance_inflation_factor


data = {
    'Mkt-RF': [0.0598799999999999, 0.107786561264822,
0.0509473684210526, -0.0147222222222222, 0.0770250896057347,
               0.0791705069124424, 0.0072, 0.077890625,
0.110208333333333,
               0.0163779527559055, -0.0324696356275304],

    'SMB': [-0.00495999999999999, 0.0270355731225296, -
0.0247368421052632, -0.0258730158730159, 0.0212544802867384,
            -0.0112442396313364, 0.012,-0.042109375,
0.0694097222222222, -0.0591338582677165, 0.00255060728744938],

    'HML': [0.03292, 0.000474308, -0.023789474, -0.001944444,
0.032329749, -0.022903226, -0.0446, -0.058554688,
           -0.028368056, 0.086535433, -0.006396761],

    'Excess Return 100 Best': [0.106416341, 0.263729256, 0.170124078, -
0.10476479, 0.180082757, 0.267426094,
```

```
                                0.015933769, 0.232183341, 0.254310513,
0.027337447, -0.074250052]
}
df=pd.DataFrame(data)
X = df[['Mkt-RF', 'SMB', 'HML']]
Y = df['Excess Return 100 Best']

X = sm.add_constant(X)

model = sm.OLS(Y, X).fit()

print(model.summary())

X = sm.add_constant(X)

vif_data = pd.DataFrame()
vif_data["feature"] = X.columns
vif_data["VIF"] = [variance_inflation_factor(X.values, i) for i in
range(X.shape[1])]

print(vif_data)
```

Output:

```
                            OLS Regression Results
==============================================================================
Dep. Variable:     Excess Return 100 Best   R-squared:                       0.952
Model:                               OLS   Adj. R-squared:                  0.932
Method:                    Least Squares   F-statistic:                     46.50
Date:                   Thu, 07 Dec 2023   Prob (F-statistic):           5.45e-05
Time:                           11:59:15   Log-Likelihood:                 23.529
No. Observations:                     11   AIC:                            -39.06
Df Residuals:                          7   BIC:                            -37.47
Df Model:                              3
Covariance Type:               nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const         -0.0204      0.017     -1.191      0.273      -0.061       0.020
Mkt-RF         2.8316      0.261     10.847      0.000       2.214       3.449
SMB           -0.5461      0.362     -1.510      0.175      -1.401       0.309
HML           -0.4805      0.285     -1.684      0.136      -1.155       0.194
==============================================================================
Omnibus:                        0.333   Durbin-Watson:                   1.924
Prob(Omnibus):                  0.847   Jarque-Bera (JB):                0.208
Skew:                          -0.263   Prob(JB):                        0.901
Kurtosis:                       2.579   Cond. No.                         36.6
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly
specified.
  feature       VIF
0   const  2.533933
1  Mkt-RF  1.247628
2     SMB  1.305600
3     HML  1.076925
```

9.3.2 Technology Strategy - Fama-French Three Factor Regression

Python Code:

```
import pandas as pd
import statsmodels.api as sm
```

```
import matplotlib.pyplot as plt
from statsmodels.stats.outliers_influence import
variance_inflation_factor


data = {
    'Mkt-RF': [0.0598799999999999, 0.107786561264822,
0.0509473684210526, -0.0147222222222222, 0.0770250896057347,
               0.0791705069124424, 0.0072, 0.077890625,
0.110208333333333,
               0.0163779527559055, -0.0324696356275304],

    'SMB': [-0.00495999999999999, 0.0270355731225296, -
0.0247368421052632, -0.0258730158730159, 0.0212544802867384,
             -0.0112442396313364, 0.012, -0.042109375,
0.0694097222222222, -0.0591338582677165, 0.00255060728744938],

    'HML': [0.03292, 0.000474308, -0.023789474, -0.001944444,
0.032329749, -0.022903226, -0.0446, -0.058554688,
            -0.028368056, 0.086535433, -0.006396761],

    'Excess Return Tech Strategy': [0.139318682, 0.281169815,
0.126342247, -0.043686906, 0.313871096, 0.439289278,
                                0.236484834, 0.23538528, 0.461202126,
0.080800403, -0.088100978]
}
df=pd.DataFrame(data)
X = df[['Mkt-RF', 'SMB', 'HML']]
Y = df['Excess Return Tech Strategy']

X = sm.add_constant(X)

model = sm.OLS(Y, X).fit()

print(model.summary())

X = sm.add_constant(X)

vif_data = pd.DataFrame()
vif_data["feature"] = X.columns
vif_data["VIF"] = [variance_inflation_factor(X.values, i) for i in
range(X.shape[1])]

print(vif_data)
```

Output:

```
OLS Regression Results
==============================================================================
Dep. Variable:     Excess Return Tech Strategy   R-squared:                       0.768
Model:                                     OLS   Adj. R-squared:                  0.669
Method:                          Least Squares   F-statistic:                     7.741
Date:                         Thu, 07 Dec 2023   Prob (F-statistic):            0.0126
Time:                                 12:45:21   Log-Likelihood:                12.008
No. Observations:                           11   AIC:                            -16.02
Df Residuals:                                7   BIC:                            -14.42
Df Model:                                    3
Covariance Type:                     nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const          0.0634      0.049      1.297      0.236      -0.052       0.179
Mkt-RF         2.7726      0.744      3.727      0.007       1.013       4.532
```

```
SMB            0.8158      1.031      0.791      0.455      -1.622       3.253
HML           -0.5451      0.814     -0.670      0.524      -2.469       1.379
==============================================================================
Omnibus:                        1.456   Durbin-Watson:                   1.024
Prob(Omnibus):                  0.483   Jarque-Bera (JB):                1.066
Skew:                           0.577   Prob(JB):                        0.587
Kurtosis:                       2.004   Cond. No.                         36.6
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
  feature       VIF
0   const  2.533933
1  Mkt-RF  1.247628
2     SMB  1.305600
3     HML  1.076925
```

9.3.3 Top 10 Strategy – Fama-French Three Factor Regression

Python Code:

```
import pandas as pd
import statsmodels.api as sm
import matplotlib.pyplot as plt
from statsmodels.stats.outliers_influence import
variance_inflation_factor


data = {
    'Mkt-RF': [0.0598799999999999, 0.107786561264822,
0.0509473684210526, -0.0147222222222222, 0.0770250896057347,
               0.0791705069124424, 0.0072, 0.077890625,
0.110208333333333,
               0.0163779527559055, -0.0324696356275304],

    'SMB': [-0.00495999999999999, 0.0270355731225296, -
0.0247368421052632, -0.0258730158730159, 0.0212544802867384,
             -0.0112442396313364, 0.012,-0.042109375,
0.0694097222222222, -0.0591338582677165, 0.00255060728744938],

    'HML': [0.03292, 0.000474308, -0.023789474, -0.001944444,
0.032329749, -0.022903226, -0.0446, -0.058554688,
            -0.028368056, 0.086535433, -0.006396761],

    'Excess Return Top 10': [0.126016914, 0.237081474, 0.038930459, -
0.12516629, 0.141319777,
                             0.307848934, 0.161334234, 0.190094202,
0.218020945, 0.100775346, -0.079231051]
}
df=pd.DataFrame(data)
X = df[['Mkt-RF', 'SMB', 'HML']]
Y = df['Excess Return Top 10']

X = sm.add_constant(X)

model = sm.OLS(Y, X).fit()

print(model.summary())

X = sm.add_constant(X)

vif_data = pd.DataFrame()
```

```
vif_data["feature"] = X.columns
vif_data["VIF"] = [variance_inflation_factor(X.values, i) for i in
range(X.shape[1])]

print(vif_data)
```

Output:

```
OLS Regression Results
==============================================================================
Dep. Variable:     Excess Return Top 10   R-squared:                       0.674
Model:                              OLS   Adj. R-squared:                  0.535
Method:                   Least Squares   F-statistic:                     4.830
Date:                  Thu, 07 Dec 2023   Prob (F-statistic):            0.0396
Time:                          13:38:43   Log-Likelihood:                 13.416
No. Observations:                    11   AIC:                            -18.83
Df Residuals:                         7   BIC:                            -17.24
Df Model:                             3
Covariance Type:              nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const          0.0065      0.043      0.151      0.884      -0.095       0.108
Mkt-RF         2.2771      0.655      3.479      0.010       0.729       3.825
SMB           -0.2750      0.907     -0.303      0.771      -2.420       1.870
HML           -0.2303      0.716     -0.322      0.757      -1.923       1.462
==============================================================================
Omnibus:                        0.684   Durbin-Watson:                   1.241
Prob(Omnibus):                  0.710   Jarque-Bera (JB):                0.549
Skew:                           0.453   Prob(JB):                        0.760
Kurtosis:                       2.386   Cond. No.                         36.6
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
  feature       VIF
0   const  2.533933
1  Mkt-RF  1.247628
2     SMB  1.305600
3     HML  1.076925
```

9.3.4 Top 20 Strategy – Fama-French Three Factor Regression

Python Code:

```
import pandas as pd
import statsmodels.api as sm
import matplotlib.pyplot as plt
from statsmodels.stats.outliers_influence import
variance_inflation_factor


data = {
    'Mkt-RF': [0.0598799999999999, 0.107786561264822,
0.0509473684210526, -0.0147222222222222, 0.0770250896057347,
               0.0791705069124424, 0.0072, 0.077890625,
0.110208333333333,
               0.0163779527559055, -0.0324696356275304],

    'SMB': [-0.00495999999999999, 0.0270355731225296, -
0.0247368421052632, -0.0258730158730159, 0.0212544802867384,
             -0.0112442396313364, 0.012,-0.042109375,
0.0694097222222222, -0.0591338582677165, 0.00255060728744938],

    'HML': [0.03292, 0.000474308, -0.023789474, -0.001944444,
0.032329749, -0.022903226, -0.0446, -0.058554688,
```

```
            -0.028368056, 0.086535433, -0.006396761],

    'Excess Return Top 20': [0.139415862, 0.253080654, 0.203119956, -
0.169277178, 0.158228414, 0.315724586,
                             0.088877393, 0.230576682, 0.318564949,
0.013813787, -0.123917089]
}
df=pd.DataFrame(data)
X = df[['Mkt-RF', 'SMB', 'HML']]
Y = df['Excess Return Top 20']

X = sm.add_constant(X)

model = sm.OLS(Y, X).fit()

print(model.summary())

X = sm.add_constant(X)

vif_data = pd.DataFrame()
vif_data["feature"] = X.columns
vif_data["VIF"] = [variance_inflation_factor(X.values, i) for i in
range(X.shape[1])]

print(vif_data)
```

Output:

```
OLS Regression Results
==============================================================================
Dep. Variable:     Excess Return Top 20   R-squared:                       0.893
Model:                              OLS   Adj. R-squared:                  0.848
Method:                   Least Squares   F-statistic:                     19.57
Date:                  Thu, 07 Dec 2023   Prob (F-statistic):           0.000879
Time:                          13:47:02   Log-Likelihood:                 17.083
No. Observations:                    11   AIC:                            -26.17
Df Residuals:                         7   BIC:                            -24.57
Df Model:                             3
Covariance Type:              nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const         -0.0293      0.031     -0.951      0.373      -0.102       0.044
Mkt-RF         3.1694      0.469      6.757      0.000       2.060       4.279
SMB           -0.3910      0.650     -0.602      0.566      -1.928       1.146
HML           -0.7931      0.513     -1.546      0.166      -2.006       0.420
==============================================================================
Omnibus:                        0.637   Durbin-Watson:                   2.303
Prob(Omnibus):                  0.727   Jarque-Bera (JB):                0.508
Skew:                          -0.435   Prob(JB):                        0.776
Kurtosis:                       2.408   Cond. No.                         36.6
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly
specified.
  feature       VIF
0   const  2.533933
1  Mkt-RF  1.247628
2     SMB  1.305600
3     HML  1.076925
```