The use of return on equity as a criterion for stock selection in the Indian equity markets

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Abstract. As per Dorsey, companies with a sustainable competitive advantage tend to outperform the market benchmarks over time. Companies which have a durable competitive advantage compared with their competitors manage to compound capital at attractive rates of return and such companies tend to grow sales and profits predictably and generate substantial free cash flows. This reflects in their share prices over time. In this paper we have used a measure of Return on Equity as an indicator that a company has a sustainable competitive advantage, and have studied the equity performance of such companies as compared with market performance. We find that companies which have attained Return on Equity greater than 15% each year for the past ten years tend to outperform the market benchmarks over the next five years.

1. Introduction
Companies operating in the broader economy may tend to perform better than their competitors at certain periods of time for various reasons. For example, they may have introduced a certain product that is achieving high sales and profits. Or they may have entered certain markets where the possibilities for growth are substantial. Or they might diversify into a new sector which is growing at a rapid pace.

However as the companies perform well, their success attracts competitors. Over a period of time, the advantage that such companies had may get eroded away owing to competitive pressures. Then the company’s sales and profit growth returns to original levels and the company is forced to look for new methods to grow.

Nevertheless, there are few companies which are able to maintain their high growth rates even in the face of competition. Competition doesn’t affect such companies; in fact they demonstrate their superior capabilities year after year. This is referred to as sustainable competitive advantage and the reason for such an advantage could be varied. For example such companies may have a strong brand, or they may have high switching costs, or network effects or they may be the lowest cost producer due to being able to leverage on economies of scale.

In this paper we look at the problem of investing that is stock selection. We investigate the problem of how to construct a portfolio of companies that outperform the equity indices. Our hypothesis is that, if we leverage the fact that certain companies have sustainable competitive advantages, such companies would perform well over a long period of time and their stock prices would reflect their performance.
2. Literature review
The relationship between Price to Earnings ratios and Stock Returns was documented in detail by Basu (1977). He showed that portfolios containing stocks with low Price to Earnings ratios outperformed portfolios with high Price to Earnings ratios and therefore the market could not be described by the Efficient Market Hypothesis. Fama and French (1998) published the paper, Value and Growth, the International Evidence where they showed that value stocks represented by stocks with high book to market values outperformed growth stocks in twelve out of thirteen major markets of the world.

Rozeff and Kinney (1976) demonstrated that there were significant differences between monthly returns of stocks. This argues for presence of seasonality in stock returns, particularly considering that returns were particularly high for the month of January compared with the rest of the months. Similar effects were discussed by Haugen and Lakonishok (1988) in their book The Incredible January Effect: The stock markets unsolved mystery. Gibbons and Hess (1981) documented the existence of the day of the week effects in stock returns; namely that returns on Monday were traditionally negative compared with the rest of the week. In the efficient markets, participants should have spotted these anomalies and arbitrage should have reduced the January and the Monday effect, these effects still persisted over the years. Lakonishok and Smidt (1988) demonstrated that the return at the turn of the month and before holidays is higher than returns at other times of the year.

These findings support the hypothesis that investors are not always rational. They do not always make rational decisions due to the presence of a number of behavioral biases. Debonddt and Thaler (1985) found that most investors overreact to sudden and unexpected news which leads to abnormal movements in security prices. This makes a contrarian strategy on investing in stocks that are out of favor and shorting those in favor attractive.

Fama and French (1992) studied the relative success of using value characteristics to explain average portfolio returns compared to market returns on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and National Association of Securities Dealers Automated Quotations (NASDAQ) stocks. For this purpose, the impact of size, book to market, leverage and market beta was studied on average returns. The data for the purpose consisted of all non-financial firms, which was extracted from Compustat and Centre for Research in Security Prices (CRSP). The period of the study ranged from 1963 to 1990. The results revealed that the beta did not seem to explain the cross section of average stock returns. The combination of size and book to market equity absorbed the role of leverage and earnings to price ratio in explaining the average stock returns during the period of the study.

Capaul et al. (1993) analyzed the returns obtained from portfolios formed of stocks with high price to book ratios (growth stocks) and those obtained from portfolios of stocks with low price to book ratios (value stocks) for 6 countries i.e. France, Germany, Switzerland, the United Kingdom (UK), Japan and the United States (US). It was observed that value stocks outperformed growth stocks on an average in each country during the period studied, both absolutely and after adjustment for risk. Lakonishok et al. (1994) examined the performance of growth and value stocks classified on the basis of book to market ratio, cash flow to price ratio, earnings to price ratio and past growth in sales. The reason behind existence of value premium was also explored. They observed that value strategies based on cash flow to price ratio outperformed the glamour strategies by approximately by 10–11% per year. They concluded that value strategies yielded higher returns because those strategies exploited the sub optimal behavior of the typical investor and not because those strategies were fundamentally riskier.

Brouwer et al. (1996) analyzed value strategies for 4 European countries (i.e. France, Germany, Netherlands and U.K) on the basis of 4 value variables, that is, earnings to price (E/P ratio), book to market (B/M ratio), cash flow to price (CF/P ratio) and dividend yield. They found that the annual returns for the value portfolios outperformed the annual returns
for the glamour portfolios and that difference turned out to be especially remarkable for CF/P ratio (20.8%). They further observed that the result could not be explained by risk differences alone and thus behavioral factors were conjectured to be responsible towards the presence of value premium. Bauman and Miller (1997) found that value stocks with relatively low price in relation to earnings per share, cash flow per share and low past earnings per share growth rate evinced favorable investment performance as they outperformed growth portfolio on the basis of total as well as risk adjusted return basis. Doeswijk (1997) examined the performance of value investing strategies in Dutch stock market for the period 1973–1995. La Porta et al. (1997) showed that the announcement returns suggested that a significant portion of the return difference between value and growth stocks was attributable to earnings surprises which were systematically more positive for value stocks. Therefore the study conjectured the behavioral factors to be responsible for high returns to value stocks. Mukherji et al. (1997) investigated the presence of value premium in Korean stock market for the period 1982 to 1993. Vaidyanathan and Chava (1997) explored the potential of book to market ratio in yielding value premium in Indian stock market. For this purpose, the scrips actively traded at Bombay Stock Exchange from 1990 to 1997 were considered. The results revealed that significant difference in the mean returns of value and growth portfolios was not observed. Thus, the value stocks classified on the basis of book to market ratio could not yield any premium in Indian stock market.

2.1. Recent research in stock market investing
The previous section mainly referred to research that has been done in the field of value investing. However in recent years, it has been seen that the field of investments have become greatly automated and as a result of this automation, a large number of algorithms to create winning stock investments have been tried out. Covering all of them is beyond the scope of this paper but in general, they have involved automating rules for selecting investments and back-testing these rules over past data in order to verify the veracity of these rules. Whereas previously, investors would buy and hold stocks for many years, presently with algorithmic investing, stocks are bought and sold infinitely more frequently, in fact over seconds.

Some of the recent research in the field of stock market investing is summarized as follows. Pimenta, et all (2018) have applied multiobjective genetic programming to stock investing. Hurst et all (2017) have done a study on trend following based on momentum as a stock picking strategy. Alberg and Zipton (2017), have investigated factor based quantitative investing by forecasting company fundamentals. Dimson et all (2017) have examined the long term evidence as to whether factor based investing is effective. Feng and He (2019) have explored hierarchical ensemble learning in factor investing.

With the rapid advances of machine learning and artificial intelligence, it is no surprise that such techniques have found their way into global stock market investing as well. Zhong and Enke (2019) have tried to predict the daily returns of the stock markets using machine learning techniques. Gurav and Sidnal (2018) have discussed stock market related technical indicators, mathematical models and algorithms used in data science and how these can be applied to investing. Sigo et all (2020) have applied Ensemble Machine Learning techniques, in Indian Stock Markets predictive data analytics. Kumar et all (2018) have compared different supervised machine learning algorithms for stock market trend prediction.

3. Proposed hypothesis and methods of analysis
ROE Based: As per Dorsey (2008) a measure of whether a company is considered to possess sustainable competitive advantages is if it has generated Returns on Equity of more than 15% over the past ten years. Sustainable competitive advantages refer to the fact that the company has a lead over its competitors and this lead is sustainable, that is it persists over
time. Sustainable competitive advantage could arise due to the value of a company’s brand, switching costs for its services, network effects and economies of scale. A company with a sustainable competitive advantage would continue to generate a high rate of profit irrespective of market conditions and that should reflect in its share price.

3.1. Scope
This study is limited to Indian companies listed on the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). For the purpose of this study, companies with a market capitalization of below Rs 50 crore have been excluded. The company also should have been in existence in the past fifteen years (from 2002 onwards) and should have reported annual results for each year in this timeframe. Therefore, companies which have come out with initial public offerings after 2002 have not been considered for the study.

H1: A portfolio of companies reporting Return on Equity greater than 15% in each year of the prior ten years outperforms our benchmark return rate of 10% per year over the next five years.

As per Dorsey (2008) a measure of sustainable competitive advantage of a company is their ability to generate above average returns over a period. For US based stocks, Dorsey posits that companies that generate Returns on equity of 15% and above over the past ten years possess a competitive ‘moat’ that prevent competitors from displacing them as market leaders. As a result, their dominance is reflected in their stock returns, and investors are advised to identify such companies and invest in them. However, this criteria of whether stocks returning a return of equity of 15% and above over each of the past ten years outperform the indices has not been tested for the Indian markets. This is what I propose to do as my first hypothesis.

Using the Prowess database, we aim to obtain the Return on Equity for all companies (of a minimum size as defined before) listed on the BSE and NSE from 1996 to 2017. The analysis would be done for seven portfolios from 2011 to 2017 (table 1).

| Portfolio | ROE Each year in period | Stock price returns in the period |
|-----------|-------------------------|----------------------------------|
| 1         | 1996–2005               | 2006                             | 2011                             |
| 2         | 1997–2006               | 2007                             | 2012                             |
| 3         | 1998–2007               | 2008                             | 2013                             |
| 4         | 1999–2008               | 2009                             | 2014                             |
| 5         | 2000–2009               | 2010                             | 2015                             |
| 6         | 2001–2010               | 2011                             | 2016                             |
| 7         | 2002–2011               | 2012                             | 2017                             |

As the table shows, the first portfolio would be constructed from stocks which have generated ROE of 15% and above each year from 1996–2005 (the ten-year period for this portfolio). The portfolio would be equally weighted since each of the stocks of the portfolio has, in the absence of other information, an equal chance of outperforming our benchmark return of ten percent. The stock price returns for the 5-year period from 2006 to 2011 would be obtained from prowess database. This process would then be repeated for the portfolios till 2017 and the extent of outperformance would be calculated for these seven portfolios. A standard t test can then be used to determine whether this outperformance is statistically significant.
3.2. **Hypothesis**

The data for this hypothesis is attached in the accompanying excel sheet. The data is too large to be incorporated in this document, hence, the examiner is requested to refer to the attached excel sheet for details and calculations. The summary calculations can be found below:

A brief explanation of the methodology behind the excel sheet and the calculations is as follows.

From the CMIE Prowess database, the data (Return on Equity as per financial statements) for the companies for the required time periods was downloaded into an excel sheet which is provided as an attachment with this thesis. The following steps were then followed to arrive at the results given below:

(i) Using Excel’s conditional formatting function, the companies which achieved ROE > 15% for each year for the past ten years, were isolated;

(ii) This was done from 2011 through 2017. Post that subscription to the Prowess Database was discontinued by the university and free databases that provided this data were not in the public domain;

(iii) The adjusted closing price of the stocks were then downloaded from Prowess and merged into the file;

(iv) This was done for all the years going back to 2006

(v) For each of the stocks generating ROE > 15% for each year for the past ten years, the stock price at 31st March for that year and the corresponding price for March 31st, five years before were isolated.

(vi) The annualized return for the stocks that fulfilled the criteria was calculated using the CAGR formula.

(vii) Now a portfolio is constructed. It is assumed that each stock that fulfilled the ROE criteria was given an equal weight in the portfolio. That is, an equally weighed portfolio was formed from the stocks that fulfilled the criteria for the given year.

(viii) It is assumed that the portfolio composition changes with the change in the stocks fulfilling the criteria for the year. That is, if a different stock fulfils the criteria the next year, it would be included in the portfolio and if an existing stock doesn’t fulfil the criteria, it would be removed from the portfolio.

(ix) The return of the equally weighted portfolio is calculated.

(x) The annualized returns of the BSE Sensex (the major stock index in India) for the past five years is calculated using data downloaded from the Yahoo Finance database.

(xi) The difference in the returns of the equally weighted portfolio and the BSE Sensex gives the outperformance for the year.

(xii) The percentage outperformance for the 7 years 2011–2017 was collated. This was then compared to an outperformance of 0% using a Student’s t test, which compares the means of two populations.

(xiii) The mean outperformance for the 7 year period was 4.16% with St Deviation of 4.44% which gives a p value of .048% which lies in the 95% confidence interval in the paired sample t-test.

(xiv) This proves that our hypothesis is justified under the 95% confidence interval.

(xv) Since the data in the periods overlap (for example, 2011–2016 and 2012–2017 have 4 years overlapping), the data may not be independent from one period to another. However this caveat is not entirely true because we are considering the difference between our model portfolio that we have formed using our criteria of including stocks achieving ROE greater than 15% each year for the past ten years, and the index performance. And what we have seen is that the performance of the model portfolio from one period is not correlated with
the performance in the next period because for each period, different stocks fulfil the above criteria. Hence the stocks chosen from one period to be included in the model portfolio are quite different from the stocks chosen at the next period and therefore there is no autocorrelation between the performance of the model portfolio from one period to the next. Indeed this fact has been validated using Durban Watson statistics (table 2).

Hypothesis 1:

\[ H_0 : \mu_1 \leq 0 \]
\[ H_1 : \mu_1 > 0, \]

where \( \mu_1 \) is the % outperformance (Portfolio Performance-Sensex Performance) for the year (table 3).

### Table 2. 5yr Portfolio Performance vs Sensex Returns

| 5 Yr Portfolio Performance CAGR | 5 Yr Sensex Performance CAGR | % Outperformance |
|---------------------------------|-------------------------------|------------------|
| 2012–2017 16.60%                | 11.22%                        | 5.38%            |
| 2011–2016 14.64%                | 5.44%                         | 9.20%            |
| 2010–2015 14.29%                | 9.79%                         | 4.50%            |
| 2009–2014 24.84%                | 18.19%                        | 6.65%            |
| 2008–2013  9.24%                | 3.78%                         | 5.46%            |
| 2007–2012  8.77%                | 5.89%                         | 2.88%            |
| 2006–2011  6.62%                | 11.51%                        | −4.89%           |

### Table 3. Hypothesis H1, One sample statistics

|                     | N    | Mean   | Std. deviation | std. error mean |
|---------------------|------|--------|----------------|-----------------|
| Outperformance      | 7    | 4.1679%| 4.44407%       | 1.67970%        |

### Table 4. Hypothesis H1, paired sample t-test

|                      | Test Value = 0 | 95% Confidence Interval of the Difference |
|----------------------|----------------|------------------------------------------|
|                      | t   | df  | Sig. (1-tailed) | Mean Difference | Lower | Upper |
| Outperformance       | 2.481 | 6   | 0.048            | 4.16793%        | 0.0579 | –     |

Since the p value comes out to be −0.048 less than the limit of .059 we conclude that the null hypothesis can be rejected and that the portfolio outperformance is statistically significant at the 95% confidence interval.

### 4. Conclusion

Thus, in this piece of research a method of stock selection has been demonstrated, that has been shown to perform adequately in the Indian markets. This study can be extended for foreign markets as well to see if this phenomenon persists universally or not. We believe that our study
could be of importance to investors in India and abroad and could provide a paradigm to them to make prudential investment decisions for their portfolios.

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