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**MULTIPLE DIMENSIONS OF CYCLICALITY IN
INVESTING**

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Abstract

Returns on Equity as an asset class tend to be erratic and uneven. Contrary to popular opinion, such fluctuations in returns cannot be attributed to business cyclicity alone. Historically, investors' attitude towards risk has had ramifications on how individual stocks and indices are priced. Commonalities across market up-cycles and down-cycles are examined using data on the Nifty-50 index. Based on firm-level characteristics, the investible universe is segregated into two categories: quality and Cyclical. The performance of the Quality and Cyclical portfolio across market cycles is analysed. Although markets are 'efficient' in the long run, investor perception plays an important role in short-term pricing. The Price to Earnings (P/E) ratio in spite of its shortcomings serves as a useful tool in evaluating prospective investments.

Keywords: *Quality, Cycle, Investment, Portfolio*

JEL Codes: *G11, G12, G15*

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INTRODUCTION

The term cyclical describes phenomena that are recurrent or repetitive. A vast majority of routine decision-making has evolved as a response to such cycles. Specifically, in the economy and capital markets, such patterns manifest in the form of recession-expansion cycles (Moore, 1967) and bull and bear markets respectively. Cyclicalities arise from naturally occurring phenomena and, importantly, from the ups and downs of human psychology and the resultant human behaviour (Marks, 2018). Acknowledgement of such cycles would enable investors' decision-making to adapt accordingly to the changing circumstances. The work of Timmer (2017) showed that globally, financial institutions and capital market participants have exhibited differing behaviour under different phases of the economic cycle. The work of Rajan (2005) showed that the ability of financial intermediaries to take on risks changes as progression is made through various phases of the economic cycle. Cyclicalities in the context of financial markets is a very broad concept, and an effective methodology of analysing cyclicalities entails the study of swings in investor psychology, swings in profitability, competitive intensity, and swings in stock returns. This work explores how each dimension of cyclicalities influences the way equity prices behave as the transition is made from one part of the cycle to the next.

Traditionally in theoretical and academic discourse, individuals are assumed to be 'rational'. However, the behaviour exhibited by individuals across market cycles is far from rational. A typical individual overestimates his/her chances of success leading to unrealistic optimism. In the context of finance, mere reliance on theoretical models could lead to disaster. However, effective investing principles require a review of theoretical models and relaxing the assumptions involved. Fama (1970) formally introduced the concept of "Efficient Markets", where asset prices fully reflect all publicly available information. In Perfectly competitive markets, the cost of acquiring information equals the corresponding benefit (Ball, 2009). The existence of the Efficient Market Hypothesis

(EMH) ensures that the price of a traded stock reflects the true value of the underlying business, although there may be temporary phases where such 'efficiency' breaks down. Although one may expect the markets to be efficient in the long run, the exact time frame remains ambiguous (Kayal and Maheswaran, 2018; Kayal and Mondal, 2020). Taken to the extreme, such departure from 'efficiency' creates bull-bear phases, and the history of financial markets is replete with such instances. The creation of every asset bubble is characterized by investor exuberance and disregard for conventional methods of valuation. This was highly evident during the 'Dot-Com' bubble. The work of Wheale *et. al.* (2003) highlighted that during the height of the frenzy stock returns were negatively correlated with efficiency indicators such as Return on Assets (RoA) and Return on Equity (RoE). Clearly, the notion of 'efficiency' broke down completely during the Dot-Com bubble, where investor euphoria on the establishment of the 'internet' economy led to an overestimation of the potential size of the technology sector. During the same time, the established (but profitable) firms were termed as the 'old' economy and 'brick and 'mortar' stocks. Once reality caught up with the hype, investors flocked back to the tried and tested business models. While a bubble is obvious in hindsight, tools to identify a bubble in its build-up phase will lead to the avoidance of big losses. This necessitates the need to determine investor attitudes towards risk. When investors are risk-tolerant (averse) in bull (bear) markets, the incremental return for an additional unit of risk is reduced (increased) and hence this reduces (increases) the slope of the capital market line, which depicts the risk-reward trade-off. The Equity Risk Premium (ERP) denotes the 'price' of risk, which indicates the excess returns investors collectively demand over and above the risk-free rate of return. The ERP serves as an effective tool to time entry and exit into equities, such strategies involve exiting equities when investors are exceedingly optimistic and buying equities when investors are drowned in pessimism. Apart from analysing the qualitative aspects of market up-cycles and down-cycles, understanding commonalities across bull and bear market cycles by

employing statistical measures enable a better reactive mechanism for investors during the next market up-cycle or down-cycle.

Although this work primarily focuses on cyclicity in equity investing, with the advent of globalization, studying cycles in the equity markets alone merits no value. Although the Sub-Prime crisis in 2008, and the IL and FS debt market crisis in 2018 (in India) emanated initially in the debt markets their ripples were felt in the equity markets as well. Viewing equities alone in a vacuum is a futile exercise given the nature of co-movements and financial integration seen globally. Hence there is a need to view equity markets along with money markets to arrive at a holistic picture. The rate-sensitive sectors of the economy such as banking and automobiles, exhibit regular recurring patterns, which is well understood can deliver market-beating returns. Kavinsky and Reinhart (2002) have investigated how interest rates, equity returns and bond spreads behave in times of financial stress. Post globalization, the capital markets have been characterized by significant capital movement across countries, leading to synchronization of stock market cycles globally. With such an integration taking place globally, emerging market indices tend to exhibit a high degree of correlation with their developed counterparts (Edwards *et. al.*, 2003; Sharma *et. al.*, 2019).

In the context of financial integration, investors are constantly on the lookout for signs of stress in the bond market or credit market to time entry and exit in the equity market. The most widely accepted principle in investing is the buy and hold strategy, and investors are perpetually discouraged from attempting strategies to time their entry and exit into equities (Venkataramani and Kayal, 2021). However, given the non-linear movement of equity prices investors can use simple rules of thumb such as the spread between Earnings to Price Ratio (PE) of S and P 500 (or any equity index) and interest rates to time entry and exit in equities to avoid market downturns, this is in complete contrast to the widely accepted practice of the 'buy and hold' strategy. Such a switching strategy (switching from equity to cash when the spreads reach a certain

threshold level) provided a higher mean return, with a lower variance (Shen, 2002).

Conceptually, cyclicity in business profitability is well understood. There is wide agreement that the profitability of sectors such as metals, textiles and paper (to name a few) exhibit a high degree of correlation with the overall economic growth locally as well as globally, these stocks typically witness significant price appreciation during an economic upcycle and a significant price erosion during an economic down-cycle. 'Quality' companies, which predominantly are consumer-facing franchisees (the profitability of such companies is less linked to the economic cycle) are assumed to offer consistent capital appreciation for investors (Janani *et. al.*, 2022). However, given the interplay between investor perception and future stock returns, 'Quality' stocks tend to undergo implicit, time corrections. Given the lack of research pertaining to time corrections, this work addresses the issues with identifying time-wise corrections. The work of Walkshäusl (2013) presents the view that stocks with low volatility and a high degree of profitability (the predominant characteristics of quality stocks) earn better risk-adjusted returns. Furthermore, the returns from investing in quality firms are abnormally high on a risk-adjusted basis and are not prone to crashes (Bouchaud *et. al.*, 2016).

In a developing country like India, where the equity cult is picking up gradually, a vast majority of investors have chosen mutual funds (over direct equity) to participate in the equity market. However, given the competitive landscape of the asset management industry, a lot of emphasis is placed on short term returns, which inevitably forces fund managers as well as retail investors to chase the 'hot' stocks or the high-flying stocks given their recent outperformance. Whilst the stock price is a function of earnings growth (Das and Kayal, 2021), in the long run, mood and momentum (which are impossible to predict) have a significant influence on short-run stock prices. This work attempts to highlight the shortcomings of market quoted prices in the short run. An over-reliance

on market quoted prices as the final 'verdict' on a company's long-term prospects could lead to significant loss of capital.

Damodaran (2017)¹ presented a view that investing in equities is certainly not science since there are virtually no universally accepted principles. No consensus has ever been reached on any aspect of portfolio construction. Debates abound around the right 'price' paid for a stock, the appropriate time horizon for holding investments. Something as rudimentary as the number of stocks to be held in a portfolio is subject to intense scrutiny and debate. This debate assumes greater importance, given the benefits of diversification where investors seek to hold a basket of stocks in order to eliminate company-specific risk. The work of Evans and Archer (1968) concluded that holding as many as 10 stocks in itself leads to diversification while Statman (1987) advocates 30 stocks for a borrowing investor and 40 stocks for a lending investor to reap the benefits of diversification. Hence, unlike science, investing in equities involves the considerable application of intuition from the investor's side. The differences in opinion among investors lead to properly functioning markets. Each market bubble occurs when investors 'herd', and in such cases, the consensus trade is bound to fail at some point in time (Banerjee and Kayal, 2021). This work argues highlights the benefits of being a 'rational' contrarian. Speaking in a more general sense, generating market-beating returns requires perspective, patience and courage (Kirby, 1984)². Although there exists a wide range of work with regards to portfolio construction, a predominant section of investors relies on simple rules of thumb to optimize returns from equity as an asset class.

The rest of the paper is arranged along the following lines. We provide a brief overview of Bull and Bear Markets, by computing a range of

¹ Damodaran, A. (2017) Valuation: Art, Science or Magic? Accessed at <http://people.stern.nyu.edu/adamodar/pdfiles/country/val2dayDubai2017.pdf>

² Kirby, R (1984) The Coffee Can Portfolio. Journal of Portfolio Management

statistical measures. We discuss investor attitudes towards risk using the equity risk premium next. Then we provide a means to differentiate firms on the basis of efficiency indicators such as RoCE and RoE. In the next section, we compare the returns on a portfolio of quality and deep cyclical stocks across market cycles and discusses possible market timing strategies. Finally, we present a perspective on market quoted equity prices followed by concluding remarks.

UNDERSTANDING BULL AND BEAR MARKETS

In stock market terminology, the bull (bear) market corresponds to periods of generally increasing (decreasing) market prices (Chauvet and Potter, 2000). Typically, investors classify a 25 percent up-move (down-move) as a bull (bear) market. Given the fact that equity prices operate in cycles, a bull market denotes an optimistic phase in investor psychology, and the reverse holds for bear markets. Broadly a bull market is characterised by rising equity prices and increased risk tolerance (which in turn causes the risk-reward trade-off to turn against an investor). The need to quantitatively classify each market cycle is further necessitated by the fact that with the increased computerization of equity trading, intra-day volatility of major equity indices has increased. The recent bear market induced by the Coronavirus pandemic highlighted the possibility of “fat” tails in the return distribution to be a reality and not just a possibility.

Although existing work on classifying Bull and Bear markets involve the use of complex mathematical and statistical tools, an average investor is not expected to have expertise in such tools, and hence the paper uses an intuitive approach to classify bull and bear markets. An appealing feature of this approach is the ease with which it can be applied. Bry and Boschan (1971) used an algorithm to determine turning points, i.e., the exact phase of a bull market turning into a bear market, Edwards *et. al.* (2003) used a non-parametric approach to study common patterns among bull markets and bear markets. Pagan *et. al.* (2003)

studied bull and bear markets in the United States using mathematical methods to identify local troughs and local peaks. Since the primary goal involves an analysis of the characteristics of market up-cycles and down-cycles, this paper does not employ any such techniques to identify turning points or local peaks and troughs. The primary objective here is to study commonalities among previous bull and bear cycles. Using the chart of Nifty-50 and with the benefit of hindsight major peaks and troughs are identified and quantitative metrics of each up-cycle and down-cycle is analysed. Using weekly data on the Nifty-50 index, a range of statistical and non-statistical measures are calculated.

Phase-Wise Division of Nifty-50 Index

Table 1: Classification of Market Moves Based on Time

This table describes the phase-wise division of NIFTY-50. The 25-year period beginning from December 1995 has been broken down into 9 Phases in order to draw commonalities across market up-cycles and down-cycles.

Phase	Time Period
1	December 1995- December 1998
2	January 1999- March 2000
3	April 2000-April 2003
4	May 2003-December 2007
5	January 2008-April 2009
6	May 2009- December 2010
7	January 2011-January 2020
8	February 2020-March 2020
9	April 2020 onwards

Table 2: Metrics Employed for Studying Bull and Bear Markets

This table highlights the criteria for classifying market cycles. The differences across each market cycle are captured in these statistical and quantitative measures. Given the way these measures are defined, it leaves no ambiguity with respect to the results obtained.

Measure	Utility
Duration	Typically bull markets last for a longer time than bear markets. Even though bear markets are short-lived the potency of a bear market is far higher than that of a bull market
Standard Deviation of Returns	Academic theory prescribes volatility as a proxy for risk. The volatility differences across bull and bear markets lead to significant differences in risk-adjusted return.
Skewness and Kurtosis	To check the presence of 'fat' tails in the return distribution
Sharpe Ratio	To determine the risk-adjusted rate of return
Drawdowns (Moves in Excess of 2 Standard Deviations from Mean)	Understanding the possibility of negative returns in the extreme left tail of the return distribution

A detailed explanation for each metric used follows,

Duration of Bull and Bear Markets

Typically, the duration of bull markets exceeds bear markets. However, the historical trends cannot be merely extrapolated to the future. The duration aspect, although trivial in the way it is defined serves as a benchmark for investors in terms of portfolio allocation decisions. Investors can exercise a great degree of caution as a bull market approaches its end (and allocate a larger part of the portfolio to cash or fixed-income securities), or aggressively buy equities as a bear market is in its final stages, by using prior trends as a benchmark.

Skewness and Kurtosis of Returns

Modern Portfolio Theory (MPT), postulates the mean and variance to be sufficient criteria for choosing an investment portfolio. Statistically, the mean and variance involve the first and second moments. However, the real world involves multiple states of nature and heterogeneous investor utilities, forcing the need to incorporate such differences. Thus, checking for Skewness during Bull and Bear runs indicates a departure from the normal distribution. Investors typically prefer stocks with positive skewness since it offers a larger probability of positive fat tail returns. Kurtosis on the other hand measures how 'peaked' the return distribution is. A higher value of Kurtosis indicates the presence of fatter tails, and when combined with Skewness, presents a complete picture of the return distribution for the given phase (Brockett and Kahane, 1992). The statistical formulae for Skewness and Kurtosis are given as follows.

$$\text{Skewness} = \frac{1}{n} * \frac{\sum(X_i - \bar{X})^3}{s^3} \quad \text{Kurtosis} = \frac{1}{n} * \frac{\sum(X_i - \bar{X})^4}{s^4}$$

Where $X_i = \text{Returns in Month } i$

$\bar{X} = \text{Mean Monthly Return for the given Phase}$

$s = \text{standard deviation of monthly returns}$

Statistically, a skewness value different from that of 3, indicates a departure from normality and denotes the presence of long tails in the return distribution. A positive (negative) value indicates the possibility of many small losses (gains) and few big gains (losses). Kurtosis helps in gauging the possibility of extreme returns (in comparison to the normal distribution). A positive value of Kurtosis indicates a higher probability of an extreme value of loss or profit than the probability implied by a normal distribution (Kayal *et. al.*, 2021). The aggregate index level returns display negative skewness while individual firm returns display positive skewness owing to the co-skewness among stocks comprising the index (Albuquerque, 2010). Ideally, investors would prefer a return distribution with lower Kurtosis and higher skewness, since it offers the

possibility of a majority of returns being above mean, with a lower probability of high negative returns.

Standard Deviation of Returns

The Standard Deviation of returns indicates the degree of volatility in the markets. According to the Mean-Variance framework, a higher mean return is desirable, while a higher standard deviation is undesirable. Higher variability of returns leads to a greater degree of uncertainty with regard to the potential payoff from an investment. For the same level of return, a higher level of standard deviation is undesirable since the range of outcomes for returns below the mean as well as above the mean are much higher. Since risk-averse investors due to behavioural biases such as loss aversion tend to focus more on returns below mean, a higher standard deviation is considered undesirable.

$$\text{Standard Deviation} = \frac{\sqrt{\sum(X_i - \bar{X})^2}}{N}$$

Summers and Poterba (1984) studied the impact of volatility on stock market prices. It was found that changes in volatility lead to changes in short term expected rate of return. While mean reversion ensures stability in volatility, the short term effects of changes in volatility can impact portfolio returns. The work of Schwert (1989) showed that large changes in the ex-ante volatility of market returns have important negative effects on risk-averse investors.

Sharpe Ratio

The Sharpe Ratio is defined as,

$$\text{Sharpe Ratio} = \frac{\text{Return on Market} - \text{Risk Free Return}}{\text{Standard Deviation of Return}}$$

Sharpe Ratio is a useful tool, to measure the rate of return, in relation to the risk borne by an investor. Since risk minimization and return maximization is the primary goal in ensuring sustainable returns,

the Sharpe Ratio serves as a useful metric. The Sharpe Ratio denotes the incremental return for each additional unit of risk. Sharpe (1966), described it as the reward-to-variability ratio for mutual fund performance.

Drawdowns

The market price of any asset or security seldom moves in a linear trend. Although at any given point in time equities can be under an up-trend, down-trend or sideways trend. However, each trend consists of a counter-trend move as well. That is every bull (bear) market consists of several minor down (up) trends. These counter-trend moves are quite important to understand since these could also lead to a trend reversal. In the current context, drawdowns are defined as a monthly return in excess of 2 standard deviations away from the mean return.

Using monthly price data (closing basis) on Nifty-50, the following results were obtained.

Table 3: Statistical Measures for Nifty-50 under Each Market Phase

Although each market phase is characterised by different values for the metrics involved, the magnitude and direction of the measures exhibit a high degree of commonalities across bull and bear market cycles.

Phase	Duration (In months)	Standard Deviation	Skewness	Kurtosis	Draw-downs
1	37	26.17 percent	0.30	2.16	0
2	16	22.93 percent	-0.75	2.35	1
3	37	22.19 percent	-0.07	2.35	1
4	56	23.00 percent	-0.70	4.41	2
5	16	37.68 percent	-0.40	2.75	1
6	21	27.66 percent	1.42	6.23	0
7	109	15.29 percent	0.05	3.00	3
8	40*	69.55 percent	-0.95	2.48	2

Note: *-duration in days

MEASURING RISK

The concept of 'risk' in equity markets is broad in its scope. Risk implies the excess of possibilities over the outcome. An average investor is risk-averse i.e., given a choice between a risk-free asset and a risky asset offering the same payoff, the uncertainty associated with the risky asset forces investors to choose the risk-free asset. Equity as a financial instrument is ranked last in the financial seniority hierarchy. Individual investors are heterogeneous with respect to their levels of risk tolerance. The work of Bakshi and Chen (1994) concluded that if the life cycle risk aversion hypothesis were to hold, risk aversion and age would be positively correlated. Intuitively the logic behind the argument is based on the fact that as one grows older (and approaches retirement) the remaining number of paychecks reduces, forcing investors to be cautious with their investment decisions.

However, such discussions based on the set of outcomes and seniority are abstract. It simply states that equities are inherently riskier than other asset classes, but sound investment strategies require risk to be quantified. The disagreement, in both theoretical and practical terms, remains on how to measure the risk in an investment, and how to convert the risk measure into an expected return that compensates for risk³.

Conventional View on Risk

Modern Portfolio Theory (MPT) for instance considers the standard deviation of returns as a proxy for risk. The Capital Asset Pricing Model (CAPM) breaks down risk into 2 components, systematic (market-wide) and unsystematic risk (company-specific risk). The CAPM postulates that by holding a well-diversified 'market' portfolio company-specific risks can be eliminated. The CAPM uses the Beta as a measure of systematic risk.

³ Damodaran, A. (1999) Estimating Equity Risk Premiums. Accessed at <http://people.stern.nyu.edu/adamodar/pdfiles/papers/riskprem.pdf>

The expected rate of return hence depends on the level of systematic risk borne by the investor.

$$\beta = \frac{\text{Covariance } (R_m, R_s)}{\text{Variance } (R_m)}$$

Where R_m = Return on Market Portfolio

R_s = Return on Stock S

The Arbitrage Pricing Theory (APT) considers the sensitivity of the asset price to macro-economic factors as a measure of risk (Damodaran, 2007). Statistical measures such as Downside Semi Variance focus on rates of return below mean value as 'risky' outcomes (Saraf and Kayal, 2022).

Although these alternatives aid in quantifying risk, these measures give a backdated value of risk i.e., the historical return distribution is considered. But investors buy equities in the present to make gains in the future. Therefore, it is pertinent to note that to determine the future risk the past return distribution is considered. For such methods to yield optimal results, one has to assume that the return distribution in the future remains the same, which is a very strong assumption to make. The other issue with these measures is that they are 'price'-based measures and do not consider variability or changes in cash flows as a measure of risk. Given the advent of the internet, price fluctuations on major equity indices have increased over the years (Chaudhuri and Kayal, 2021). In the short run, the price of a stock is increasingly influenced by investor mood and perception and hence the price may not necessarily reflect 'risk' in a company. In reality, the risk stems from the cash flows of the company. Hence the true measure of risk requires an evaluation of the cash flows accruing to the company, and investors need to consider the product offering of the firm (necessity vs luxury), the proportion of fixed costs in total cost structure and the debt to equity ratio in evaluating risk.

Typically, firms with a higher level of leverage as measured by the Debt to Equity (D/E) ratio always carry a higher risk since the implied costs of bankruptcy are higher. Moreover, interest payment on debt represents a fixed cost that has to be paid irrespective of profitability. Firm-specific characteristics such as the nature of product offering (luxury vs necessity) and the nature of the cost structure facing the firm are some other determinants of risk.

The cash flows accruing to equity holders are risky due to the construct of equities as an asset class. The Capital Market Line (CML) graphically represents the optimal portfolios of risk-free and risky assets. The slope of the CML gives the risk-reward trade-off. Rational investors would ideally want a higher rate of return for every incremental unit of risk. Special emphasis is placed here on the slope of the CML. As the slope rises, the reward over-powers the risk and leads to far superior returns. The Equity Risk Premium (ERP) formalizes this concept.

Understanding Investor Psychology Using Equity Risk Premium

Given the ranking of equity in the financial seniority hierarchy, investors require a spread over and above the risk-free rate as an incentive to hold equity investments. This price of risk or the spread above the risk-free rate is given by the Equity Risk Premium (ERP). The ERP is viewed as the price or reward for risk-taking, and the returns on any risky asset can be expressed in terms of a spread over the risk-free rate of return. Ideally, this 'premium' for risk should reflect market sentiments and investor perception regarding corporate profitability. When the ERP is high (low), the incremental return for every additional unit of risk is higher (lower). This is reflected through the slope of the capital market line. Implicitly the ERP influences the following;

Firstly, the ERP influences asset allocation decisions, projections of wealth and the cost of capital, but there is no simple model that explains the premium (Siegel, 2005). When investors are increasingly risk-tolerant (due to an ongoing bull market), a larger part of the

investment portfolio gets allocated to risky assets, and the subsequent bear market can potentially erode a large part of the invested capital. Secondly, ERP influences investors seeking to time entry and exit into equities. Market timing involves buying equities when an investor perceives the market price to be too low and exiting equities when the market prices are too high. Such investors assume a lower compensation for risk-taking while exiting and hence reduce exposure in equities, and subsequently re-enter equities when the risk premiums are high enough to justify the risks involved. Finally, the ERP influences the cost of capital and allocation of capital among firms in the financial markets. During Bull (Bear) Markets, as risk premiums shrink, the cost of capital reduces (increases). Firms capitalise on such reductions in the cost of capital by timing their Initial Public Offering (IPO) and other fundraising programmes during Bull markets.

Calculating Equity Risk Premium

The Historical Premium Approach

The calculation of the historical premium involves the following steps

1. A time period for estimating the ERP is defined (last 10 years, 15 years or even 50 years)
2. The average return on a stock index is calculated for the time period
3. The average return on a risk-free investment is calculated for the period
4. The ERP is then computed by deducting the average returns on a risk-free investment from the returns on the stock index.

Although the intuition and logic behind the historical premium are straightforward, there remain ambiguities in every step of the process. Firstly, the time period chosen can significantly alter the average returns earned on risk-free assets and equity, given the fact that equity returns over a short interval of time can deviate by a large margin from the long-term average. The choice between a simple and compounded average of return yields multiple values for the risk premium. Given these

shortcomings, using the historical return approach leads to multiple values for the risk premium and the uniqueness of the measure cannot be established. Further, this method implicitly assumes that the distribution of results in the future is a mere extrapolation of the return distribution in the past, which could lead to inconsistent results. Additionally, relying on the historical approach assumes that investors' perception towards risk remains unchanged across time, i.e. the risk aversion may change year to year, but it reverts to historical averages. Mehra and Prescott (1985), argued that the historical premium of 6 percent in the United States was too high and only a high degree of risk aversion could justify a high premium. A similar argument was presented by Robert and Peter (2002) stating that a mere extrapolation of the past spreads between equity and risk-free returns in the United States overstated the risk premium, given the fact that the United States was one of the most successful economies in the 19th Century. Calculating the ERP using the historical approach is not feasible for most Emerging Markets owing to the limitations in the availability of historical data on equity indices. Hence a reliable measure of the Equity Risk Premium requires a methodology that yields a unique and forward-looking measure of risk.

Survey Method

Another popular method to compute the ERP is the Survey Method, where fund managers and financial professionals state their acceptable levels of ERP. However, such a method suffers from the collective bias of the respondents, and given biases like Anchoring Bias (fund managers may be too fixated on the near term departure from fundamental value) and Recency Bias (fund manager's estimate for the risk premium may be biased by the recent state of the markets), such survey-based estimates may not yield accurate results for the Equity Risk Premium (Damodaran, 2008). Fernandez *et. al.* (2020), regularly estimate such a survey-based measure of equity risk premiums each year. The credibility of such-survey based numbers is further questionable given the fact that most

investors sell at the bottom and buy at the top when the mood is euphoric.

Forward-Looking Premiums

Given the drawbacks of the survey and historical premium approach, there is a need to compute risk premiums that are dynamic (since the market price of traded stocks changes on a real-time basis) and leave no room for ambiguity concerning the inputs used in the calculation. Efforts have been made by academicians as well as practitioners to quantify risk using a forward-looking and dynamic measure. Most notably, the methodology used by Damodaran (1997)⁴ has gained popularity. This method of calculating the risk premium begins with calculating the risk premium of a mature market (countries with AAA or the highest credit rating) and scaling up the mature market premium based on volatility to arrive at a risk premium for emerging markets. The mature market premium is calculated by expressing the current value of an equity index such as the S and P 500 in terms of the present value of dividends and buybacks.

Implied Equity Risk Premium

$$= \frac{D_1}{(1+r)} + \frac{D_2}{(1+r)^2} + \dots + \frac{D_{n-1}}{(1+r)^{n-1}} + \frac{D_n/(r-g)}{(1+r)^n}$$

Where, D_i = Dividend and Buybacks at time period i g = Perpetual Growth Rate of Dividends, r = Risk Premium

Given the current value of an equity index and the dividend yield, investors can solve for the risk premium on the basis of expectations regarding future level of dividend and buybacks.

Emerging Market Risk Premium is given by,

$$\text{Mature Market Premium} * \frac{\text{Standard Deviation}_{\text{Equity Index}}}{\text{Standard Deviation}_{10 \text{ Year Government Bond}}}$$

⁴ Damodaran, A. (1999) Estimating Equity Risk Premiums. Accessed at <http://people.stern.nyu.edu/adamodar/pdfiles/papers/riskprem.pdf>

Using Volatility to Map Investor Behaviour

Taking a cue from the above discussion, the standard deviation of an equity index relative to the standard deviation of the 10-year government bond can yield useful information to investors. Economic theory dictates that major changes in the bond yield arise out of structural changes in economic growth. Hence, major changes in bond yields have to be viewed as an adjustment to the 'new-normal'. Such changes could stem from the Central Bank's efforts to stimulate the economy in case of low growth or monetary tightening owing to higher inflation. Seldom has bond yields remained low while economic growth remained on a strong footing. The work of Rudebusch *et. al.* (2006) explored this conundrum. Typically a low Price to Earning (P/E) ratio implies subdued investor sentiment. Ideally, buying the equity index when the P/E ratio is below the long-term average yields superior returns. However, for superior market timing confirmation signal can be obtained from the behaviour of bond yields. Investors can go long on equities when bond yields are highly volatile alongside low a P/E ratio for the Nifty-50.

Table 4: Nifty-50 Volatility Relative to 10-year Bond

Periods of low relative volatility in Nifty-50 is followed by a significant pick up in volatility for Nifty-50 relative to the 10-year bond yield. Investors can improve their market timing skill by using such a metric.

Year Ending March 31st	Standard Deviation Nifty- 50 (in percent)	Standard Deviation 10-Year Bond Yield (in percent)	Relative Variation
2001	28.30	9.94	2.84
2002	27.07	13.91	1.94
2003	16.60	18.44	0.90
2004	22.72	8.02	2.83
2005	20.87	17.93	1.16
2006	17.10	9.89	1.72
2007	23.97	11.54	2.07
2008	29.27	7.51	3.89
2009	38.81	28.72	1.35
2010	27.69	14.43	1.91
2011	18.23	10.28	1.77
2012	20.94	9.54	2.19
2013	13.84	6.31	2.10
2014	15.01	16.81	0.89
2015	14.97	6.76	2.21
2016	17.66	6.16	2.86
2017	12.23	10.73	1.13
2018	10.13	8.57	1.18
2019	12.70	8.96	1.41
2020	20.76	11.52	1.80

USING THE RoCE AS A SELECTION CRITERIA

Conventional methods of valuation such as Discounted Cash Flow (DCF) model, the Dividend Discount Model and the Net Present Value state that the value of a firm is the discounted present value of the future cash flows. To obtain the cash flows, firms use capital as a raw material. However, it is pertinent to note that capital is not costless, to create value for stakeholders the value of cash flows should exceed the costs involved in raising capital (Damodaran, 2007). The Return on Capital Employed (RoCE) indicates the efficiency with which the capital employed is translated into profitability.

$$\text{RoCE} = \frac{\text{Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA)}}{\text{Capital Employed (Total Assets – Current Liabilities)}}$$

Value creation requires the RoCE to exceed the Cost of Capital (CoC). Conventionally, firms use a mixture of debt and equity to raise capital, and hence the Cost of Capital is academically stated as the Weighted Average Cost of Capital (WACC). To create value, the RoCE should exceed the CoC, and this gap between the RoCE and CoC is the free cash flow available to the shareholders. The Economic Value Added (EVA) as an indicator determines the value created by the management for the shareholders⁵. EVA was calculated by deducting the CoC from the operating profits of the company. There is an increasing amount of conflict with regards to the efficacy of EVA in determining shareholder returns. While Tully (1993)⁶ highlighted how firms such as Quaker, Briggs and Stratton, CSX used the concept of EVA to enhance capital efficiency and create sustainable value for shareholders. Ferguson *et. al.* (2005) concluded that there was insufficient evidence to show that less

⁵Stern Stewart, a popular American Consulting firm came up with the concept of Economic Value Added (EVA) in 1983 to determine the 'value' added by the management for shareholders of a firm.

⁶Tully, S (1993) The Real Key To Creating Wealth. Accessed at https://archive.fortune.com/magazines/fortune/fortune_archive/1993/09/20/78346/index.htm

profitable firms adopted EVA or EVA adoption led to superior stock performance. Kyriazis and Anastassis (2007) have used the information available in the Greek financial markets to show that EVA metrics add very little information to conventionally used accounting metrics. Hence, the authors concluded that the degree of correlation between EVA and shareholder return is not significantly different from the correlation observed with conventional accounting metrics. Drucker (1995)⁷ suggested the importance of looking beyond conventional accounting measures and stressed the importance of considering firms as a going concern, with the primary objective of creating wealth. The work of Shrieves and Wachowicz (2001) showed that in spite of the differences in the computational methodology, the Free Cash Flow (FCF), Net Present Value (NPV) and Economic Value Added (EVA) yield the same results. Therefore, to ensure sustainable value creation, firms need to be profitable through superior capital efficiency.

In spite of the debate surrounding the importance of EVA Vis a Vis accounting profits, understanding the gap between RoCE and CoC sheds important insights into competitive advantages possessed by a firm.

RoCE And CoC Differential in Competitive Markets

The sustenance of the gap between RoCE and CoC is critical in creating shareholder value. This difference constitutes the free cash flow to the shareholders or 'supernormal' profits in economic parlance. The existence of such a gap attracts competition in a particular industry since newer firms desire to capture a part of this 'supernormal' profit and hence, as per the underlying economic theory of Perfect Competition one would expect the gap to close down. In the long run, firms would earn a Return on Capital Employed equal to the cost of capital, without any scope to earn 'abnormal' profits. Extending this argument further, one would

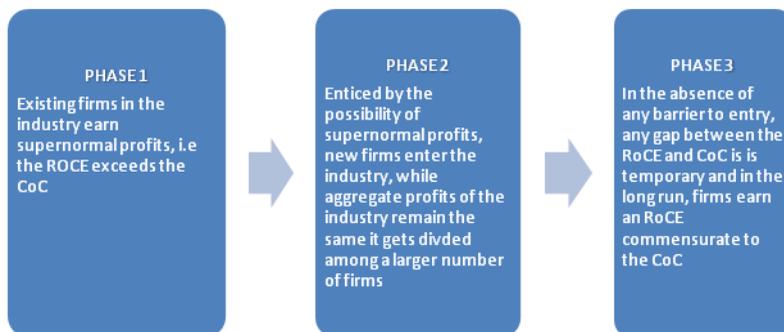
⁷ Drucker, P.F. (1995) The Information Executives Truly Need. Accessed at <https://hbr.org/1995/01/the-information-executives-truly-need>

expect the market leader in any given sector to earn a RoCE that equals the CoC.

Given the economic forces of perfect competition, sustained shareholder value creation seems a highly unlikely proposition. In an ideal world, the following sequence of events can be expected, when existing firms in a particular industry earn supernormal profits.

Figure 1: Returns to Capital in Perfectly Competitive Markets

In the context of Perfectly Competitive markets, where the existence of entry and exit barriers is not present, sustained value creation is an impossible task.



Capital Intensity and Stock Returns

Businesses relying more on physical capital run the risk of replication and hence exhibit a higher degree of capital intensity which depresses long term stock returns (Elmasr, 2007). Companies or Industries relying predominantly on physical capital are characterised by the inability to offer differentiated products to the end consumer. Industries such as Tele-Communication, Aviation and Metals have generated sub-par returns on a longer time frame primarily due to this reason and such industries tend to exhibit a high degree of cyclicity in terms of RoCE as well as stock price returns. The commoditised nature of the end product results in excessive competition since consumers ultimately prefer the lowest cost provider. In an emerging market context, while tele-communication

and airlines have witnessed a significant increase in penetration and usage levels, it has failed to translate into shareholder value creation.

Typically in commoditised industries (where product offering by every company is similar), incumbent players earn a superior RoCE when the collective industry capacity declines due to regulatory reasons or bankruptcy. When an existing player exits the industry due to insolvency or regulatory concerns, it induces a temporary supply-side shock. Assuming stable demand for the end product, this results in increased prices (and hence profit margins) realised by the existing companies. Since such industries are characterised by a higher proportion of fixed costs, the benefits of operating leverage are reaped by the firms. Monitoring the supply side in a commoditised industry determines profitability from an equity holder point of view. Hence the profit margins and RoCE are important metrics to time entry and exit into commoditised industries.

The following graphs highlight important aspects of the sugar industry, and the results can be extrapolated to other commoditised industries where the end product is sold by a large number of sellers and establishing product differentiation is not possible. In the current example of the Sugar industry, during FY 14, FY 15 and FY 16 the companies in the sector struggled to maintain a RoCE above CoC. Hence this acted as a deterrent for newer companies to enter the industry. In 2014-17 Brazil, a leading sugar producer witnessed a severe drought. With a major part of the sugar supply being cut off from the global markets, it resulted in a supply-demand mismatch which eventually led to higher sugar prices globally without altering the production costs for firms. Indian sugar manufacturers reaped the benefits of a glut in sugar supply in the global markets, resulting in superior RoCE and Profit Margins.

Figure 2: Revenues of Select Sugar Companies

The revenue trajectory of the companies is fairly stable, indicating a stable demand for the end product.

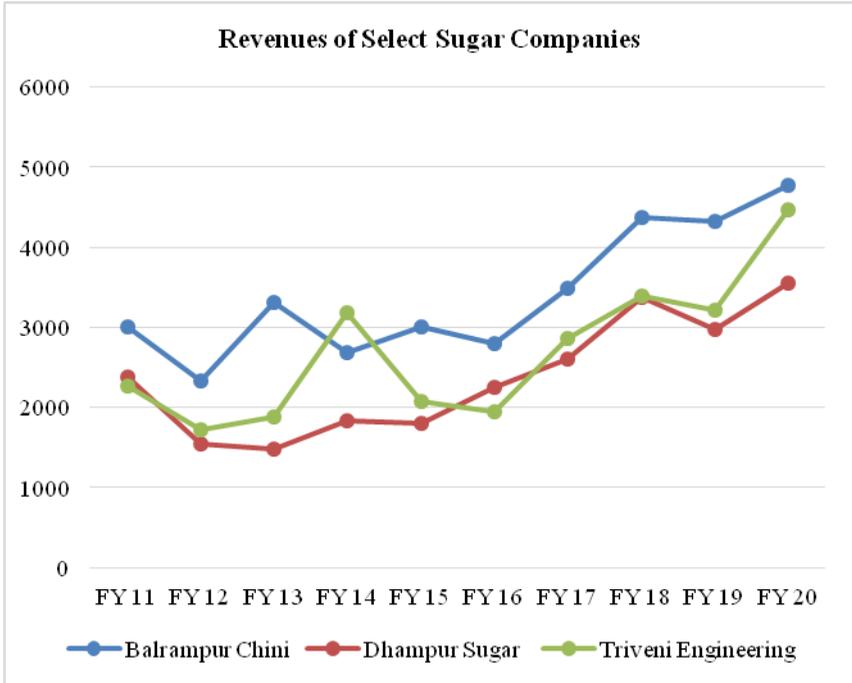


Figure 3: PBT Margins of Select Sugar Companies

Although the revenue trajectory was largely stable, the PBT Margins show a great deal of fluctuation based on the underlying supply-demand situation for the commodity.

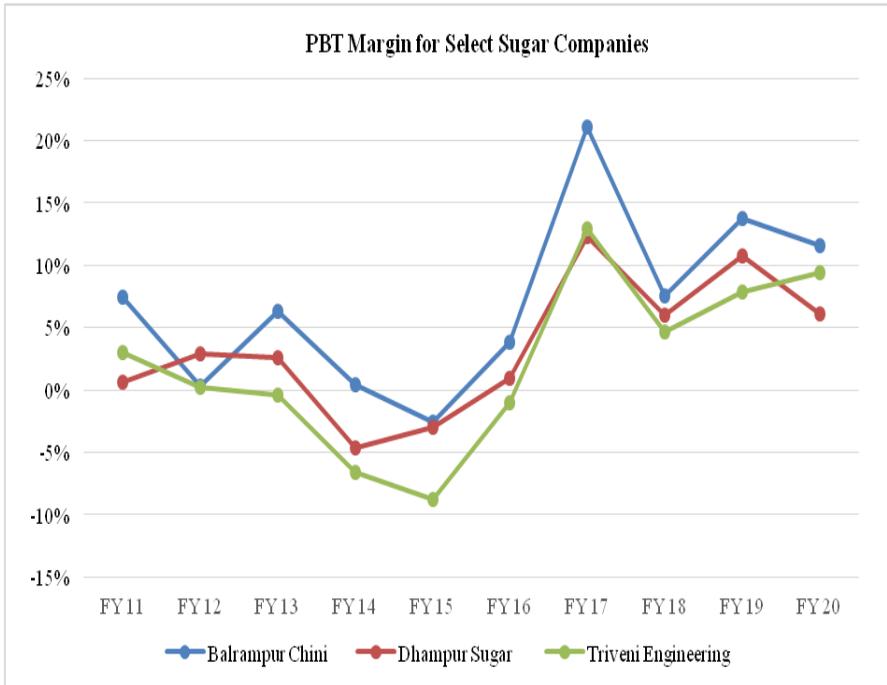


Figure 4: EBITDA Margin for Select Sugar Companies

Although each company is exposed to the same dynamics of the sugar industry, individual firm-level characteristics result in differences with respect to the EBITDA margin, highlighting a certain degree of heterogeneity within the same industry.

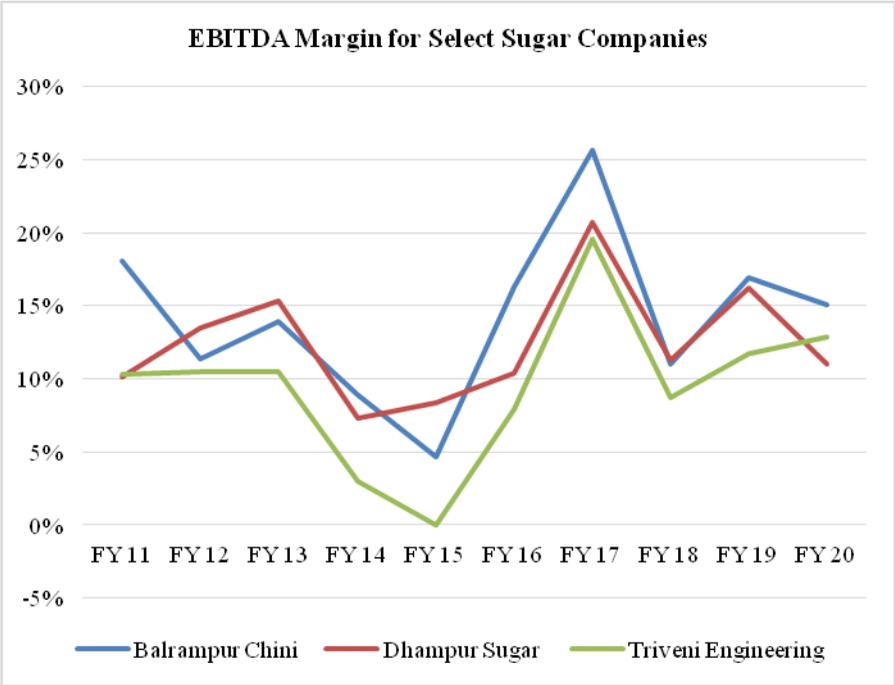
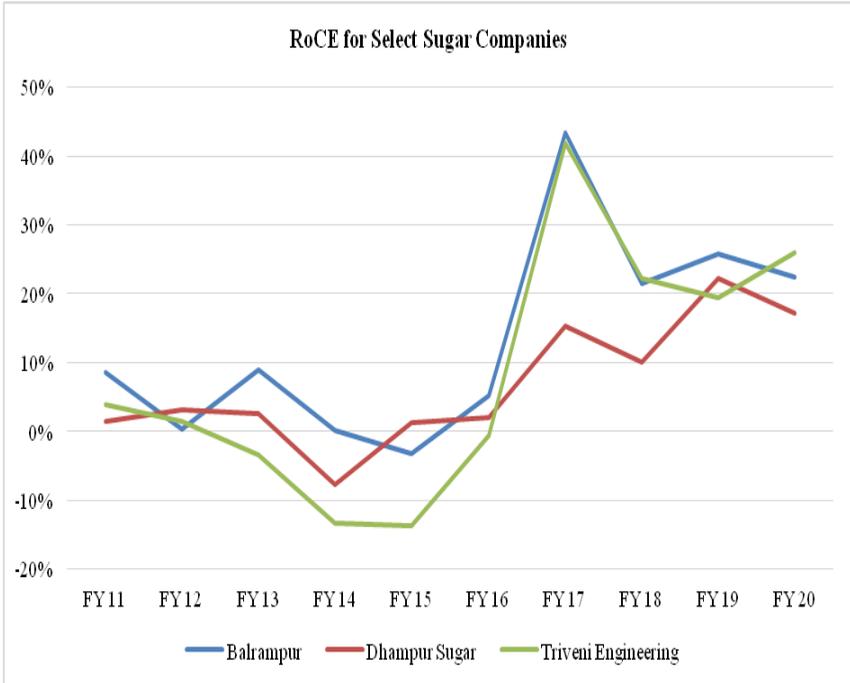


Figure 5: RoCE for Select Sugar Companies

Given the cyclicity in underlying sugar prices, the companies undergo cycles in capital efficiency. For the most part, RoCE is well below CoC.



Although the degree of variation in the top line of the firms is low, the profitability (as measured by the EBITDA and PBT) fluctuates significantly based on the supply-demand dynamics of the global sugar market. The high degree of cyclicity exhibited in the profitability leads to a cyclicity in the RoCE as well.

Since the profitability and profitability margins depict regular recurring patterns whereby long periods of RoCE below CoC is followed by a sharp increase in RoCE above CoC, and long periods of losses are followed by sharp increases in profitability, investors can accordingly time their entry and exit into such stocks.

Product Differentiation and Intellectual Capital

On the other end of the spectrum, firms that rely more on intellectual capital (using Research and Development, patents or processes) tend to be capital efficient and hence offer the prospect of superior returns. The emphasis on building intellectual capability creates an implicit entry barrier thereby enabling the firm to earn RoCE consistently above the CoC. The entry barrier could be in the form of superior brand, logistics management, cost efficiency or systems and processes. Thiel (2014)⁸ contrasts the value creation abilities of US Airline companies and Google, a technology-driven company. Given the nature of the Airline business, companies retain a very minuscule portion of revenue as profits, whereas Google backed by its proprietary technology is successful in retaining a large portion of revenues as profits. Therefore for a market leader to create value for shareholders, building intangible barriers to entry is crucial. Kay (1993)⁹ uses an IBAS (Innovation, Brands, Architecture and Strategic Assets) framework to differentiate firms based on competitive advantages. The relative resilience of investment in intangible assets are cyclically less sensitive than investment in physical assets and hence benefit more from government actions in the early stages of a crisis (Pedro *et. al.*, 2018). The 2006 Organisation for Economic Co-operation and Development (OECD) report acknowledges the benefits of intellectual property in enabling shareholders to earn a higher return on their investments. Bismuth and Tojo (2008) further explored the policy challenges facing OECD countries to harness the benefits of intellectual assets in aiding economic growth. Given the nature of intangible assets, their corresponding valuation is a challenging task, and unlike physical assets, these are not prone to replication.

⁸ Thiel, P (2014). Competition is for losers. Accessed at <https://www.wsj.com/articles/peter-thiel-competition-is-for-losers-1410535536>

⁹ Kay, J. (1993). The Structure of Strategy. Retrieved from <https://www.johnkay.com/1993/06/01/the-structure-of-strategy-business-strategy-review-1993/>

To grow organically, firms re-invest a part of their profits and increase the capital employed. However, a mere increase in the scale of operation does not lead to share-holder value, since the return on incremental capital must exceed the cost of capital. The telecom industry in India has witnessed a surge in the number of users over the last two decades. Telecom companies have re-invested large sums of capital to support a large and growing user base. But given the commoditised nature of the business, the growth in the sector has not translated to shareholder value.

Figure 6: RoCE and Re-Investment Rate for Bharti Airtel

Even though the number of mobile network users has grown manifold from FY 03 to FY 20, the growth has created no meaningful value to shareholders. In an emerging market like India, where inflation itself averages around 5-6 percent, the company has failed to post RoCE in excess of 15 percent.

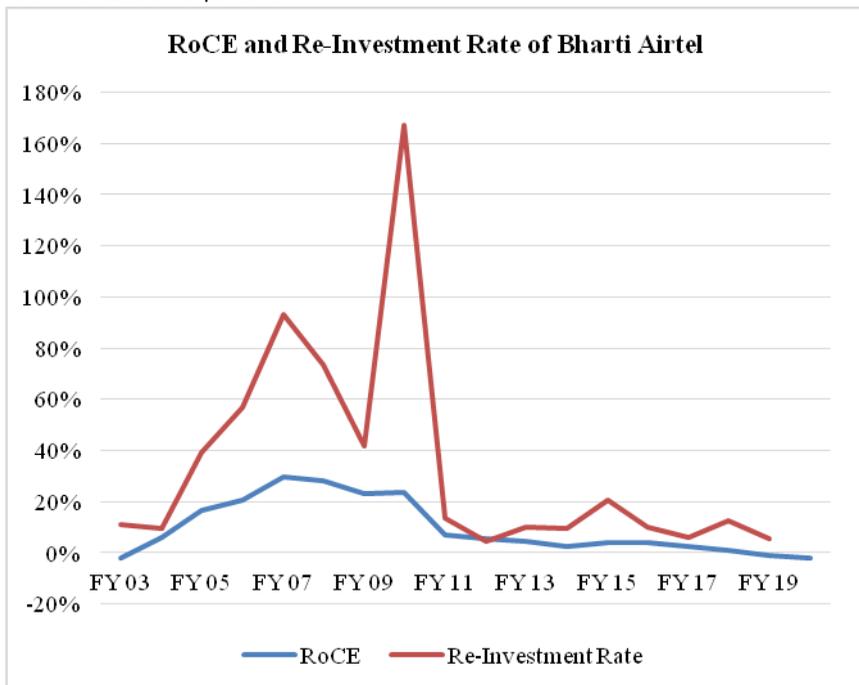


Figure 7: RoCE and Re-Investment Rate of Pidilite Industries

By focusing on brand-building, Pidilite Industries has been able to generate returns on re-invested capital significantly higher than the cost of the capital.

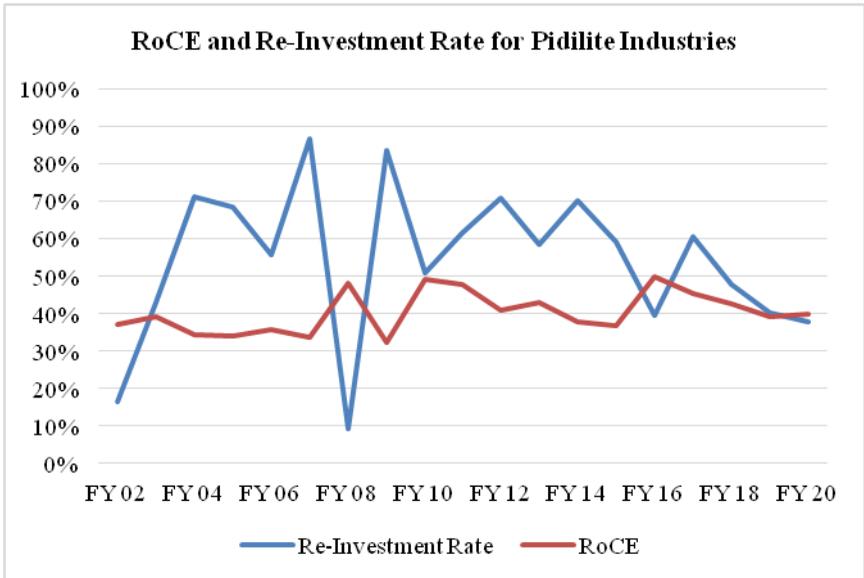
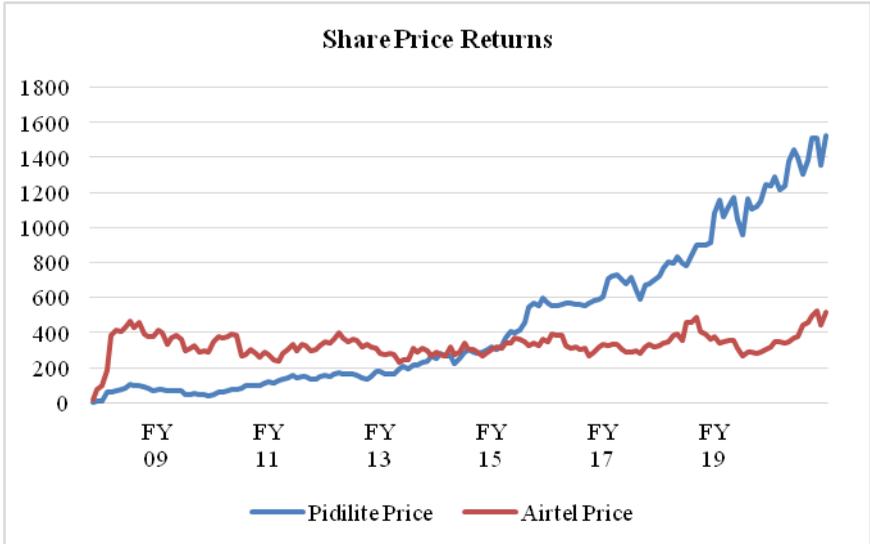


Figure 8: Share Price Returns for Pidilite Industries and Bharti Airtel Limited

The differences in the value creation ability of both firms are highly evident in terms of the share price movement.



Capital Allocation and Management Quality

To grow earnings organically, the re-investment rate (proportion of net profits re-invested) and the return on the incremental capital are important. The Re-investment rate is a function of the industry in which the firm operates, as well as the firm’s projection regarding the size of the industry in the future. It is not uncommon to find companies that sustain a large gap between RoCE and CoC, but find it difficult to re-deploy the surplus cash to grow the business organically. In such cases, firms could either return the surplus to shareholders by way of dividends or buybacks, or companies can use the surplus cash to undertake merger and acquisition deals. After 2005, several dominant Indian companies have deployed surplus capital towards international expansion/

acquisitions (Marcellus Investment Managers, 2020¹⁰). On the other end of the spectrum, firms operating in highly commoditised industries like airlines, telecommunications, and metals have re-invested a large part of the profits to enhance the capital base of the company, but the competitive landscape of the industry resulted in minuscule value creation for shareholders. While, incurring capital expenditures is crucial in running the core operations revenues and profits are never guaranteed. Historically, such capital intensive businesses tend to re-invest when the underlying commodity prices have peaked. Given the nature of the business, there is a large time lag between the announcement of the capital expenditure (CAPEX) programme and the eventual completion of the project, and hence by the time the capacity augmentation is completed, the commodity price correct significantly from the peak. The vulnerability of such large scale CAPEX programmes to be written off completely increases during periods of economic uncertainty. For instance, during the Coronavirus pandemic, large drops in the price of crude oil led resulted in Oil Majors writing off nearly \$80 billion worth of CAPEX, apart from laying off a large portion of their workforce¹¹.

The re-investment of surplus cash flows pertains to the capital allocation decisions undertaken by the firm. The firm should ideally re-invest a large part of their net profits whilst ensuring a gap between RoCE and CoC. Given the differentiated degree of competitive advantages possessed by firms, its implications on stock price returns need to be gauged. Given the possibility of high RoCE firms generating

¹⁰ Marcellus Investment Managers (2020). Why is India Blessed with Consistent Compounders? Accessed at <https://marcellus.in/newsletter/consistent-compounders/why-india-is-blessed-with-consistentcompounders/#:~:text=Marcellus%20Consistent%20Compounders%20Philosophy%20identifies,that%20of%20a%20government%20bond.>

¹¹ Suratman, N (2020) Exxon Mobil to write off as much as \$20 bn in assets; cuts capex. Independent Commodity Intelligence Services. Accessed at <https://www.icis.com/explore/resources/news/2020/12/01/10581278/exxonmobil-to-write-off-as-much-as-20bn-in-assets-cuts-capex>

market-beating returns consistently, the performance of portfolios consisting of such "Quality" firms and Cyclical firms respectively have to be compared across the bull market and bear market cycles.

The quality of management is regarded as an important criterion. Smart and efficient management teams are quick to adapt to changes in consumer preferences and the regulatory environment. Given its qualitative nature and the inability of retail investors to directly interact with the management of a company, the RoCE (along with the Return on Equity) serves as a useful guide to adjudge management quality. As shown earlier, an enduring gap between RoCE and CoC in a competitive landscape is a clear sign of superior processes undertaken by the management.

Investors need to exercise caution, in using the RoCE as a criterion for stock selection. Historically firms have indulged in accounting malpractices and over-estimate the levels of profitability and efficiency. (Schilit, 2018). Inflation of the RoCE would involve capitalizing expenses, and putting them under the balance sheet, instead of showing it as a debit item under the Profit and Loss account, thereby optically increasing the profitability of the company. Similarly, the RoCE of an individual firm needs to be viewed in tandem with the industry in which the firm operates. A wide discrepancy in the RoCE of an individual firm from its competitors (in the absence of any attributable competitive advantage or proprietary know-how) should raise red flags in the reported figures.

PERFORMANCE OF QUALITY VIS A VIS CYCLICAL

Given the differences in the business models of 'Quality' and 'Cyclical' companies, it has to be seen if such differences exist in the return distributions as well. This necessitates an analysis of the stock price returns of Quality and Cyclical stocks across market up-cycles and down-cycles.

Constructing an all-equity portfolio consisting of quality and cyclical stocks (using stocks listed on National Stock Exchange, India) a working definition of quality stocks is required. Loosely speaking quality companies or stocks are characterized by intellectual and intangible assets and unique processes which leads to sustained competitive advantages, and significantly reduces the risk of duplication by competitors. Ambit Capital (2014)¹² classify quality stocks as those having a RoCE over 15 percent and revenue growth over 10 percent, consistently for a period of at least 10 years. The quality of a business in simple terms is the ability of a business to generate superior, consistent, predictable and durable RoCE (Shah 2013).

An 11-stocks cyclical portfolio (consisting of metal, cement and paper companies) and quality portfolio is constructed, to compare and contrast the return profile of the portfolios across market cycles. Using the weekly data on the NSE-500 database, the performance of Cyclical and the Quality stocks are compared. The following results were obtained.

¹² Ambit Capital (2014) The Coffee Can Portfolio. Retrieved April 3, 2021 from http://reports.ambitcapital.com/reports/Ambit_Strategy_Thematic_IndianCoffee_17Nov2014.pdf

Table 5: Return Distribution of Quality Basket

The Quality basket is characterised by significantly low levels of volatility, and hence offers superior returns on a risk-adjusted basis. The portfolio also shows much better resilience during bear markets.

Statistic	2003-08	2008-09	2009-11	2011-20	March 20
CAGR		-	-	14.20 percent	
Std. Dev	30.44 percent	26.26 percent	15.00 percent	12.50 percent	44.39 percent*
Absolute Ret	707.00 percent	-25.40 percent	151.00 percent	380.37 percent	-15.82 percent
Skewness	2.34	-0.38	0.204	-0.12	-1.25
Kurtosis	16.05	3.43	1.56	2.87	3.58
Drawdowns	6	2	3	14	4
Total No Of Weeks	248	65	87	469	38**

Note: *-annualised figure **-total no of days

Table 6: Return distribution of cyclical basket

The cyclical basket tends to outperform the quality basket during bull runs on an absolute return basis, but the returns tend to be highly volatile. The portfolio however leads to major wealth erosion during bear markets, thereby reducing the potential payoffs for retail investors.

Statistic	2003-08	2008-09	2009-10	2011-20	March 20
CAGR	203 percent	-	-	2 percent	-
Std. Dev	74.27 percent	55.63 percent	28.78 percent	22.65 percent	57.53 percent
Absolute Ret	3013 percent	-54.28 percent	120 percent	19 percent	-33 percent
Skewness	6.15	0.24	0.73	0.44	-0.53
Kurtosis	43.74	0.56	3.81	1.43	1.49
Drawdowns	0	2	1	11	1
Total No Of Weeks	248	65	87	469	38**

THE VIEW ON MARKET PRICES

The market price of a stock is a function of investor mood and momentum in the short run and a function of earnings growth in the long run. With the advent of the internet and improved communication services, investors have improved access to security prices on a real-time basis. While the price of an asset is often used as a proxy for the value of an asset, they are governed by entirely different processes. The market price of a security such as is determined collectively by the actions of individual investors. Fundamentally, the value of any stock, in general, is the present value of the future cash flows Kamstra (2018).

Potential Pitfalls in Market Quoted Prices

Conventional economic theory considers human actions to be 'rational', and extending this argument in the context of investing, investors are assumed to completely account for the risk-reward trade-off in deciding the portfolio allocation among equities and risk-free assets. However, as the history of financial markets has shown, a typical investor is unduly influenced by short term fluctuations and a large part of the decisions are likely to be based on rules of thumb (Thaler and Sunstein, 2008). The herd mentality of investors makes investing in equities a risky proposition (Parikh, 2009). The herd mentality and excessive optimism of investors (without considering risks) manifest themselves in the creation and deflation of asset bubbles, such as the Dot Com Bubble, the Sub-Prime crisis of 2008, the debt market crisis in India (calendar year 2018). Kahneman and Tversky (1974) have shown that the human mind is susceptible to behavioural biases of representativeness, availability and anchoring, and hence the collective appraisal of individual market participants may not be accurate. For instance, investors anchor onto the most recent stock price as a reference point for decision making, completely focus on reward (and ignore risk) during bull markets.

The market price of an asset can be decomposed as follows

$$\text{Market Price} = \text{Price to Earnings} \left(\frac{P}{E} \right) \text{Ratio} * \text{Earnings Per Share (EPS)}$$

$$\text{Where EPS} = \frac{\text{Profit attributable to the owners of the company}}{\text{Total Number of Shares Outstanding}}$$

The EPS is a function of the nature of projects undertaken by the firm. The P/E ratio, on the other hand, is influenced by investor expectations and perception regarding growth in the earnings of the company. Although theories such as Efficient Market Hypothesis posit that the stock prices reflect all publicly available information, episodes such as the Dot-Com Bubble, Sub-Prime Crisis, the bear market in March 2020 (Varma *et. al.*, 2021) suggest that efficiency might break down in the short run, and market prices of traded securities are influenced by the ups and downs of human psychology.

A 'Fair' Value for the P/E Ratio

Given the popularity of the P/E ratio as a method to price assets, it is pertinent to determine the appropriate P/E multiple for a given stock. In a relative sense, investors are willing to pay more for a company where the prospects for growth are perceived to be higher, but establishing a consensus value for the P/E multiple is a futile task. However, every major bear market is preceded by a spike in the P/E ratio. As markets overheat, the ensuing correction results in major wealth erosion. Although the market price of a stock is not indicative of value, it nevertheless sheds light on investor expectations regarding the future growth of the company. Since human decision making is susceptible to biases such as Recency bias, market participants collectively tend to extrapolate the present state of affairs into the future, as a result of which stock markets tend to be forward-looking, and market prices may factor in several years' worth of cash flows and profitability well in advance.

For stocks that have a relatively high P/E ratio, market participants implicitly price in a higher growth rate in earnings in the future, thus making the potential returns susceptible to any decline in actual earnings. The tendency to overpay is extremely high in industries that are at a nascent stage, where the potential market size is unknown but perceived to be large. Damodaran and Cornell (2020) referred to this as the concept of Big Market Delusion. The Dot-Com bubble for instance was fuelled by the promise of an 'internet' economy, which led to a collective over-valuation of technology stocks which eventually culminated in major stock market corrections globally. The stock price recovery for companies that survived the crisis to the dot-com peak took several years. Closer home, in India with increased liquidity in the financial markets post demonetization enabled Non-Banking Financial Companies (NBFC's) to raise low-cost liabilities, and hence the sector was collectively over-valued till the debt market crisis in 2018 exposed the inadequate risk controls adopted by certain institutions. Investors need to exercise a great degree of caution while chasing new and emergent sectors, while the internet and technology sector expanded globally, a large majority of the firms went bankrupt, and their shareholders were subject to permanent erosion of capital. In India, while the underlying growth drivers of credit demand remain intact, a large number of banks and NBFC's have either closed down or are grappling with balance sheet issues. Although as the sector continues to grow, the benefits will accrue to only a handful of firms. This problem is further compounded by the fact that there is no consensus value for the P/E multiple, and it is left to the investor to decide if the market's pricing of a stock is rational or not. Although there is no universally accepted 'fair' value for the P/E multiple, investors have to weigh the pricing of a stock with expectations regarding the future earnings growth of the company, along with the intellectual assets possessed by the company, which is reflected by the Economic Value Added (EVA).

Not surprisingly every major bear market is preceded by a subsequent spike in the P/E ratio. Excessive optimism compresses the

risk premiums demanded by investors leading to enhanced asset prices. The excessive optimism not only leads to a complete disregard for risk, but investors end up paying for several years' worth of growth well in advance.

Figure 9: The Historical P/E Ratio for Nifty-50

Each major market correction has been preceded by the P/E Ratio reaching a value well in excess of the long-term historical average.

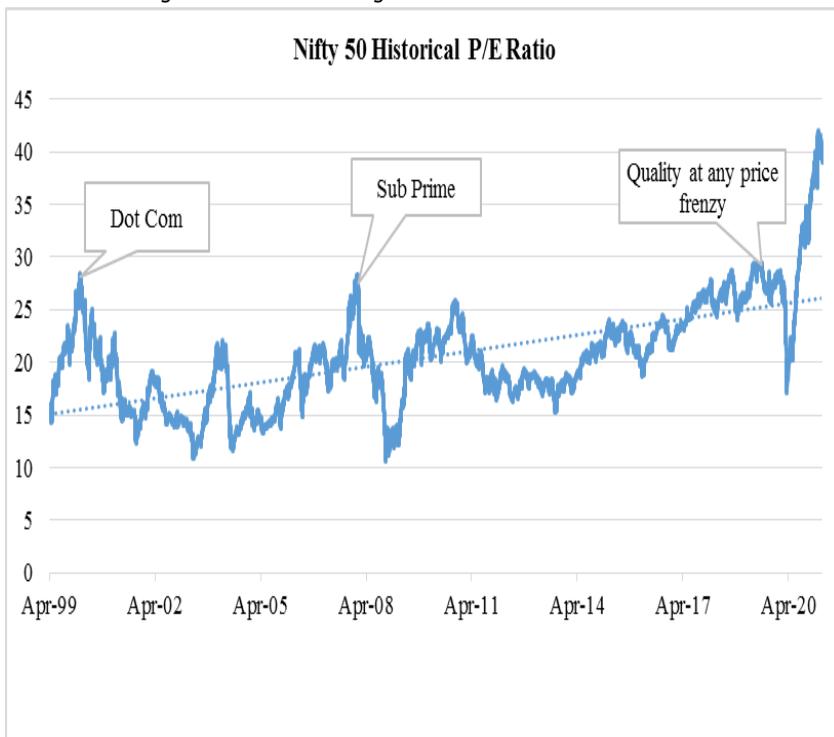
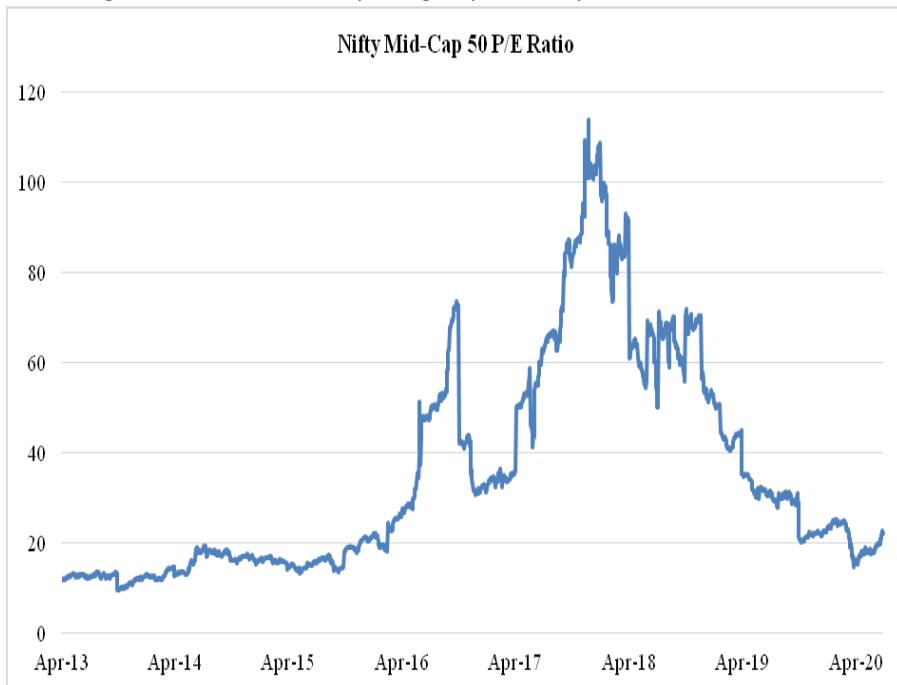


Figure 10: The Historical P/E Ratio for Nifty Midcap-50

After making a peak in the first half of 2018, which was significantly higher than the long term average there has been a corresponding drop from the peak.



The 'Right' Price for a Stock

The price paid for a stock can be judged as the 'right' price only with the benefit of hindsight. Given the competitive landscape in the mutual fund industry, fund managers showcase a tendency to stuff portfolios with stocks that have a positive 'momentum' (S and Kayal, 2022). Even though majority of investors identify themselves as 'long term' investors, significant focus is still placed on short term gains. This results in market participants loading up on recent outperformers causing market prices of such stocks to run well ahead of fundamentals.

Each industry group differs in terms of the nature of demand and competitive advantages possessed by the incumbent firms, the P/E ratio differs significantly across different industry groups. The following graphs indicate the level of heterogeneity across industry groups with respect to the P/E ratio. Given this reality, each sector has to be viewed under a different context. The wide fluctuation in the P/E multiples is a primary factor causing cyclicality in stock prices (even when the business is not necessarily cyclical). The standard deviation in the multiple results in the same business being priced at different levels based on the cycle in investor psychology.

Figure 11: Nifty FMCG Index P/E Ratio from April-11

In the last decade, there has been a structural rise in the P/E multiple of the FMCG index. Owing to the uncertainties posed by the Corona Virus pandemic, the multiples contracted significantly.

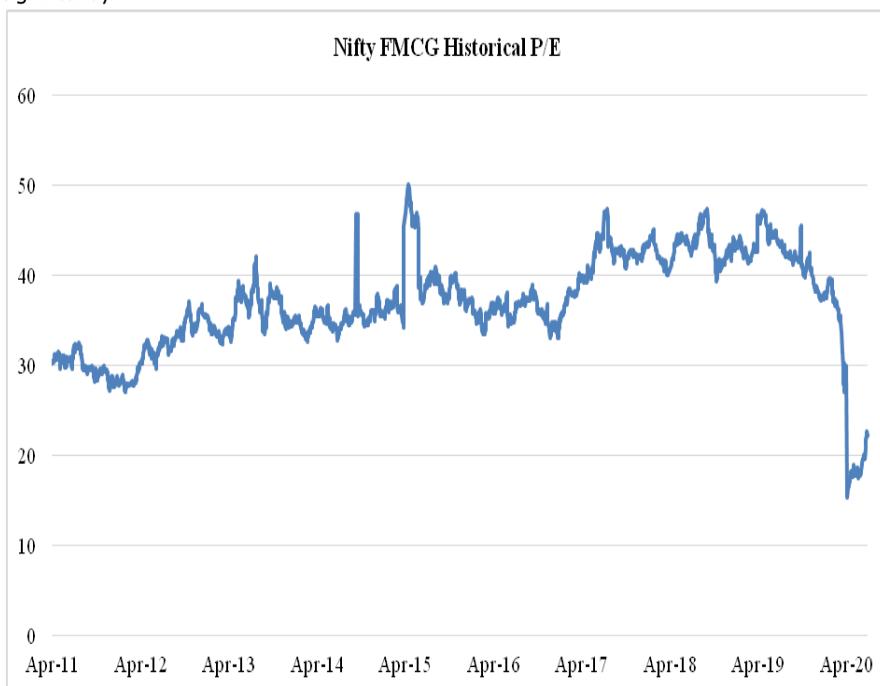


Figure 12: Nifty Pharma Index P/E Ratio from April-11

The P/E multiple of the Pharma index has fluctuated significantly. Given the nature of the business models followed by a majority of the pharma companies in India, the end product is largely commoditised in nature resulting in cyclicality in earnings growth.

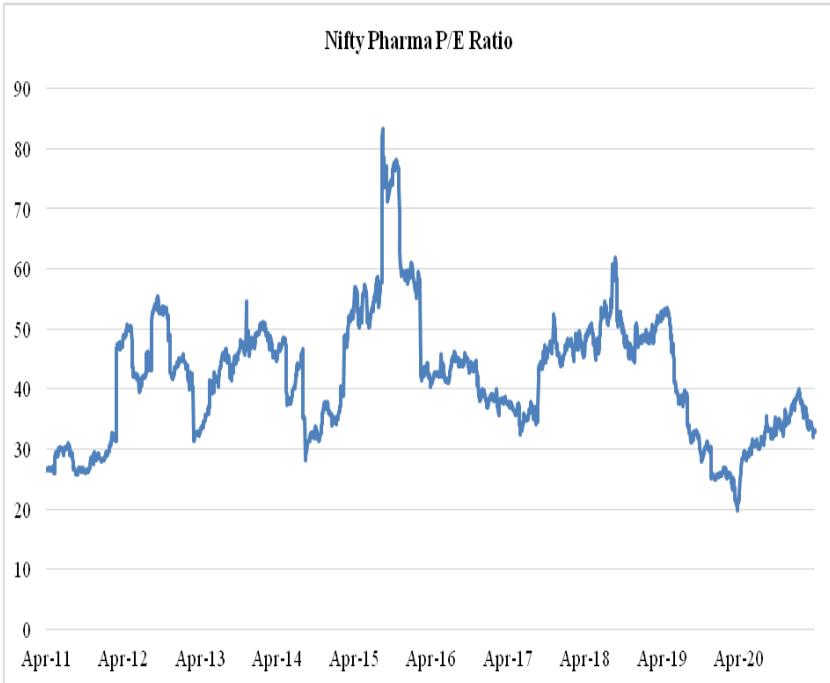


Figure 13: Nifty Bank Index P/E Ratio from April-11

In the last decade, the P/E multiples of the Nifty Bank index have headed northwards, given the demand for credit in India. The increased optimism on the banking industry is reflected in the significant re-rating of the banking stocks in the Nifty-50 index.

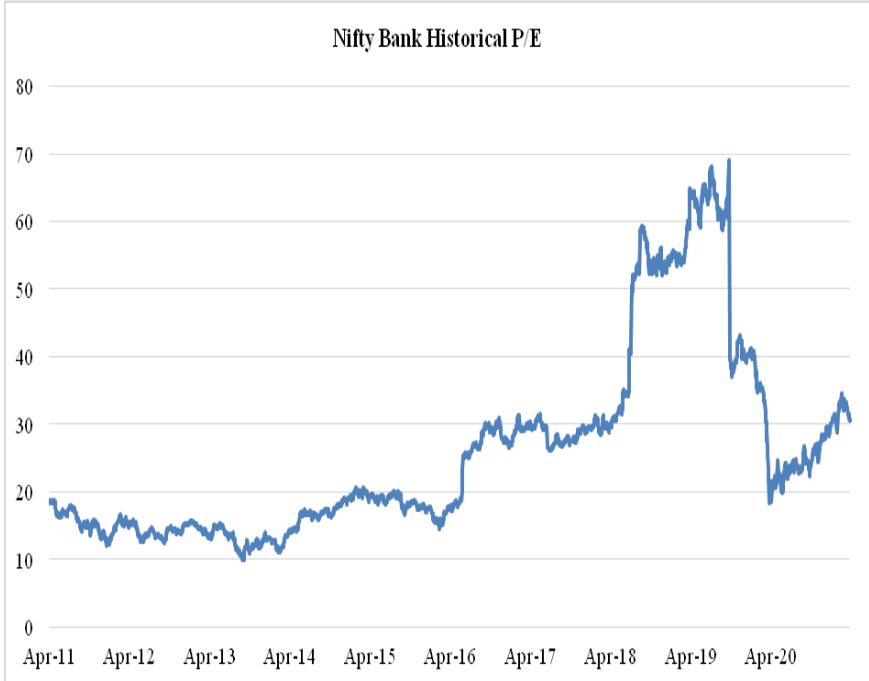


Figure 14: Nifty Metal Index P/E Ratio from April-11

The last decade was marked by low economic growth rates and low inflation, which kept commodity prices under check, and hence apart from a spurt in FY 16-FY 17 the multiples remained benign.

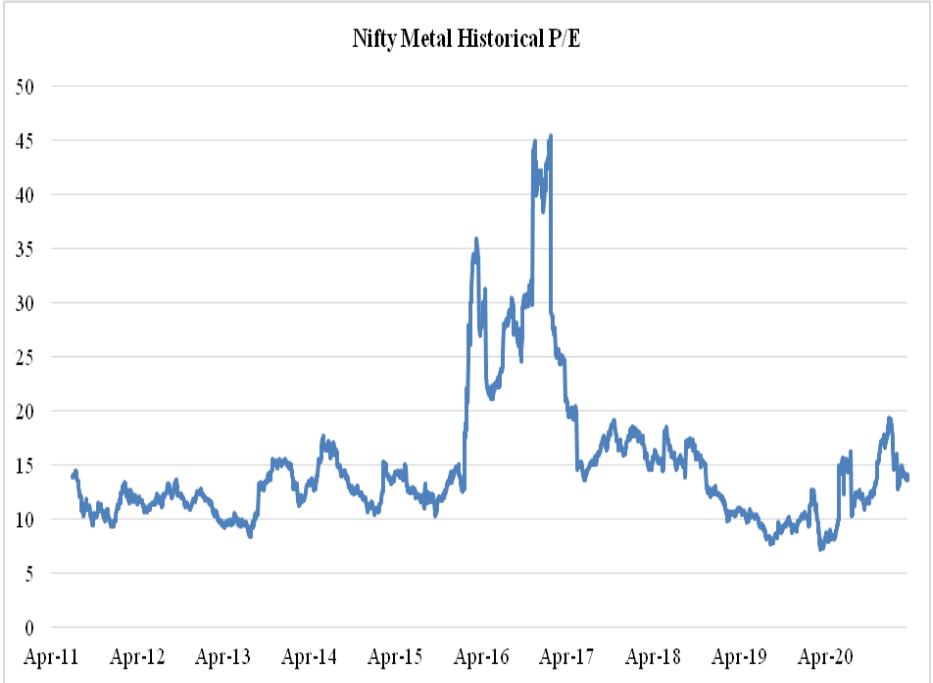


Figure 15: Nifty IT Index P/E Ratio from April-11

The average P/E multiple remained largely close to the historical averages for the Nifty IT Index

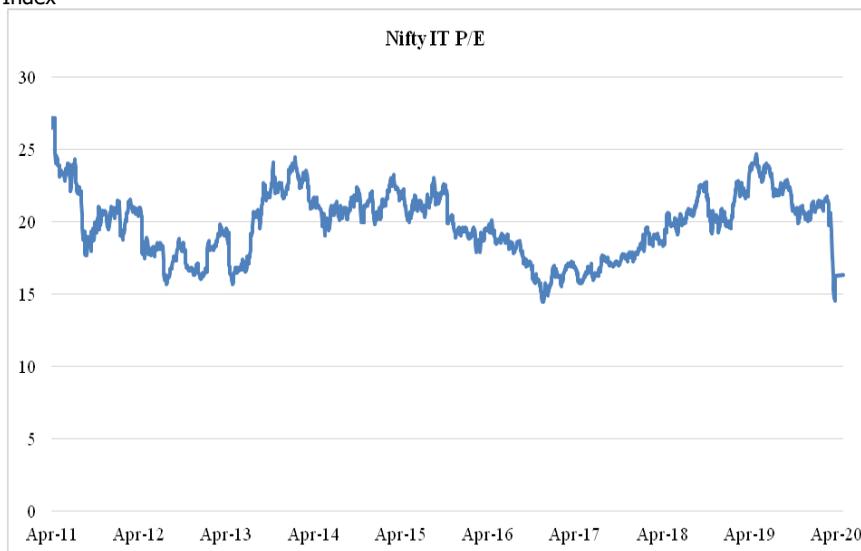


Table 7: P/E multiples and Variation in the Multiple for sectoral Indices

The differences in P/E multiples of sectoral indices, indicates the heterogeneity with respect to the way investors price different sectors.

Index	Average P/E Multiple	Standard Deviation
Nifty-50	23.17	5.04
Nifty Bank	25.85	14.06
Nifty FMCG	36.95	5.58
Nifty Pharma	41.89	10.22
Nifty Metal	14.92	6.47
Nifty IT	19.80	2.27

Note: *-Average P/E Multiple for the Period from April11-April 21

Data Source: NSE

Since the establishment of a consensus P/E multiple is an impossible task given the involvement of investor psychology and heterogeneity across industry groups, it is necessary to invoke the Efficient Market Hypothesis (EMH). The EMH states that stock prices reflect all available information and any discrepancy among price and value is eliminated in the long-run. Using the EMH one can argue that the long-run average P/E multiple across different sectors is the fair value for the P/E multiple. Hence the P/E multiple framework of stock selection involves the calculation of a 5 year and 10-year average P/E multiple for an index or stock and weighing it against the current P/E multiple.

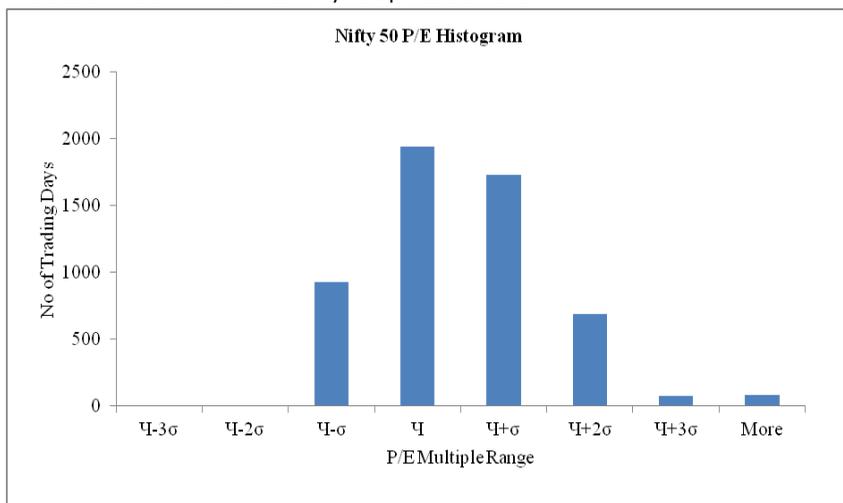
Avoiding the popular stocks when they trade at P/E multiples well over their long term average is crucial in ensuring the protection of capital as well as ensuring reasonable returns in the future. Focusing on earnings growth alone without considering the P/E multiple could lead to sub-optimal returns and hence entry price is an important factor to consider.

USING THE P/E RATIO AS A SIGNAL

The P/E ratio by capturing investors' willingness to pay for a stream of cash flows, provides a means to time entry and exit into equities. The following histogram of the P/E ratio for Nifty 50 indicates the mean-reverting nature of the multiple.

Figure 16: Nifty-50 P/E Histogram from April 1999 to April 2021

Although the graph looks positively skewed, periods of excessively high P/E multiple nevertheless have been followed by sharp contractions.



The histogram indicates that the P/E multiple for the Nifty-50 stays mostly within a distance of one standard deviation (σ) from the long-term mean (μ). As the figures above show, a major spike in the P/E ratio inevitably leads to a contraction in the multiple. The contraction of the P/E multiple from a relative high can be viewed as a return to the mean after a period of an enhanced level of pricing. Similarly, extremely low levels of the P/E multiple indicate a point on the left tail of the distribution which then results in a subsequent expansion of the multiple. When combined with earnings growth a low P/E multiple can significantly enhance the returns earned by an investor.

A similar strategy can be employed to time entry and exit into 'Quality' stocks. Whilst their revenues are less volatile and competitive advantages are well established, the existence of such capital efficiency and predictability of cash flows is well known to every investor. Hence the only way to optimize returns by investing in 'Quality' is by considering market positioning on the stock by using the P/E multiple. In statistical

parlance, this would involve buying Quality when the multiple is on the left tail of the distribution.

An important point regarding the use of P/E multiple needs to be emphasised here. Although the P/E multiple serves as a very useful barometer regarding investor expectations, the range for the multiple can change as interest rates in the economy change. When risk-free rates plummet, it is fair to assume that investors would allocate a larger part of their portfolio towards equity as an asset class. Apart from the change in interest rates, several other factors can impact the average P/E multiple. Macroeconomic variables like inflation, growth rates of the economy have a bearing on the multiple. Over the years equity ownership by retail households has increased in India, this has increased the demand for equities as an asset class which would tend to push the P/E ratios higher. Therefore, in using the average P/E multiple, one needs to consider not just the long-term average but a slightly shorter-term average as well to account for the changing times.

The decade post the GFC resulted in significantly higher liquidity globally, thereby resulting in significantly lower risk-free rates globally as well as in India. With a large part of the developed world facing near-zero interest rates, rational investors moved a larger part of their wealth towards equities. Post the dot-com bubble, the average P/E multiple for the Nifty-50 index stood at 17.29. Post the GFC as liquidity caused interest rates to plummet, the average P/E multiple for Nifty from FY 11 to FY 20 stood at 23.17.

Market Corrections

Typically, a stock or an index can undergo two kinds of corrections viz. Price and Time correction. Whilst price corrections are easy to identify and well understood, time corrections are less talked about and are an outcome of an elevated P/E multiple.

Historically, stocks have shown a tendency to revert to the historical P/E multiple. Figures 9-15 make it amply clear that a P/E multiple well over the long term average leads to an inevitable price-wise market correction.

To understand price-wise corrections better, a simple analysis of the P/E multiple during market peaks and bottoms is undertaken. The average P/E multiple for a five year period preceding the market top and bottom is considered and the gap between the multiple at the peak/bottom and the average multiple is expressed in terms of standard deviation units.

Table 8: Nifty-50 P/E Multiple at Major Market Tops

During periods of market euphoria, the difference in the P/E multiple of Nifty-50 and the long-term average is beyond two standard deviations from the mean. In statistical terms, these are highly unlikely events that are eventually followed by a reversion to mean.

Market Phase	Peak P/E Multiple	Trailing 5 Year Average	DEVIATION FROM MEAN (IN STANDARD DEVIATION UNITS)
Dot-Com Bubble	28.47	20.76*	2.32
2008 Sub-Prime Crisis	28.29	17.26	3.11
2020 March	29.90	24.80	2.98

Note: *-Trailing 18-month average.

This difference in the identification of price and time correction stems from the way they are defined. While price correction can be identified by quantified means, time correction on the other hand is implicit. Conventionally a price drop in excess of 20 percent is termed as a 'price' correction. Time correction occurs when the price of a stock remains unchanged for long periods. Unchanged stock prices against the backdrop of inflation results in an erosion of wealth in real terms. Overpaying for a cyclical stock or companies with a weak business model in a majority of cases leads to a 'price' correction. While the pace and intensity of the fall remain high they nevertheless are easy to identify. 'Quality' companies on the other tend to undergo time-wise corrections.

Owing to their superior capital allocation and efficiency, strong business models and long track record, any excesses built into the stock price are corrected by the price remaining stagnant and a commensurate growth in earnings over time. Under both scenarios, the P/E multiple compresses but in Price corrections, the numerator of the ratio falls rapidly causing investors to take cognisance of such corrections. Time corrections on the other hand are characterised by stagnation in price and increasing earnings growth. An absence of price fall leads investors to an illusion that 'Quality' stocks are not prone to corrections. Time corrections can be significantly higher during periods of high inflation since the risk-free rates tend to be higher (and hence the opportunity cost of stagnant stock prices are higher) and the wealth erosion in real terms is also sharper. In essence, while both forms of correction are outcomes of superior stock prices (relative to earnings) investor perception and response to these corrections are contrasting.

The Price-Value Debate

Earlier, the differences between price and value were highlighted. Every investment endeavour involves the acquisition of a stream of cash flows, where the present value of the cash flow is above the market price.

$$Present\ Value = \sum_{t=1}^n \frac{FCF_t}{(1 + Discount\ Rate)^t}$$

Given, the way the Present Value (PV) is defined, investors have to determine the longevity of the cash flows and the appropriate discount rate. The longevity of cash flows merits special attention. Investors must avoid premature exit from companies possessing the ability to offer free cash flows for very long periods or entering firms that appear cheap, but offer no promise of consistent cash flows. Hence successful investing hinges not only around the calculation of future cash flows but determining the longevity of the cash flows in order to harness the benefits of compounding.

Drawbacks of the P/E Ratio

The popularity of the P/E ratio as a means to 'value' companies looks misplaced. While value emanates from the firm side, P/E multiple pertains to pricing and hence reflects collective investor psychology. However, sole reliance on the P/E ratio for investment decisions could lead to undesirable outcomes for investors.

Firstly the P/E ratio is a reflection of the Profit and Loss (P and L) account without any reference to the balance sheet or the cash flow statement. Given creative accounting tricks used by firms, the profit numbers mentioned in the P and L account may not necessarily be the 'true' figure. Companies with weak business models tend to push up sales by offering goods on credit to the end-user thereby resulting in a long receivable cycle. While the profitability in such cases looks optically higher, it does not imply a higher cash inflow for the company. Given the fixation on accounting profits, accounting malpractices take the form of capitalising expenses rather than passing them through the P and L account. Whilst a low P/E ratio improves the odds of making superior returns, viewing the P/E ratio in isolation leads to an incomplete analysis. Secondly, the P/E ratio does not take into account the re-investment rate incurred to generate the given level of profits. Consider the following illustration involving two companies that generate the same level of profits and trade at the same P/E multiple.

Table 9: Illustrating the Hollowness of the P/E ratio

Given the way the P/E ratio is defined, 2 companies with the same P/E ratio could nevertheless, have entirely different operating metrics.

S.No	Particulars	A	B
1	Profit in ₹	100	100
2	Market Capitalisation	1000	1000
3	P/E Ratio (2/1)	10	10
4	Capital Employed	1000	500
5	RoCE (in percent) (1/4)	10 percent	20 percent
6	Re-Investment Rate	50 percent	50 percent
7	Fundamental Growth (5*6)	5	10
8	Profit in Next Period (1+7)	105	110

Optically while both companies appear to earn the same level of profit both companies differ in their capital efficiency and hence the fundamental growth of both these companies differ. To get a complete picture, the P/E ratio must be supplemented by an analysis of the balance sheet and cash flow statement, to ascertain the value created for shareholders.

Although the discrepancy between the historical average and current P/E multiple sheds light on investor expectations and positioning on a stock or index, the P/E multiple alone cannot serve as a guide. A stock that has lost investor attention will most certainly trade at a P/E multiple well below the historical average, but an investor must ascertain the reason for the contraction in the P/E multiple. For instance, a company on the verge of bankruptcy and a company undergoing temporary problems will both trade at P/E multiples below the historical average, but in the former case, the existence of the company is itself under question (the market, in this case, is justified in assigning a lower multiple to the stock) while the latter presents a favourable situation to an investor. Similarly, when an industry undergoes structural changes which could impact the earnings growth for a long period of time, it is natural for the market to assign a P/E multiple well in excess of the long-term average for the industry. To effectively use the P/E multiple as a buy or sell signal investors must ascertain the reason for the deviation of the multiple from the long term average.

Investing in deep cyclical on the contrary involves an entirely different process. As seen in the previous section, cyclical or commodity-based industries undergo long periods where the RoCE is well below CoC owing to lower profitability. The P/E ratio in such cases does not signal any useful information, since the companies are either incurring losses or post extremely low levels of profitability. The top-line of cyclicals do not vary as much as their bottom-line does, a negative or significantly low

EBITDA margin¹³ relative to historical trends suggests a cyclical downturn in the commodity prices, which will eventually be followed by a cyclical upturn. However, it is virtually impossible for an investor to time the cycle. Investors should create a basket of such commodity-based stocks when the RoCE and EBITDA margins are at their recent lows. However, the transition from low commodity prices to high commodity prices requires structural increases in global economic growth. The waiting time for such a change in the cycle could either be a few months or could extend to a few years as well. Hence while approaching deep cyclical, investors based on publicly available financial reports should be reasonably confident that the company has the financial wherewithal to survive for a reasonably long period of time in case the cycle takes longer than anticipated to turn. An important point needs to be noted here, chalking out an exit strategy for deep cyclical is as important as the entry strategy. Exiting too soon may lead to a lower return on investment while exiting too late could lead to capital erosion. Although predicting exact tops and bottoms is a futile task, investors nevertheless can improve their returns by getting the general trend right.

DISCUSSION OF RESULTS

The causes of cyclicity in equity returns are manifold. The easiest, but least plausible answer revolves around business cyclicity. A more nuanced explanation involves investor perception and firm-level characteristics.

Table 1 documents that irrespective of the market cycle, the downside on the Nifty-50 predominantly remains within standard deviation below the mean. Statistically, 95 percent of the observations lie within two standard deviations from the mean. Investors can successfully preserve capital if they manage to wade away from large moves that are below two

¹³ EBITDA Margin is defined as $\frac{\text{Earnings before Interest, Tax, Depreciation and Amortisation}}{\text{Revenue}} * 100$

standard deviations from mean. Empirical results indicate that the returns on the Nifty-50 index have majorly remained within one standard deviation of the mean. Retail investors can use this to their advantage by adopting index-based investing given the return distribution over the last 25 years. Such an 'indexation' is particularly useful for retail investors given the fact that mutual fund portfolios are loaded up with near term outperformers, and as mentioned earlier such short-term optimism ends up depressing longer term returns. Although equities cannot be viewed in a vacuum, the returns provided by equity over other asset classes have been far superior. While there is wide agreement that returns on safe-haven assets like gold is negatively correlated with returns on equity, the reality is entirely different. Using monthly price data on Brent Crude, Gold and the Nifty-50, there is enough evidence to show that returns on these assets are positively correlated.

Although, the long term returns on the Nifty-50 has led to significant wealth creation, on closer examination the index level returns has demonstrated negative skewness. Negative skewness indicates a larger possibility of 'fat' tail returns on the negative end. This rather paradoxical feature is probably explained by the collective correlation among the stocks comprising the Nifty-50 index. As mentioned earlier in the paper, while individual stocks exhibit positive skewness, on an aggregate level the skewness turns out to be negative owing to the covariance among stock returns. Investors, while constructing their equity portfolio have to be cognisant of covariance between individual stocks.

The Nifty-50 index has undergone a radical transformation over the years with sectors such as financial services commanding a weightage in excess of 40 percent in the index. As the networking effects in form of cheaper communication and connectivity unfold themselves, the domestic economy is becoming much more integrated with the global economy and hence the return distributions on an aggregate level are displaying negative skewness. Apart from the changes in the composition

of the index, each time frame in equity investing is marked by different characteristics. The last decade, for instance, has seen an unusually low level of volatility and a skewness value of close to zero (indicating a perfect-symmetric distribution). The sudden spurt of volatility during March 2020, was a response not just to the economic uncertainties posed by the Corona-Virus pandemic but an adjustment from abnormally low volatility and high predictability of the return distribution. This once again highlights the cyclical nature of the market. As the environment of low volatility persisted, the risk premiums demanded by investors compressed, eventually blurring the risk-reward trade-off. Eventually, the cycle turned in March 2020 and a decade of low volatility was followed by a sharp increase in volatility. The relative standard deviation of Nifty-50 and the 10-year bond yield can be used to time entry and exit into equities. Major structural shifts in the economy ultimately get reflected in the bond yield. Hence each time bond yields witness an upsurge in volatility, investors need to weigh it against the volatility in the equity index. Post the Dot-Com bubble in April 2001, equity markets in India remained sideways. However, as liquidity began increasing globally, the economy transitioned from a high-interest rate scenario to moderate interest rates. The sideways nature of the market was captured in the low standard deviations for the Nifty-50 return distribution, while the bond yields had to rapidly adapt to falling economic growth rates. Similarly, during the height of the bull-run right before the GFC, the bond yields remained relatively stable, while the equity index (Nifty-50) continued its upward movement relentlessly.

To facilitate optimal stock selection, investors can break down the investible universe into cyclical and quality. However as Table 7 documents, the cyclical portfolio outperformed the quality portfolio by a huge margin during the 2003-07 bull-run, the degree of volatility shown by the portfolio during each cycle is significantly higher. The cyclical moreover fall much more than the quality portfolio during market down-cycles, and hence the threat of capital erosion always looms large especially for investors who do not have the technical skills to time the

commodity cycle correctly. Conventionally investors are advised to buy profitable companies, the reverse logic applies for investing in cyclical companies where the product offering is commoditised in nature. Historical data shows that buying a basket of deep cyclicals during the commodity price down-cycle and selling them as the cycle witnesses an upcycle leads to significantly higher returns.

The decade post the Global Financial Crisis was marked by low risk-free rates, low volatility and low growth rate in earnings. The absence of inflation led to low risk-free rates and significantly reduced the earnings growth for cyclical companies. Table 7 documents the abysmal returns on the cyclical portfolio in the period from January 2011-20. The volatility of the cyclical basket during the March-20 bear run is also a cause of concern. Quality on the other hand appear to withstand market corrections better and show significantly lower levels of volatility. This theme of 'Quality' has played very well in the decade post the GFC. The Price to Earnings (P/E) multiples of the Nifty-Bank, Nifty-FMCG have expanded significantly post the GFC. If historical trends were to hold, the subsequent mean reversion would result in a severe contraction of the multiple. The midcap frenzy, which began in Calendar Year 2016, resulted in the significant creation of speculative excesses in the Nifty-Midcap 50 index. At the height of the frenzy the P/E multiple quoted at a level of 113, which translated to a gap of 4 standard deviations from the trailing 5-year average. Eventually, the froth came off and left investors with a serious amount of damage. Whilst the P/E multiple might appear as a wonderful tool to identify spots in the market where the 'Efficient Market Hypothesis' (EMH) has broken down, it comes with its own set of limitations. It has to be noted that the P/E multiple has to be viewed in conjecture with the prevailing risk-free rates along with firm-level characteristics. With low risk-free rates and low growth rate in corporate profitability being the norm in the previous decade, it made sense for investors to flock to consumer-facing industries such as consumer staples and durables. With a majority of these companies operating with

significant competitive advantages, the value creation abilities of these companies are very high.

CONCLUSION

Cyclicality in investing has to be viewed in the context of the application of investing principles being an 'art' rather than a science. Each market phase is fuelled by different factors. Investors, therefore, have to adapt to the changing circumstances and course-correct in case their initial hypothesis does not materialise. Popular themes and trends in equity markets can reverse in very quick succession. The Dot-Com bubble, which consisted of a five-year up-move in the NASDAQ index was followed by a brutal sell-off that eroded nearly 75 percent of investor's wealth. Given the multi-faceted nature of investing principles, any attempt to establish a 'fair' price and hence a 'fair' P/E multiple is an exercise in futility. Hence it is left to the investors to figure out the 'appropriate' price is for a stock or index. Tools such as the Equity Risk Premium contribute towards understanding prevailing investor sentiment, and enables investors to ascertain the incremental benefits to risk taking. Only after a bull or bear market has ended, are investors able to question the consensus opinions that prevailed during the market cycle, although historical trends do not repeat in entirety, investors can nevertheless improve their returns by studying commonalities across market cycles. History has shown, every over-crowded trade ends up in an explicit price correction or an implicit time correction.

APPENDIX 1

Constructing a Quality and Cyclical Portfolio

To test the effectiveness of value creation in enhancing superior returns, a portfolio of 'Quality' stocks is constructed. The criteria for Quality include a Return on Capital Employed (RoCE) > 15 percent and a Revenue Growth in excess of 10 percent for 10 consecutive years. Owing to computational constraints the number of stocks in the portfolio was restricted at 11 stocks. On the basis of the criteria the following stocks formed the part of the Quality basket.

Table 10: Quality Basket

The Quality basket consists of stocks that rely heavily on proprietary technology and intellectual capital. Such companies have a strong portfolio of brands that create a unique bundle of products.

S.No	Stock Name
1	Asian Paints Ltd
2	Cipla Ltd
3	Dr Reddy's Laboratories Ltd
4	Godrej Consumer Products Ltd
5	HDFC Bank Ltd
6	Hindustan Unilever Ltd
7	Indian Tobacco Company Ltd
8	Infosys Ltd
9	Marico Industries Limited
10	Pidilite Industries Ltd
11	Titan Company Ltd

Table 11: Cyclical Basket

The cyclical portfolio on the other hand includes those companies that produce an end product that is commoditised in nature. These companies have to contend with their competitor's product offering that are a near perfect substitutes.

S.No	Stock Name
1	Bharti Airtel Ltd
2	Balrampur Chini Sugar Mills Ltd
3	Chambal Fertilizer Ltd
4	Container Corporation of India Ltd
5	Engineers India Ltd
6	Hindalco Industries Ltd
7	India Cements Ltd
8	Larsen and Toubro Ltd
9	Tata Power Company Ltd
10	Tata Steel Ltd
11	Vedanta Ltd

APPENDIX 2

Covariance among asset classes is obtained by using monthly returns on Nifty-50, Brent Crude and Gold from January 1996 to January 2021.

Table 12: Variance-Covariance matrix for Nifty-50, Brent Crude and Gold

This table depicts the existence of a positive correlation among the asset classes, contrary to the widely believed notion that returns on equity are negatively correlated with returns on gold and crude oil.

Asset Class	Nifty-50	Brent Crude	Gold
Nifty-50	1	0.321	0.132
Brent Crude	0.321	1	0.177
Gold	0.132	0.177	1

APPENDIX 3

Figure 17: Sharpe Ratio for Nifty-50 from Calendar Year 1998.

The Sharpe Ratio denotes the returns on a stock or index adjusted for the level of risk, and hence presents a more complete picture of the return distribution. Most notably, investors can use the ratio to determine whether the level of risk they assume to generate a given level of return is optimal or not.

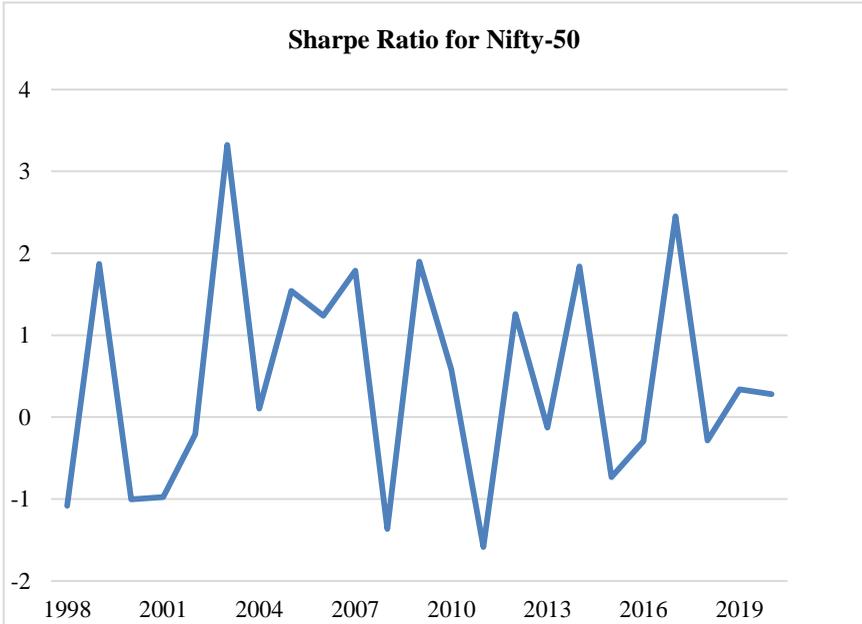
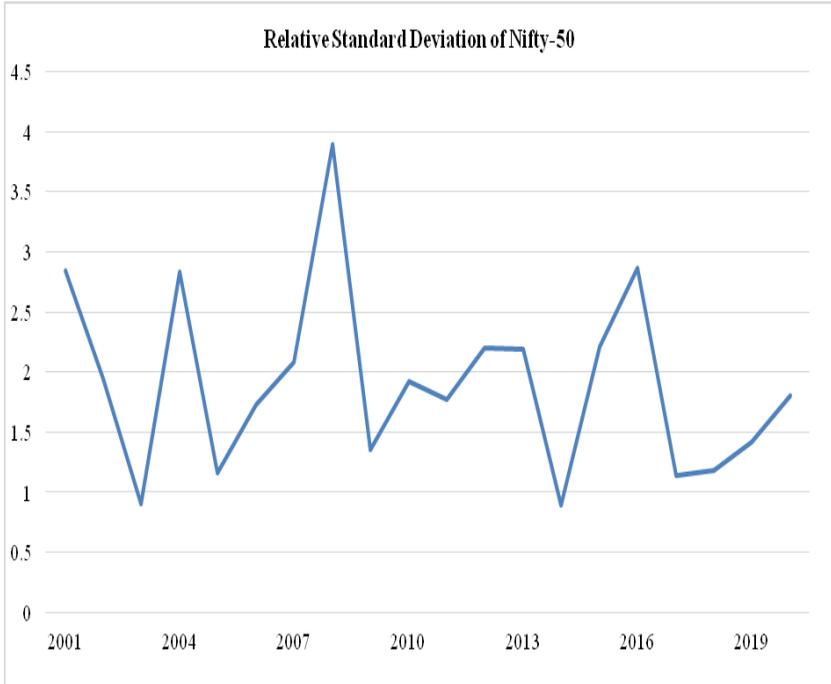


Figure 18: Relative Standard Deviation of Nifty-50

Historically every bull market is preceded by a low standard deviation of Nifty-50 relative to the standard deviation in the bond yield. The corollary applies to bear markets.



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