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Research Article

An Empirical Study of A Rule Based Stock Selection Method To Generate Alpha

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Abstract

This paper examines whether a set of filters – for size, ROIC, free cash flow, and high valuations can shift the distribution of returns earned by an investor to the right of the return curve. Paper shows that a portfolio created on the basis of these filters (the expensive growth stock portfolio) consistently outperforms the broader market, while exhibiting lower downside volatility and lower maximum drawdown. Every portfolio created is held for a period of two years. In the study, conducted an empirical assessment of returns made from the expensive growth stock portfolio, from 2016 to 2020 - a total of 4 portfolios held for the full 2-year period, and 1 portfolio, created in 2020, held for 1 year - to assess the robustness of the strategy across different time periods and conditions in stock markets. Then paper compared the risk-return metrics – the Calmar, Sharpe and Sortino ratios - of the expensive growth stock portfolio and the benchmark index, and have shown that the expensive growth stock portfolio has better risk adjusted returns. Furthermore, our results pertaining to shift in the distribution of the returns earned by the investor, to the right of the return curve by investing in the expensive growth portfolio and test the statistical significance of the same. The results of the study states that systematic investing strategies in general and the expensive growth stock portfolio in particular, will aid the investor in beating broad market indices over the long run while having lesser downside volatility.

Keywords: Growth Investing, Expensive stocks, Systematic Investing, Portfolio Analysis, Return Distribution Curve, Risk-Adjusted Returns

Introduction

One of the best ways to compound money is by investing it for the long term in equity instruments. The odds favour a mixture of investments in a combination of stocks rather than investing in fixed deposits or in just one stock. Stocks have proven to be the best asset class and have provided higher returns than fixed income securities, provided the time horizon is sufficiently long (Siegel, 2014). Also, not all stocks give positive returns to the investors. So, the question arises as to how an investor would select his stocks and how his portfolio could be

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created so that he can receive maximum benefit. Creating a portfolio with irregular returns is not a very hard task, but building a portfolio which gives consistent and meaningful returns for an investor in the long run is a hard task. Consistent returns can be generated through the process of fundamental analysis.

Fundamental analysis is the process of evaluating a security to know its intrinsic value. The Financial analysis seeks to understand the story, the reported numbers portray. But one inherent limitation of fundamental analysis is that it relies basically on the figures reported on the financial statements. Values in the financial statements could always be manipulated through window dressing.

Growth stocks are those stocks that tend to trade at a higher price relative to their fundamentals. On a conventional scale, these stocks generally have high price-to-earnings (P/E) ratios, and high price-to-book (P/B) ratios, as the market values them at a premium when compared to non-growth stocks. But there is also no guarantee that the company's investment in the growth will always lead to profit.

The investors who purchase growth stocks will be receiving returns from future capital appreciation, rather than dividends. Growth stocks may seem to be overvalued and expensive but have higher expansion rates resulting in larger revenues year-on-year. The stability, easier access to funding, and economies of scale that accrues to such companies as they increase in size lead to PE and PB multiple expansions, thus increasing returns exponentially, even if the initial investment was made at high PE and PB multiples. The profits in growth stocks can only be realized by investing them for long term. The returns from growth stocks are considerably larger than the inflation rate, which allows investors to generate real income on their total investment. But these stocks are always known as risky investments because the aim of the company is to generate profits by creating significant market advantage by adopting aggressive business strategies. Selecting such stocks requires a keen understanding of competitive strategy, and often entails considerable work.

Another investment style searches for value stocks. They are stocks that tend to trade at lower price when compared to its fundamentals. Most investors prefer to invest in such stocks to gain long term return. These stocks are always issued by companies undervalued in the market for some reason. They have lower P/E and P/B ratios than are considered average for companies of their size, and health. The investors who purchase value stocks will be gaining through both dividend and also capital appreciation from those stocks. In value stocks, there are very low fluctuations even periods of high market volatility. Famous practitioners of the value investing framework include such legends like Warren Buffet, Seth Klarman, Mohnish Pabrai, Walter Schloss, and Irving Kahn. Their success could be taken as testament to the fact that value investing when applied properly can generate Alpha

Our paper attempts to fill the gap in literature, by analysing the performance of a portfolio of growth stocks considered "expensive" by conventional metrics. Several papers have considered the performance of portfolios in the intersection of growth, and value.

Literature Review

1. Hart, Slagter and Dijk in this article have examined the profitability of stock selection strategies in emerging markets and also tested whether the stock selection strategies were profitable if applied in practice by large investors. To meet the objectives of this research work, stock prices were taken from the Emerging Markets Database (EMDB) of the

International Finance Corporation (IFC) and monthly total returns on US dollars were collected by using stock prices, dividends and capital adjustment factor. The authors found that performance of univariate strategies can be enhanced by combining value, momentum and revision into a multivariate strategy. Further, they investigate that financial market liberalizations affected the performance of stock selection strategies and they found no evidence that financial market liberalizations in emerging countries have affected the performance of the strategies. It was also concluded by the authors that the trading strategies can be implemented successfully in practice by large investors. **(Hart, Slagter and Dijk, 2003)**

2. In this paper, the authors- Mohapatra and Mishra focus on establishing portfolio-based momentum profits in the Indian market and also on designing a model to identify portfolio-specific and macroeconomic factors generating abnormal returns. Momentum investing involves the purchase of stocks that have recently outperformed the market on the expectation that the condition will continue. The authors examine returns of long-term and short-term winners and losers' portfolios to establish the existence of extra-normal profits similar to those documented by Jegadeesh and Titman (1993). The authors use vector autoregressive methodology to find price-earnings ratio (P/E Ratio), price-book ratio (P/B Ratio) and net foreign institutional inflows as significant factors in momentum generation. The author's study provides insights to portfolio managers in exploring the concept of momentum during portfolio designing. (**Sabyasachi Mohapatra and Arun Kumar Mishra, 2000)**
3. Trabelsi, in this article has done a comparative survey of the portfolio selection strategies with the aim of defining the best strategy for the Tunisian stock market. Under this study, a survey was conducted to know the different strategies of portfolio selection adopted by the portfolio manager in Tunisia. And the researcher proposed a new strategy which they called it weighted over action strategy. **(Trabelsi, 2010)**

4. The authors in this article on "Great Investors: Their Methods, Results and Evaluation" which was published in "The Journal of Portfolio Management" in summer 2012 explicated that the outstanding investment managers pioneered some wealth paths by adopting the Timeless Wisdom as they avoided market timings. Further, a comparison was made between Ordinary Sharpe Ratio (OSR) and Downside Symmetric Sharpe Ratio (DSSR) to find out a better measurement for performance evaluation of the wealth paths pioneered by the great investors taken under the study. **(Gergaud and Ziemba, 2012)**

5. In the study "Portfolio Selection in BSE & Expected Return and Risk Analysis through Markowitz Theorem", Rajasekaran made an attempt to assess the optimality of the portfolios in the Bombay Stock Exchange (BSE). The author analysed all the risks and returns for all the realms to assess the optimization choice of the portfolio. By this study, the author suggested that the portfolio choice should be made looking at the beta values and correlation values to beat the investment market. **(Rajasekaran, 2012)**

6. In this article, the authors- Tiwari and Islam analysed the weak form of stock market efficiency. They took a sample of eight indices from the different sectors of Bombay Stock Exchange (BSE) and examined whether portfolio diversification strategy be used by the investors to make financial gain. The authors found that BSE sectoral indices were weekly

efficient and it was also concluded by them that the opportunities for investors to gain from portfolio diversification in BSE sectoral indices were enormous in the long-run. The results explained that the diversification was employed as a strategy to make gain in the investment market. **(Tiwari and Islam, 2012)**

7. The authors- Jegadeesh and Titman have argued that momentum strategy represents the strongest evidence against the Efficient Market Hypothesis. They say that the momentum effect is quite pervasive and it is unlikely to be explained by risk. Momentum strategies have continuously generated positive returns not only in the US but also in other parts of the world except in Japan where there is a very weak and statistically insignificant evidence of momentum. **(Narasimhan Jegadeesh and Sheridan Titman, 2005)**

8. The authors in this paper "Do Indian Professional Investors Beat the Market?" conducted a study based on the sample of 40 growth schemes of 15 fund houses that have been in existence for at least 15 years. Results of the study shows that the sample funds earned average excess returns over benchmark returns of 0.02% over a 5-year period and 0.01% over a 15 years period. These funds also have lower risk-return ratio compared to the same for benchmark portfolios. The authors concluded saying that Indian Professional Investors are able to beat the market. **(Narayan Rao Sapar and Suhas R H, 2017)**

9. In this article, "Portfolio Objective: Win big, lose little!" published in The Journal of Portfolio Management, concluded that since the market does not appear to reward risk-taking systematically, this is a game full of opportunities for "those who have sufficient skills." **(Robert F. Vandell and Mark T. Finn, 1982)**

10. In his seminal work, "Efficient Capital Markets: A Review of Theory and Empirical Work", Nobel Prize winner Eugene Fama makes the case for the EMH or the Efficient Market Hypothesis. Fama defines an efficient market as one in which security prices; at any and all times fully reflect all available information. The EMH is closely related to the Random Walk Theory, which argues that successive one period returns of any security are independent of each other, and follow an identical distribution. Fama, through this work, states that the broad market cannot be beaten by any investor, in the long run, unless he assumes above market risk. In other works, on a risk adjusted basis, no form of active money management, whether using technical, or fundamental analysis, can beat broad market indices. **(Eugene F. 'Fama, 1970)**

11. Several papers have presented that value, and momentum strategies have consistently provided market beating returns, despite the fact that momentum, and value are, individually the antithesis of each other. In his work "The Interaction of Value and Momentum Strategies", Clifford Asness seeks to find out the behaviour of a cross section of securities that meet both value, and momentum criteria. **(Clifford S. Asness, 1997).**

12. Daniel, Grinblatt, Titman, and Wermers, in their 1997 article "Measuring Mutual Fund Performance with Characteristic-Based Benchmarks" concluded that the average mutual fund did indeed outperform simple mechanical strategies. However, it did note that such outperformance was fairly smjall (under 100 basis points or 1%), which is approximately

equal to the average management fees. Thus, net of costs, professional investors have not been able to provide market beating returns to investors. **(Kent Daniel, Mark Grinblatt, Sheridan Titman, and Russ Wermers, 1997).**

13. Siegel, Professor of Finance at The Wharton School, University of Pennsylvania, in his paper "Earnings, Inflation, and Future Stock and Bond Returns" makes the case for long term investments in stocks. Using data from 1802 to June 2012, Siegel calculated that every $1 invested in 1802 would add up to $669,500 in real terms (after adjusting for inflation), whereas the same investments would have got the investor $1,633 had it been made in Treasury bonds. While the paper accepts that bonds, if included in the portfolio reduce short term volatility, it also notes that US Bonds, over a 35-year period from 1946 to 1981 yielded negative real returns. The paper also computed the average annual real return of gold to have been less than 1% over the 210-year period from 1802 to 2012, turning an initial investment of $1 to $4.35. **(Jeremy J. Siegel, 2014).**

14. In an attempt to investigate the risk-return relationship in Indian stock markets, a study was carried out. They considered stocks of S&P CNX 500 index of NSE and data taken from 2001 to 2011. They found that a low-risk anomaly is present in Indian stock markets as a low volatility portfolio outperforms a market portfolio. It is reported that a low volatility portfolio generates higher absolute returns and also higher risk-adjusted returns. **(Rambhia & Joshipura, 2012).**

15. The authors back tested the profitability of Joel Greenblat's magic formula in Nordic Region for the period of 10 years i.e., Jan 1998- Jan 2008. The returns derived through the magic formula were compared with the returns so derived from the benchmarks, such as, MSCI Nordic and S&P 500 as well as the return predicted by the CAPM and Fama and French's three factor model. It was found that alpha (the excess of actual returns over estimated returns) derived from the asset pricing model and Fama and French three factor model was positive but statistically insignificant. They further found that the portfolio showed a compounded annual growth rate (CAGR) of 14.68% during the 10-year period as compared to CAGR of its benchmark i.e., 9.28% for MSCI Nordic and 4.23% for S&P 500 and the transaction cost further lowered the compounded annual growth rate to 11.98%. **(Persson and Selander, 2009).**

16. In this paper, the authors examined the weak form efficiency of 11 securities listed on the BSE using weekly closing values from July 2007 to October 2007 by employing auto-correlation tests. The study finished with the conclusion that the BSE is weak-form efficient and the stock prices are having very little effect on future prices which implies that an investor cannot earn any profit by studying the past values of shares. **(Sharma and Mahendru, 2009).**

Research Methodology

Research Objectives

a. To create a simple rules-based stock selection criterion that relies exclusively on reported financial information. The selection criteria need to be intuitive, so the outperformance can be logically explained. This way there are also no issues of there being differences between information from different sources, or from using estimates or forecasts.

b. To apply the rules-based screen to historical financial data, and evaluate the performance of the portfolio. Performance is to be evaluated using both risks, and return metrics.
c. To demonstrate portfolio performance during periods of steep market declines, like the Covid-19 Crash of January to March, 2020, to test its resilience.

Hypothesis

H_0 (Null Hypothesis): The difference in returns from the portfolio of expensive growth stocks detailed here, and benchmark returns is not statistically significant.
H_1 (Alternate Hypothesis): The difference in returns from the portfolio of expensive growth stocks detailed here, and benchmark returns is statistically significant.

Sample selection

The entire population of equity instruments listed on the National Stock Exchange, and the Bombay Stock Exchange - the two Indian bourses, has been taken into consideration. Filters have been applied to create a well sized, diversified portfolio of stocks that have the potential to provide market beating returns. Four filters have been used here, 1 for size, 1 for valuation, 1 for growth and 1 for accounting quality. The primary idea is to go long on a diversified basket of large companies with a history of efficiently deploying capital.
The data for the study came from the "Ace Analyzer", and "Yahoo Finance" both repositories of financial data, the first one being a paid provider, and the second one being a free to use site.
Company Selection – The screen used is as follows –

a) Size Filter - Stocks with Assets greater > Rs. 1,500 Crores,
b) Growth Filter - Return on Capital Employed > 20%,
c) Value Filter - Latest Price to Book Ratio > 15, AND
d) FCF Filter - Cash generated from Operations > Net Profit after Tax.

The time period of the study is from January 01, 2016 to January 04, 2021. The screen has filtered 7 stocks for 2016, 9 stocks for 2017, 9 stocks for 2018, 10 companies for 2019, 15 companies for 2020, and 16 companies for 2021.

List of Stocks Selected:

Year 2016-17	Year 2017-2018	Year 2018-2019
1. Titan Ltd.	1. Titan Ltd.	1. Titan Ltd.
2. Pidilite Industries Ltd.	2. Pidilite Industries Ltd.	2. Pidilite Industries Ltd.
3. Hindustan Unilever Ltd.	3. Procter & Gamble Hygiene and Health Care Ltd.	3. Hindustan Unilever Ltd.
4. Asian Paints Ltd.	4. Hindustan Unilever Ltd.	4. Nestle India Ltd.
5. Berger Paints Ltd.	5. Neste India Ltd.	5. Asian Paints Ltd.
6. Havells India Ltd.	6. Asian Paints Ltd.	6. Berger Paints Ltd.
7. Marico Ltd.	7. Britannia Ltd.	7. Havells Ltd.
	8. Berger Paints Ltd.	8. DMart Ltd.
	9. Marico Ltd.	9. Marico Ltd.

Year 2019-2020	Year 2020-2021	Year 2021-2022
1. Pidilite Industries Ltd. 2. Hindustan Unilever Ltd. 3. Nestle India Ltd. 4. Asian Paints Ltd. 5. Berger Paints Ltd. 6. Britannia Ltd. 7. Colgate Palmolive India Ltd. 8. Havells Ltd. 9. DMart Ltd. 10. HDFC Asset Management Company	1. Pidilite Industries Ltd. 2. Hindustan Unilever Ltd. 3. Nestle India Ltd. 4. Asian Paints Ltd. 5. Berger Paints Ltd. 6. Britannia Ltd. 7. Colgate Palmolive India Ltd. 8. Honeywell Automation India Ltd. 9. DMart Ltd. 10. HDFC Asset Management Company 11. Marico Ltd. 12. Titan Ltd. 13. Adani Gas Ltd. 14. Astral Ltd. 15. Crompton Greaves Ltd.	1. Pidilite Industries Ltd. 2. Hindustan Unilever Ltd. 3. Nestle India Ltd. 4. Asian Paints Ltd. 5. Berger Paints Ltd. 6. Britannia Ltd. 7. Colgate Palmolive India Ltd. 8. Honeywell Automation India Ltd. 9. DMart Ltd. 10. HDFC Asset Management Company 11. Marico Ltd. 12. Havells Ltd. 13. Adani Gas Ltd. 14. Astral Ltd. 15. Crompton Greaves Ltd. 16. Jubilant Foodworks Ltd.

Limitations of the research

A. The look back period extends to January 01, 2016 only. This gives us 4 completed blocks of 2 years each, and 3 completed blocks of 3 years each. Longer time periods need to be used to comprehensively test the performance of the portfolio over different market environments.

B. For easy calculation, dividends are not considered to be immediately reinvested. Instead, all dividends received during a given year are assumed to be invested in an interest-bearing security at the end of the year. This will understate portfolio returns.

C. Investing in the board market can be done with very small amounts of money, by buying into low-cost ETFs. However, the same is not possible with an actively managed portfolio such as the one being described in this paper. Significant sums of money may have to be invested, based on the price of each individual stock, so as to obtain an equal weighted portfolio. No adjustment is being made to returns for this barrier.

D. No slippages or brokerage/commission has been factored in. However, considering that the portfolios are relatively concentrated, and that there are only 2 trades for 2 years, any impact on account of brokerage will be marginal. Since stocks filtered out are large cap, slippage will be negligible.

Data Analysis

Calculation of returns

1. A portfolio is created on the first trading day of each year, starting from 2016.
2. All stocks picked up in the portfolio are held for 2 years.

3. Equal amounts are invested in each stock.
4. All stocks are bought at the Open price of the day the portfolio is created, and are sold at the Close price of the last trading day of immediately following calendar year.
5. Dividends are not reinvested in the portfolio. To make computation simpler, the dividend stream is assumed to be not invested. However, the dividends received will be computed, and included in the equity curve.
6. The last portfolio for which back tested results will be available is the one created in 2019.
7. The Nifty TRI (Total Return Index) is considered the benchmark against which portfolio performance will be determined. Nifty TRI assumes all dividends are reinvested into the basket of 50 stocks that make up the Nifty index.

Table 1: Portfolio Equity

Years	Portfolio Equity - Annually, with dividends	Nifty TRI
2016	1.075757569	1.041745
2017	1.581343341	1.358087
2018	1.918326899	1.43403
2019	2.174703861	1.62019
2020	2.50658763	1.879502

Empirical Results and Analysis

All statistical analysis performed on the monthly returns data. However, it should be noted that the monthly returns data - for both the expensive growth portfolio, and the benchmark Nifty50, does not consider dividends. Dividend reinvestment has not been assumed so as not to make computations complicated. While this is a limitation of this study, this in no way disturbs the veracity of the findings, because:

- Dividend Yields form a small part of the total returns of the expensive growth portfolio.
- This assumption only understates the true returns on the expensive growth portfolio, on both an absolute and relative basis, since the Nifty Total Returns Index assumes dividend reinvestment.

Chart 1: Monthly Returns of the expensive growth portfolio, without considering dividends.

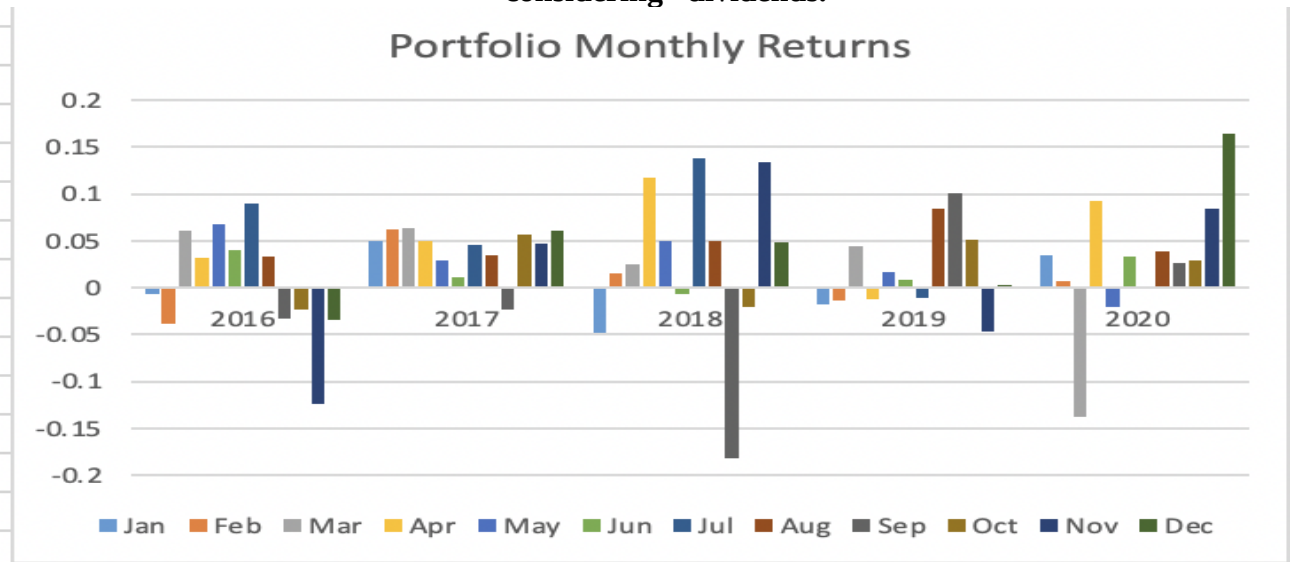


Chart 2: Monthly Returns of the Nifty50 Index, without dividends.

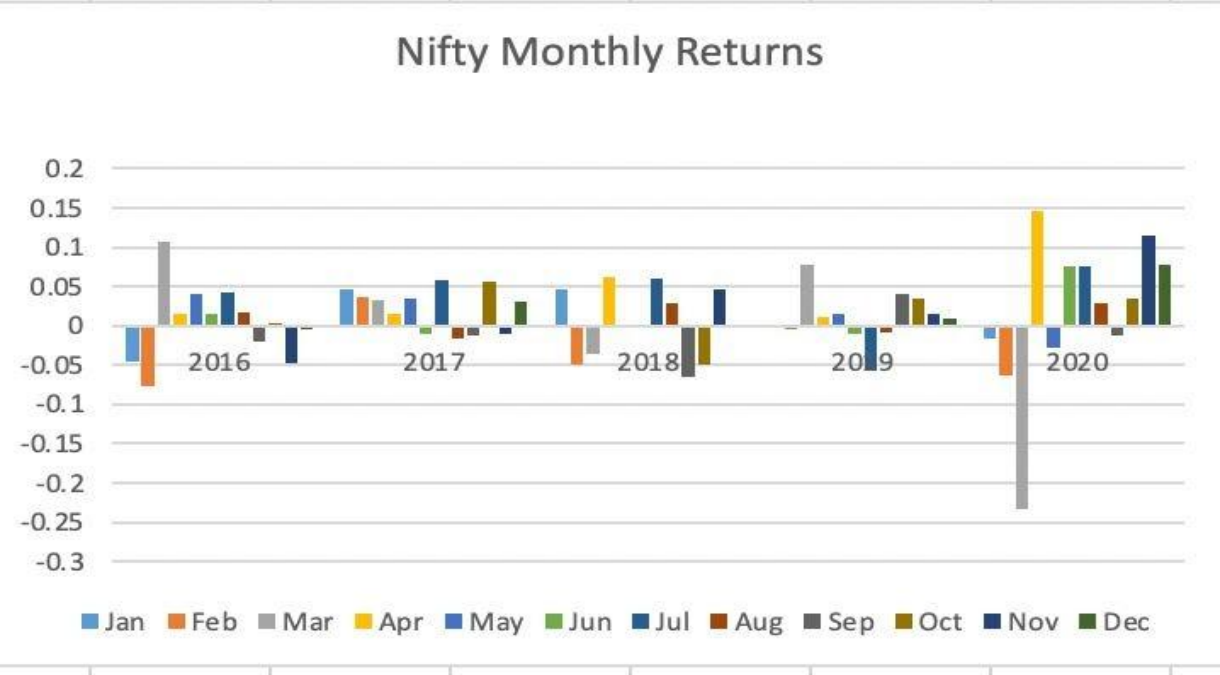


Chart 3: Annual Portfolio Returns - Dividends received during a calendar have been included as part of returns for that year, but such dividends are not reinvested in the portfolio.

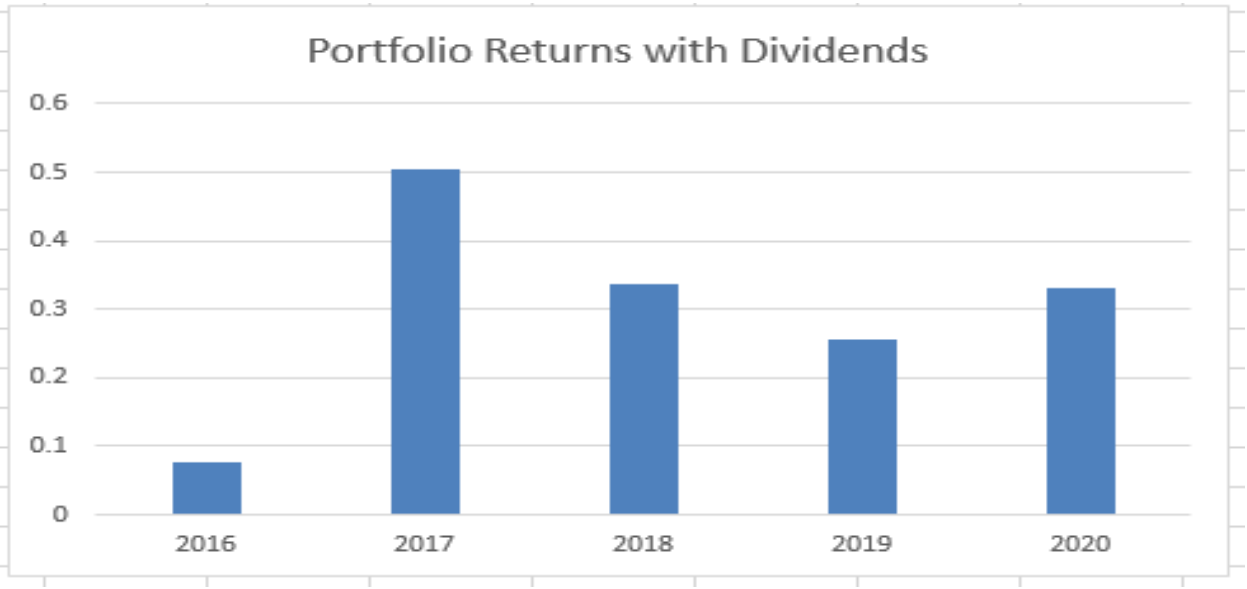
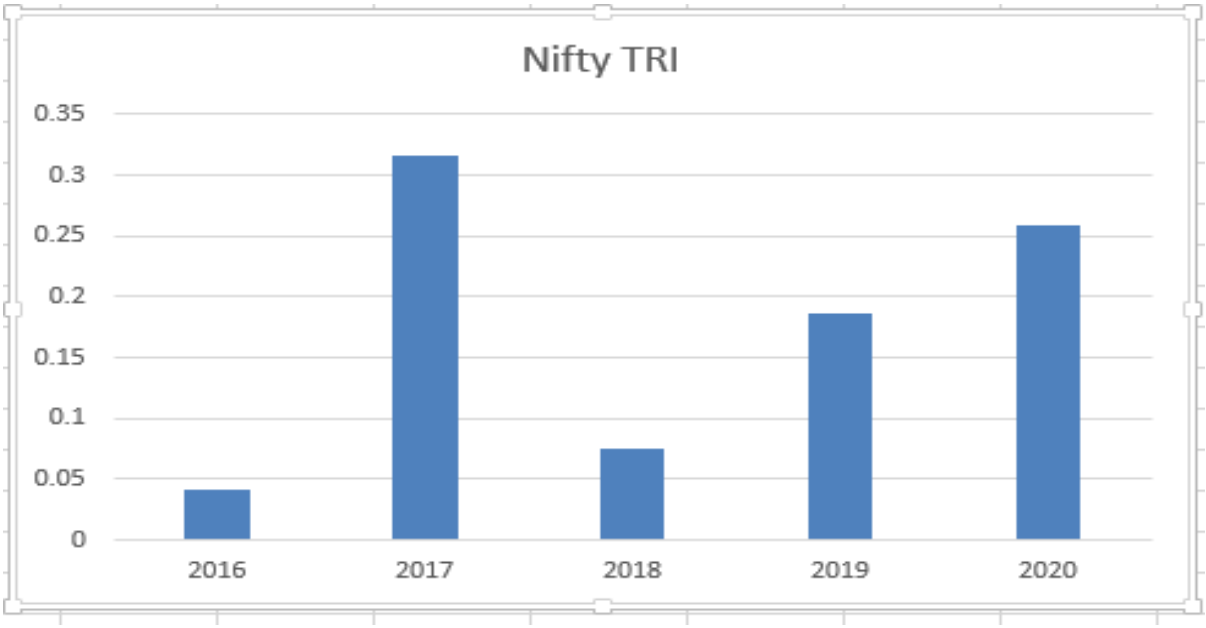


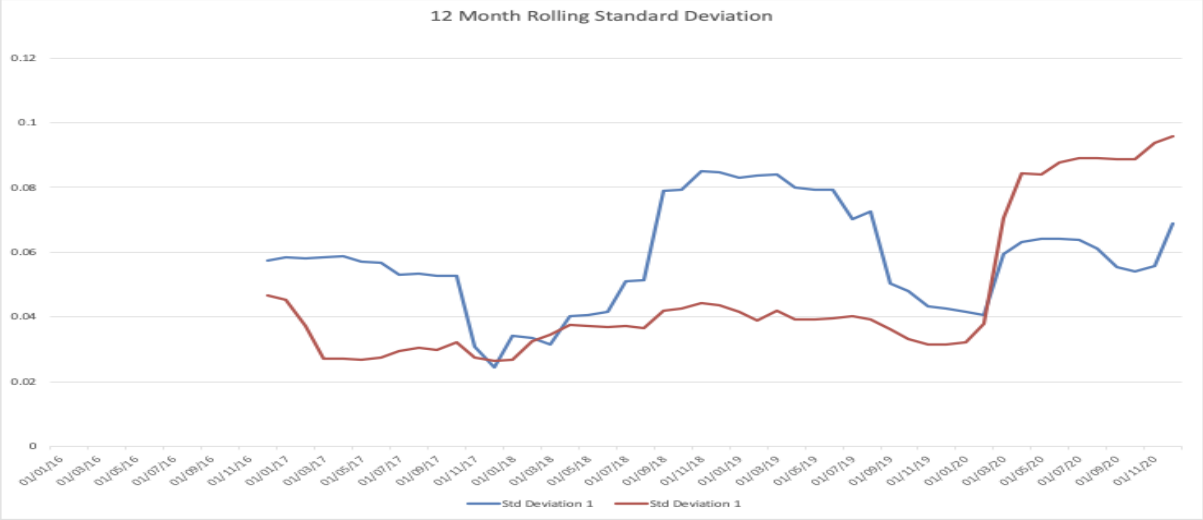
Chart 4: Nifty Total Returns Index Annual Returns.



Rolling Standard Deviation

This is a statistical analysis to measure the volatility of the market. This does not make any prediction of the markets but may serve as a confirming indicator. This has been derived by calculating the nth root of the simple moving average of the data item. Then, it sums up the squares of the difference between the data item and its moving average over each of the preceding n periods. Then, it finally divides the sum by n and calculates the square root of the results. In our case n being 5.

Chart 5: Rolling Standard Deviation



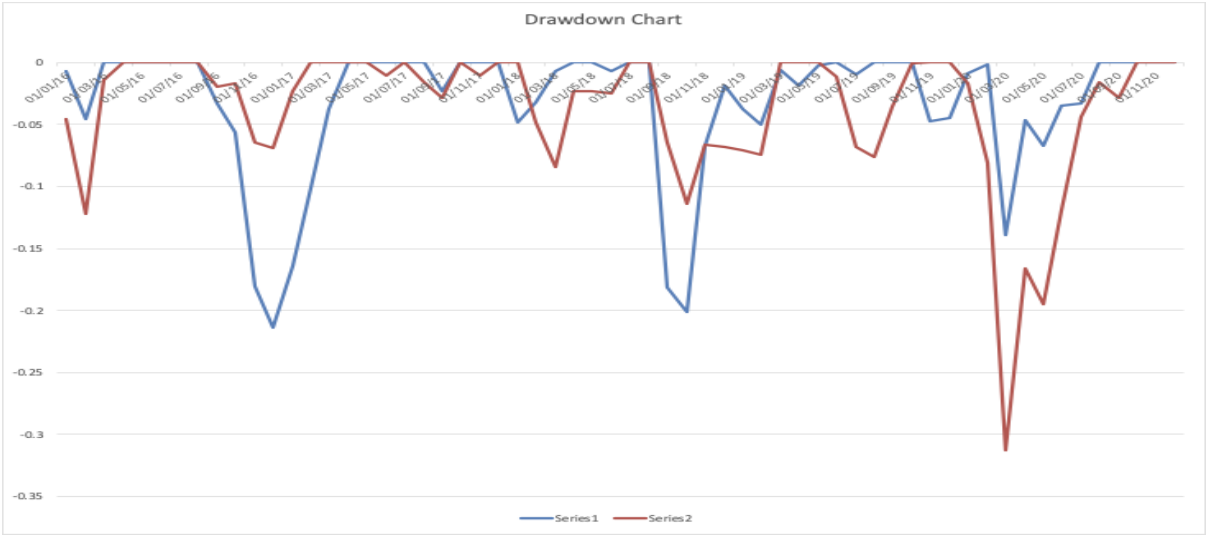
In the above fig. (Chart 5) the blue line represents the 12-month rolling standard deviation of returns of the expensive growth stock portfolio while the red line represents the 12-month rolling standard deviation of returns of Nifty50 index. There were periods when the expensive growth portfolio recorded higher 12 month rolling standard deviation of returns than Nifty50, and periods when the opposite happened. However, as can be seen in Chart 5, the 12-month rolling

standard deviation of returns of Nifty50 index rose sharply during the Covid induced market sell off in early 2020, whereas the expensive growth portfolio exhibited a far smaller increase in its 12-month rolling standard deviation of returns.

Drawdown chart

A drawdown chart is a chart which shows the peak to trough decline for a specific period of an investment. Drawdowns are generally quoted in percentage between the peak and the subsequent trough. This is a very important way in assessing the historical risk of various investments or for comparing fund performances.

Chart 6: Drawdown Chart



In the figure (Chart 6) the blue line in the chart represents the drawdown of the expensive growth portfolio, whereas, the red line represents the drawdown of Nifty50. Generally, in the drawdown chart, the lesser and lower the troughs, the better. The inferences drawn from Chart 6 are similar to the ones drawn from Chart 5 - there were periods when the expensive growth portfolio exhibited greater drawdowns, and periods when the Nifty50 index exhibited greater drawdowns; also, during the Covid-19 induced fall, the Nifty 50 experienced a maximum drawdown of 31.3% while the drawdown of the expensive growth portfolio was a far more bearable 13.9%. This shows that a portfolio of large, quality stocks that are fundamentally anti-fragile (benefit from disruption in the industry) is more likely to be more resilient in the face of a relentless market sell off.

Calmar Ratio

This is used to gauge the performance of invested funds generally that of hedge funds or large portfolios. It is a measure of risk adjusted returns for the invested funds. The unique factor of this is that this ratio uses a fund's maximum drawdown as a sole measure of risk. This ratio aims to demonstrate the amount of risk required to obtain a return for the investment. It helps investors to know the risk involved in the investment they are going to invest in or their portfolio.

Calmar Ratio = Average Annual Rate of Return

Maximum Drawdown

Table 2: Calmar Ratio

Calmar	
Portfolio	**0.9134494645**
Nifty	**0.3431003543**

The Calmar ratio thus gives the annual returns an investor can expect from a portfolio per percentage maximum drawdown. A higher ratio is favorable, since the investor gets paid more returns per unit risk.

Sharpe Ratio

Sharpe ratio was developed by William F. Sharpe and is generally used by investors to understand the return on investment when compared to the risk involved in a portfolio/investment. This ratio is the average return which is gained in excess of the total risk. The Sharpe ratio is arrived at by dividing a portfolio's returns in excess of the risk-free rate by the portfolio's standard deviation.

Formula and Calculation of Sharpe Ratio

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p}$$

where:

$R_p = \text{return of portfolio}$

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

$\sigma_p = \text{standard deviation of the portfolio's excess return}$

Table 3: Sharpe Ratio

Sharpe		
Particulars	Portfolio	Nifty
CAGR	0.195485	0.107385
Rf	0.03	0.03
Std Dev	0.209889	0.190823
Sharpe	**0.788441**	**0.405534**

The risk-free rate is taken to be 3% - the interest rate receivable on a Savings bank account in India.

The general inferences from the Sharpe ratio are:

- A ratio of below 0 indicates that the investor is better off owning the risk free asset.
- A ratio of above 0, up to 1 suggests that the portfolio is acceptable on a risk adjusted basis

- A ratio of above 1 would mean that the portfolio's risk adjusted returns are exemplary.

From Table 3, the Sharpe ratios of both the expensive growth portfolio and the Nifty50 index are acceptable on an absolute basis. However, on a relative basis, the expensive growth portfolio scores better than the Nifty 50 index, indicating that the expensive growth portfolio provides better risk adjusted returns than the index.

Sortino Ratio

This ratio is named after Frank A. Sortino. This ratio is a variant of Sharpe ratio which helps in differentiating harmful volatility from overall volatility by using standard deviation of negative portfolio returns instead of total standard deviation of our portfolio returns. In this the Risk-Free Rate is subtracted from portfolio returns and is divided by the downside deviation. Here, the Rf is taken to be 3%.

Formula and Calculation of Sortino Ratio

$$\text{Sortino Ratio} = \frac{R_p - r_f}{\sigma_d}$$

where:

R_p = Actual or expected portfolio return

r_f = Risk-free rate

σ_d = Standard deviation of the downside

Table 4: Sortino Ratio

Sortino Ratio		
	Portfolio	Nifty
CAGR	0.195485	0.107385
Rf	0.03	0.03
Downside Std Dev	0.128242	0.133309
Sortino	1.290411	0.580496

The Sortino ratio is different from the Sharpe ratio in that the former divides the portfolio's returns in excess of the risk free by the downside standard deviation of the portfolio, instead of the portfolio standard deviation as was the case with the later metric. The downside standard deviation only takes into account months whose returns did not exceed the minimum acceptable return (MAR), which is the risk-free rate of 3%. Since the Sortino ratio gives the investor the excess returns the portfolio generates over and above the risk-free rate per unit downside volatility, the higher the ratio, the better. From Table 4, the expensive growth portfolio is a better performer than the index.

Pearson's Correlation

Pearson's correlation is an inferential statistical tool which is used to analyse if there is a relationship between two continuous variables. The hypothesis has been tested at the

significance level of 0.01. The 'r' value in the table determines the strength of relationship between the variables.

Table 5: Correlation between Nifty monthly returns and monthly portfolio returns

Correlations

		Monthly Returns – Nifty	Monthly Returns – Portfolio
Monthly Returns – Nifty	Pearson Correlation	1	.711**
	Sig. (2–tailed)		<.001
	N	60	60
Monthly Returns – Portfolio	Pearson Correlation	.711**	1
	Sig. (2–tailed)	<.001	
	N	60	60

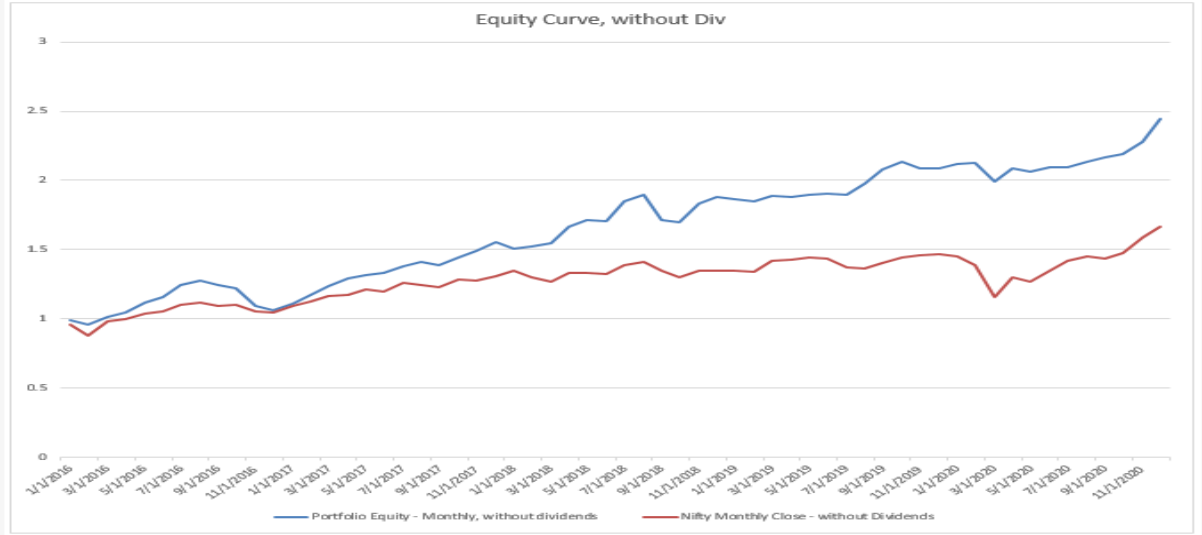
**. Correlation is significant at the 0.01 level (2–tailed).

As we can see in the table, the 'r' value is 0.711 which means it is strongly correlated. Since the p- value (Sig. (2 tailed)) < 0.01, correlation between the monthly returns from Nifty and monthly returns from the expensive growth portfolio is significant.

Table 6: Monthly Returns of the expensive growth portfolio, without considering dividends

	Monthly Returns - Portfolio				
	2016	2017	2018	2019	2020
Jan	-0.70%	4.67%	-3.09%	-0.97%	1.70%
Feb	-3.88%	5.63%	1.06%	-0.72%	0.34%
Mar	6.11%	5.46%	1.67%	2.39%	-6.44%
Apr	3.20%	4.08%	7.62%	-0.67%	4.63%
May	6.73%	2.22%	2.97%	0.90%	-1.00%
Jun	3.99%	0.89%	-0.38%	0.42%	1.59%
Jul	8.96%	3.45%	8.11%	-0.53%	0.05%
Aug	3.29%	2.55%	2.74%	4.48%	1.84%
Sep	-3.31%	-1.63%	-9.56%	5.12%	1.26%
Oct	-2.30%	4.14%	-1.16%	2.49%	1.33%
Nov	-12.40%	3.25%	7.92%	-2.21%	3.88%
Dec	-3.40%	4.13%	2.63%	0.12%	7.24%

Chart 7: Equity Curve (Cumulative Returns) - for the expensive growth portfolio, and the Nifty50. Dividends are not considered.



Conclusion

The paper shows that creating a portfolio using a sound set of fundamental filters can provide investors with healthy returns - both on an absolute basis, and on a risk adjusted basis. The expensive growth portfolio filters for, and holds large, high ROCE companies trading at high P/BV multiples whose cash from operations exceed reported earnings. While this prima facie seem the antithesis of value investing, it is not. The book value of companies, especially those that have high ROCEs is only a fraction of the company's true economic value. Hence, by filtering for high P/BV stocks, investor is not choosing overvalued stocks, investor is simply choosing stocks that are in favour.

No upper boundary has been established for the P/BV filter, and despite this the expensive growth portfolio has delivered robust returns, beating the wider market. This ought to be conclusive evidence that high P/BV stocks are not overvalued. Companies that generate high ROCEs or high ROICs are those that enjoy sustainable competitive advantages, and hence are more likely to deliver solid out-performance, while remaining resilient to disruptions. Owning quality is shown to result in smaller and shorter drawdowns, as can been seen here.

The expensive growth portfolio has outperformed the benchmark index, not just on absolute returns, but also on a risk adjusted basis. The downside volatility of the expensive growth portfolio is also lower than that of the Nifty50 index. Following a mechanical stock picking strategy eliminates human emotions and biases that creep into every investment decision. A data driven model such as this will also offer confidence to investors to continue holding their portfolio even during wide & sharp market sell-off, as was experienced in early 2020 owing to the Covid-19 pandemic.

This model can be used by investors to healthy returns far into the future. This paper has shown how fundamental filters, based on logic, can dramatically improve portfolio returns, and reduce drawdowns and downside volatility.

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