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Explaining Value vs. Growth Fallacy: An Empirical Study for Indian Market

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Abstract

Prior research describes value and growth characteristics on the same continuum. We attempt to test this for the Indian market. Similar to past studies, our results confirm the presence of value premium. But unlike previous literature, superior profits in growth strategy are also observed. This leads us to believe that value and growth are different dimensions. Value premium may be explained by investor overreaction. Whereas, growth premium arises due to future growth potential of high growth stocks. Negative correlation is observed between value and growth premiums which can be used by investors for achieving time diversification. We find that higher profits can be achieved by combining value and growth. The returns on univariate value or growth strategies are explained by either Capital Asset Pricing Model or Fama-French three factor model. The returns on bivariate strategies based on both value and growth remain unexplained even by Fama-French five factor model. The study contributes to existing literature in the following ways: 1. It highlights the role of both value and growth attributes in portfolio construction. 2. Time diversification is important for achieving higher risk adjusted return. The findings shall be pertinent for portfolio managers, market regulators and the academic community.

Keywords: Asset Pricing, Value Strategy, Growth Strategy, Investor Overreaction, Time Diversification

1. Introduction

Security markets across the world have confirmed the existence of Value anomaly. It has been observed in various markets that stocks with low Market Price-to-Book Value (P/B) ratio or low Market Price-to-Earnings ratio (P/E) have outperformed stocks with higher P/B and P/E ratio.

Past literature documents various reasons in support of this evidence. Basu (1977) documents that low P/E stocks outperform high P/E stocks. This proves semi-strong form of inefficiency in markets where publicly available P/E does not reflect the entire information. Stattman (1980) confirmed the existence of value effect with book-to-market (B/M) ratio. He concludes that stocks with high B/M ratios outperform stocks with lower B/M ratio. [1] Basu (1983) further evaluates if value effect is dependent on firm size. His results conclude the existence of this effect even after controlling for differences in firm size. Outperformance of growth stocks (low B/M) by value stocks (high B/M) is also confirmed by Rosenberg, Reid and Lanstein (1985); and Chan, Hamao and Lakonishok (1991).

According to Chan and Chen 1991, small firms are distressed and this explains the difference between returns offered by small and large firms. Lakonishok, Shleifer and Vishny (1994) report the existence of value premium and explain the reason behind value stocks performing better than growth/glamour stocks. They conclude that value strategies are more profitable not because of the inherent risk, but due to under reaction associated with distressed firms. Fama and French (1995) confirm the association of high Book Equity-to-Market Equity stocks with poor earnings, making them distressed stocks. On the other hand, higher profitability is associated with low Book Equity-to-Market Equity stocks. Fama and French (1998) prove the existence of value premium in various markets (including emerging markets) by sorting securities on the basis of book-to-market equity, earnings-to-price, cash flow-to-price and dividend-to-price ratio. Chan, Karceski and Lakonishok (2000) report there is a high chance of high P/E stocks earning lesser returns in future. They use behavioural arguments to support their results. Chan and Lakonishok (2004) revisit value vs growth investing styles and find greater support for value investing in small-cap stocks, though value premium also exists in large-cap stocks. They conclude that investors over react to growth stocks, whereas market price of value stocks is much below their fundamental value. Thus, long-term profits can be earned by staying patiently invested in value stocks. Houge and Loughran (2006) do not find value stocks earning higher returns than growth stocks for their sample indices and large-cap firms. They also report value and growth mutual funds earning similar returns across all sizes. Sehgal and Tripathi (2007) find value effect in Indian stock markets by using book-to-market equity, earnings-to-price, cash flow-to-price and dividend-to-price ratio. Schatzberg and Vora (2009) confirm profitability of PEG investment strategy. Marx (2013) analyses trading strategies created on the basis of profitability (measured using gross profit-to-assets ratio) and book-to-market ratio. Better returns are found amongst profitable firms in spite of higher P/B ratios. According to him it is beneficial to combine profitability and value strategies. Value effect is confirmed by Sehgal and Balakrihsnan (2013), where value is defined using P/E, P/B and PSG (Past Sales Growth). Sehgal and Pandey (2014) find that in Indian market low Price-to-Book, Price-to-Equity and Price-to-Sales ratio stocks outperform stocks with high Price-to-

Book, Price-to-Equity and Price-to-Sales ratios. Subramanaiam, Sharma and Sehgal (2017) confirm value effect using P/B ratio for the Indian stock market.

Past literature labels stocks with lower Price-to-Book and Price-to-Equity ratios as value stocks and securities with higher value ratios as Glamour or Growth stocks. Value effect is defined as stocks with low P/B and P/E ratios outperforming securities with higher P/B and P/E ratios. This could be due to undervaluation of relatively distressed value stocks.

On the other hand, investors who believe in growth investing strategy, assume that high growth stocks continue to have higher growth potential which leads to outperforming low growth stocks. Damodaran (2012) defines growth investors as those who invest in companies based on market valuation of their growth potential. He demonstrates that over long term, value investing outperforms growth investing. But there are certain periods when growth investing proves to be better.

Till now value and growth have been identified on the same continuum. In this study we attempt to test this and analyse if we are mixing up two different dimensions. We examine the profitability of value and growth strategy in the Indian market. If both strategies prove to be profitable, then value and growth may possibly be different dimensions. We attempt to explore this, and evaluate the profitability earned by combining these two strategies.

Combination of value and growth would result in enhanced profits, if these two phenomenon are countercyclical in nature. This could be due to preference of different strategies in different market states. Market upturns are usually sentiment-driven. High investor sentiments lead to overreaction to good as well as bad information. This leads to overvaluation of growth stocks. At the same time, overreaction to bad information leads to undervaluation of relatively distressed value stocks. (See Veronesi (1999)). Thus, it may be profitable for investors to buy low P/B and P/E stocks and aim at earning long-term profits in upswings. On the other hand, investors resort to fundamentals in pessimistic situations. Thus in market downturns the focus shifts from value strategies to growth strategies, where more emphasis is on realising benefits from future growth potential.

Specifically, this paper attempts to answer the following questions for the Indian stock market:

1. Is value strategy profitable?

2. Is growth strategy profitable?

3. Is trading strategy based on growth and value based investing more profitable than above mentioned strategies?

4. Do standard risk models such as Capital Asset Pricing Model (CAPM) and Fama-French (F-F) Three Factor Model (1993) explain returns of these sample strategies?

5. Can additional risk factors given by Fama-French Five Factor Model (2015) explain cross section of returns for portfolios created using information on value or/and growth?

The paper is divided into 5 sections including the current one. Data used and its sources are given in Section 2. The next section describes estimation procedure and methodology used.

Empirical results and analysis are discussed in section 4. Summary and concluding observations are given in the last section.

2. Data

This study uses data for NSE 500 companies from December 2001 to 2017. Data for month end stock prices is used which is adjusted for stock dividends, rights issues and stock splits. For further analysis, they are converted into percentage returns. To evaluate value anomaly, data for Price-to-Book ratio and Price-to-Earnings ratio is taken at the end of December each year. For evaluating growth anomaly, data for Net Sales and Earnings before Interest, Taxes, Depreciation and Amortisation (EBITDA) is used. This is further converted into growth rate. For each year's estimate of growth rate, average of past 5 years' growth rate is computed using 3 measures. Estimations are made using simple average, compound annual growth rate and weighted average (where highest weightage is given to the most recent value). Month end value of NIFTY 500 is taken which is further converted into returns to represent market performance. 91-day Treasury Bill yields are used as the risk free proxy. Further, data for Market Capitalisation, Return on Assets and Total Assets is taken at the end of December each year to construct factors used in asset pricing models.

Data source: Prowess Database, Reserve Bank of India's website.

3. Methodology

This section describes methodology used to construct univariate strategies (based on price-to-book ratio, price-to-earnings ratio and growth rates) and bivariate strategies (created by combining information in value and growth).

We use 12-12 trading strategy with formation and holding period of 12 months each.

To assess value effect, P/B and P/E ratios are used. Past growth rate in Net Sales and Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA) are considered for growth rate formation.

For the first formation period, value ratios as on December 2006 are taken and average growth rate estimation is made using Net Sales and EBITDA values from December 2001 to December 2006 [2].

Annual growth rate for 5 years prior to portfolio formation is estimated, which is further used to compute average growth rate using 3 construction methods; namely Simple average growth rate, Weighted average growth rate and Compound annual growth rate.

Annual growth is computed by subtracting Net Sales (EBITDA) in year 't-1' from Net Sales (EBITDA) in year 't', which is divided by Net Sales (EBITDA) in year 't-1'. This creates 5 annual growth estimates from December 2001 to December 2006, which are labelled as g1, g2, g3, g4 and g5 respectively. Simple average of these growth rates is calculated using Arithmetic Mean formula.

Weighted average growth rate is calculated by giving maximum weightage to latest year's growth rate and least weightage is given to the earliest annual growth rate. The following

formula describes calculation of weighted average:

$$\sum_{i=1}^{5} (w_i)(g_i)$$

Where, $w_i = i / \sum_{i=1}^{5} (i)$

Compound Annual growth rate is estimated using Geometric Mean formula. The construction methodology used is suggested by Sehgal and Balakrishnan (2013).

The process of estimating value and growth is repeated each year for successive formation periods.

To estimate profitability of value strategies, stocks are sorted into 10 equally-weighted portfolios on the basis of P/B and P/E ratios at the end of December each year (t). Their returns for the next 12 months (January to December of year t+1) are observed. Portfolio PE1(PB1) consists of stocks with lowest P/E(P/B) ratio and stocks with the highest P/E(P/B) ratio are a part of portfolio PE10(PB10).

Similarly, to evaluate profitability of growth strategies, past 5 years' average growth rate in net sales and earnings is taken as the ranking criterion. On the basis of growth rate at the end of December each year (t) we sort securities into 10 equally-weighted portfolios. Portfolios with low growth rate in past net sales (earnings) are labelled as $NS1_{SA}$ ($E1_{SA}$), $NS1_{WA}$ ($E1_{WA}$), $NS1_{CAGR}$($E1_{CAGR}$) where sub-scripts SA, WA and CAGR represent simple average, weighted average and Compound Annual Growth Rate method of computing average growth rate. Similarly, portfolios with high past sales (earnings) growth are labelled as $NS10_{SA}$ ($E10_{SA}$), $NS10_{WA}$($E10_{wA}$), $NS10_{CAGR}$($E10_{CAGR}$). Subscripts have the same meaning as described earlier.

Returns of these portfolios are observed for the next 12 months (January to December of year t+1). The process is repeated each year and portfolios are rebalanced annually based on new information in value and growth, thereby creating a return series from January 2007 to December 2017.

For value strategies, we obtain maximum return differential in P/E sorted portfolios (i.e. PE1-PE10) and in growth strategies, best results are observed in EBTIDA simple average growth based portfolios (i.e. $E10_{SA}$ - $E1_{SA}$) amongst all univariate growth sample strategies.

Henceforth, these two strategies are used for all further analysis. Using these investment styles, bivariate strategies are employed to analyse profitability of combined information contained in growth and value. Three types of bivariate sorted strategies- independent, conditional I and conditional II are used.

In Independent sorted strategy, securities are first ranked on the basis of P/E ratios into 3 portfolios with PE1 consisting of lowest 33-1/3 percent stocks and PE3 comprising of highest 33-1/3 percent stocks. Then securities are independently sorted on the basis of average earnings growth into 3 portfolios with E1 and E3 having lowest and highest 33-1/3 percent stocks

respectively.

Stocks in the portfolio PE1E3 and PE3E1 are defined as low value-high growth stocks and high value-low growth stocks respectively. Further two types of conditional sorted strategies; namely value-growth and growth-value are used. They are labelled as Conditional I and Conditional II respectively. In value-growth strategy, securities are sorted in ascending order into 3 portfolios on the basis of PE ratio. Within these groups, stocks are further sorted into 3 portfolios on the basis of past growth rate in earnings.

In the Conditional II strategy, the process is reversed. Stocks are first sorted on the basis of earnings growth, then on the basis of P/E ratio.

In all the above mentioned strategies, intersections of value based and growth based portfolios are created to form 9 portfolios on the basis of P/E and earnings growth (namely PE1E1, PE1E2, PE1E3, PE2E1, PE2E2, PE2E3, PE3E1, PE3E2, PE3E3.

Estimation procedures similar to univariate strategies are followed. Portfolios are constructed at the end of each year by observing past information in value and growth. Returns of these portfolios are observed for the next year and they are rebalanced annually to reflect new information.

For all univariate and bivariate sorted portfolios, returns of long-short (zero cost) strategies are estimated which involves going long in portfolio with low value or/and high growth; and short in high value or/and low growth portfolio.

Next an attempt is made to see if standard risk models explain cross section of returns of our univariate and bivariate sorted portfolios. For this purpose, three asset pricing models namely Capital Asset Pricing Model (CAPM), Fama-French 3 Factor Model (1993), and Fama-French 5 Factor model (2015) are used.

We do further analysis only on corner portfolios as they have direct implications for developing long-short strategies.

Since some months of our data period are impacted by Global Financial crisis, we add a dummy variable to account for the structural break between crisis and tranquil periods. Markets are known to be affected by the financial crisis from August 2007-October 2009 (See Trichet, 2010; Angelini et al, 2011; Sehgal et al, 2016). The dummy variable takes value of '0' during crisis period and '1' during tranquil periods.

Following equation shows the excess return version of market model which is used to operationalise CAPM:

$$R_{pt} - R_{ft} = a_p + b_p (R_{mt} - R_{ft)} + d_p (D_t) + e_{pt} \quad (1)$$

Where,

$R_{pt} - R_{ft}$ is the excess return on portfolios at time "t"; i.e; return on portfolio at time "t" minus risk free return at time "t".

$R_{mt} - R_{ft}$ is the excess return on market factor

D_t is the dummy variable to account for Global financial crisis. It takes value of '0' and '1' during crisis and normal periods respectively.

a_p is the intercept, which is the measure of abnormal profits.

b_p is the slope coefficient which shows the sensitivity of portfolio returns to market returns

d_p represents responsiveness to dummy variable

e_{pt} is the error term

For CAPM to hold true, portfolio returns must be fully explained by market returns. A significantly positive or negative intercept implies that portfolios are earning abnormal returns which are not explained by CAPM.

In this case, Fama-French 3 factor model is used which is described in the following equation:

$$R_{pt} - R_{ft} = a_p + b_p (R_{mt} - R_{ft)} + s_p (R_{SMB}) + l_p (R_{LMH}) + d_p (D_t) + e_{pt} \quad (2)$$

Where,

SMB and LMH are mimicking portfolios for size factor and value factor respectively.

s_p and l_p are sensitivity coefficients.

Other variables have the same description as in equation (1).

Construction methodology adopted by us is different from Fama-French 3 Factor Model estimated in Fama-French 1996 in two ways.

2*2 size-value partition is used instead of 2*3 size-value partition due to problems of multi-collinearity. [3]. Instead of HML factor, we construct LMH factor. This reverses the interpretation of value factor.

We divide the sample stocks into two groups on the basis of their market capitalization. Stocks are categorized into Small (S) if their market capitalization is less than the median value and remaining as Big (B). In the same manner, they are classified as Low (L) or High (H) on the basis of price-to-book ratio. Using intersection of two size and two P/B groups, four portfolios (S-L, S-H, B-L and B-H) are formed. For each holding period, difference between average return of small stocks and big stocks gives the SMB factor. LMH factor is constructed as the difference between average return of low and high P/B stocks. The fundamental reasoning behind using these factors is the superior performance of small stocks over big stocks due to higher risk associated with small stocks. Better performance of low P/B stocks vis-à-vis high P/B stocks is associated with their undervaluation of low P/B securities.

If portfolio returns remain unexplained by Fama-French Three Factor Model, we investigate the role of profitability and investment rate as proposed by Fama-French (2015).

For constructing profitability factor, each year stocks are divided into 10 portfolios on the basis of Return on Assets (ROA).

Stocks with highest and lowest ROA are labelled as Robust and Weak respectively. Average

returns of Robust and Weak portfolios across all holding periods are considered for constructing the profitability factor; labelled as RMW (Robust minus Weak factor). This factor is based on the rationale of stocks with higher past profitability outperforming stocks with lower past profits.

Investment rate is added to the explanatory model by constructing AMC factor (Aggressive minus Constructive). Investment rate for all stocks is computed each year by looking at the difference between Total Assets at the end of year 't' and Total Assets at the end of year 't-1'. This is divided by Total Assets at the end of year 't-1'. Stocks are divided into 10 portfolios each year on the basis of investment rate and are labelled as Aggressive and Conservative with higher and lower investment rate respectively. Contrary to previous studies on Asset growth anomaly, we find that firms with higher investment rate are performing better in future vis-à-vis conservative firms. Though asset growth anomaly is well documented in previous research, some recent studies support our findings.

Possible explanations are provided by Fu (2014) and Kumar and Li (2016).

The following equation describes the 5 factor model used:

$$R_{pt} - R_{ft} = a_p + b_p(R_{mt} - R_{ft)} + s_p(R_{SMB}) + l_p(R_{LMH}) + r_p(R_{RMW}) + i_p(R_{AMC}) + d_p(D_t) + e_{pt} \quad (3)$$

Where,

SMB, LMH, RMW and AMC are mimicking portfolios for size, value, profitability and investment rate factors respectively.

s_p, l_p, r_p and i_p are sensitivity coefficients. Other variables have the same description as in equation (1).

All multi-factor models used are adjusted for multi-collinearity. Appropriate corrections are made in case correlation between any two factors is more than 0.3.

An insignificant alpha from 5 factor model implies abnormal performance observed in case of 3 factor F-F model was only due to missing risk factors. On the other hand, there would be a stronger support for strategy design and arbitrage, if the alpha values are significantly positive in case of 5 factor model.

4. Empirical Results

4.1 Unadjusted returns of univariate portfolios

This sub-section reports unadjusted returns for our univariate sample strategies. (See Table 1).

Value based strategies give results consistent with past studies. Stocks with low P/E and P/B ratios outperform securities with high P/E and P/B ratios. Portfolio PE1 and PB1 provide mean monthly return of 1.95% and 1.69% respectively. On the other hand, portfolio PE10 and PB10 give an average return of 0.56% P.M. and 0.78% P.M. respectively.

Thus, investors realise a mean monthly return differential of 1.38% and 0.91% from P/E based

and P/B based value investing strategy respectively. Annual return of 16.56% and 10.92% can be earned by a zero-cost arbitrage strategy which involves going long in low P/E(P/B) stocks and short in high P/E(P/B) stocks.

For all growth based strategies, higher returns are observed for portfolios with higher past growth rate vis-à-vis portfolios with lower past growth rate.

Portfolio $NS10_{SA}$, $NS10_{WA}$ and $NS10_{CAGR}$ provide an average monthly return of 1.48%, 1.43% and 1.60% respectively. In contrast, portfolios $NS1_{SA}$, $NS1_{WA}$ and $NS1_{CAGR}$ earn 1.18%, 1.13% and 1.35% respectively P.M. This gives an average monthly return premium of 0.30%, 0.29% and 0.25% for the above mentioned strategies, when investors go short in low growth stocks and long in high growth stocks.

High earnings growth portfolios $E10_{SA}$, $E10_{WA}$ and $E10_{CAGR}$ earn 1.55% P.M., 1.64% P.M. and 1.41% P.M. respectively. On the other hand, low earnings growth stocks in portfolios $E1_{SA}$, $E1_{WA}$ and $E1_{CAGR}$ give mean monthly return of 0.84%, 1.04% and 0.92% respectively. Zero cost portfolios with long position in high growth stocks and short position in low growth stocks provide a return differential of 0.72% P.M., 0.60% P.M. and 0.49% P.M. respectively.

We observe that low P/E(P/B) stocks are outperforming high (P/E)/(P/B) stocks. At the same time, stocks with higher past growth rates are also giving better returns than low growth stocks. This leads us to investigate if value and growth are on a separate continuum.

Amongst the various value and growth based investing styles used for checking robustness of our results, we observe that maximum return differentials are provided by zero cost PE based strategy (i.e. PE1-PE10) and earnings' average growth based strategy (i.e. $E10_{SA}$ - $E1_{SA}$). Henceforth, all analysis is done on these two criteria.

Further, we analyse the growth rates of P/E based sample portfolios. Low P/E stocks have lower past growth rate vis-à-vis high P/E stocks. Thus, they are classified as relatively distressed securities. But, future growth rate of low P/E stocks is higher as compared to future growth of high P/E stocks. Reversal in their growth rates explains the value effect. Investors may have undervalued low PE stocks due to the relative distress associated with them, but they are not so bad if we look at their future growth. This leads to an increase in their value as market realises their potential. At the same time, investors believe high P/E stocks to be much better than they actually are. This is shown by the bend in their future growth rates. On the other hand, stocks with higher past growth continue to have higher growth rate in future vis-à-vis low growth portfolios. So, significant profits can be realised by growth based investing style, which is based on future growth potential.

This explains profitability of value as-well-as growth based investing in the Indian market.

On further analysis, we find negative correlation of -0.214 between return premiums of value and growth based strategies, which suggests a countercyclical relation between them. (See Figure 1).

This can be explained using behavioural reaction of investors in different market situations. When business conditions are robust and markets are in upswing, investors tend to overreact

to good as well as to bad information. This sentiment driven market leads to overvaluation of high growth stocks. At the same time, overreaction to bad news leads to undervaluation of relatively distressed low P/E and low P/B stocks. Thus, significant profits can be earned by staying invested in value stocks.

On the other hand, in pessimistic situations when markets are in a downturn, investor sentiment dries out and investors resort back to fundamentals. Previous over valuation of growth stocks is corrected in this phase, and market players tend to invest in securities with high past growth with the belief that this growth rate will continue in future.

So, a combined value and growth strategy can diversify risk and give enhanced profits as compared to univariate value based or growth based investing styles. This is further evaluated in the subsequent sub-section.

4.2 Unadjusted returns of Bivariate portfolios

To evaluate profitability of combined information, we create three types of bivariate portfolios, namely; Independent, Conditional I (Value-Growth) and Conditional II (Growth-Value). All these strategies perform better than our univariate sorted portfolios. (See Table 2)

For Independently sorted strategy, 2.43% and 0.82% mean monthly return is earned by low P/E-high growth group and high P/E-low growth group respectively.

In Conditional I (Value-Growth) strategy; when growth based portfolios are constructed within value based groups, stocks with low P/E-high growth and high P/E-low growth provide an average monthly return of 2.37% and 0.78% respectively.

With reverse conditional sorting process; i.e. constructing value based portfolios within growth based groups, we observe that 2.39% P.M. and 0.83% P.M. is earned by low P/E-high growth portfolio and high P/E-low growth portfolio respectively.

Maximum mean monthly return differential of 1.61% is provided by zero-cost independently sorted strategy, which is followed by Conditional I and Conditional II strategy, which give a return differential of 1.59% and 1.56% respectively.

Thus, instead of focusing on value vs growth investing style, investors in the Indian markets should focus on value and growth investing style.

Enhanced performance of bivariate strategies is confirmed with higher Sharpe's ratio vis-à-vis univariate strategies. We report Sharpe ratios for portfolios on the winner side. Portfolio PE1 and $E10_{SA}$ have Sharpe ratio of 0.196 and 0.150 respectively. For bivariate low value-high growth portfolios, Sharpe ratio rises to 0.251, 0.242 and 0.244 for Independent, Conditional I and Conditional II strategy respectively. This increase is observed because of lower volatility of bivariate strategies due to the benefit of time-diversification.

4.3 Risk adjusted returns based on Factor Model(s)

After the estimation of unadjusted returns, risk adjusted returns are observed using CAPM framework. We regress excess returns on all univariate and bivariate strategies on market return.

Results are reported in Table 3.

For univariate strategies, market risk factor absorbs returns of both earnings growth based portfolios and high P/E portfolio amongst value strategies.

For all bivariate strategies, CAPM explains returns of portfolios with lower earnings growth and higher P/E ratio. However, portfolios return of high growth-low value stocks in all groups remain unexplained at this stage.

Using Fama-French 3 factor model (1993), excess returns of unexplained portfolios are regressed on market, size and value factors. These results are reported in Table 4. This model captures return of univariate low value portfolio that was unexplained at the previous stage. Return of all bivariate sorted high growth-low value portfolios remain unexplained. These are further regressed on two additional factors suggested by Fama-French (2015); i.e. profitability factor and investment rate factor. (See table 5). We find that Fama-French 5 factor model is also unable to absorb excess returns of these portfolios.

Our results suggest significant profits can be earned by going long in portfolios with high earnings growth and low value. These portfolios may be sorted independently or conditionally. Since standard risk models are unable to explain results of these portfolios, there may be behavioural reasons to explain their superior performance, which may be an issue for examination in subsequent research.

5. **Summary and Concluding Observations**

This study attempts to evaluate profitability of value and growth investing styles. Past literature defines low P/E(P/B) stocks as value stocks. Growth stocks are defined as securities with higher past growth rate in net sales and earnings. Value stocks are found to have lower growth rates, and till now value and growth strategies have been identified on the same continuum. We attempt to verify this and evaluate if we are mixing up two different dimensions.

For this we use data of NSE 500 companies from December 2001 to 2017. Since, this time period was partly affected by Global Financial Crisis, we make appropriate adjustments using dummy variables to account for the structural break between crisis and tranquil periods.

To evaluate profitability of value based strategy, we sort stocks on the basis of P/E and P/B ratios. Portfolios with low P/E(P/B) ratios outperform stocks with higher value ratios. This can be explained with distress exhibited by low value stocks at the time of portfolio formation. These stocks have lower growth rates in net sales and earnings prior to formation of portfolios. However, this trend reverses in future years after framing portfolios. Value premium is borne out of investor overreaction to bad information associated with relatively distressed value stocks, which leads to their undervaluation.

For growth based strategy, we estimate average growth rates in Net Sales and EBITDA.

Average of past 5 years' annual growth prior to portfolio formation is calculated using simple average, weighted average and compound annual growth rate.

Using all the above mentioned criterion, growth based investing proves to be profitable as

securities with higher growth rates outperform low growth stocks.

This strategy is profitable due to future growth potential of high growth stocks. Stocks with higher past growth rate continue to have higher growth rates post portfolio formation as compared to low growth stocks.

Superior performance of low P/E (P/B) stocks and high growth stocks at the same time, leads us to investigate if value and growth are on a separate continuum. Amongst univariate value and growth strategies, maximum return differential is provided by Price-to-Earnings based and simple average earnings growth based strategy respectively. So we use these two investing styles for further analysis.

Negative correlation is found between return premiums of value strategy and growth strategy, thereby leading to profitable bivariate strategies that use combined information contained in value ratios and growth rates.

This can be due to different behaviour exhibited by investors in market upswings and downswings.

When business conditions are robust and markets are rising, investors tend to overreact to good as well as to bad information. This sentiment driven market leads to overvaluation of high growth stocks. At the same time, overreaction to bad news leads to undervaluation of relatively distressed low P/E and low P/B stocks. Thus, significant profits can be earned by staying invested in value stocks.

On the other hand, in pessimistic situations when markets are in a downturn, investor sentiment dries out and investors resort back to fundamentals. Previous over valuation of growth stocks is corrected in this phase, and market players tend to invest in securities with high past growth with the belief that this growth rate will continue in future.

Negative correlation helps investors achieve the benefit of time diversification, as it is possible to beat the market on both ends by investing in bivariate strategies. So investors should focus on value and growth strategy instead of value vs growth strategy.

To evaluate profitability of combined information, we use independent sorted and two conditionally sorted bivariate strategies (growth within value and value within growth).

For all three styles, low value-high growth stocks outperform high value-low growth stocks. All of them provide higher returns vis-à-vis univariate value strategy and growth strategy. Maximum return is provided by independently sorted portfolio. Profitability of combined strategies is also confirmed by higher Sharpe ratios exhibited by bivariate sorted portfolios vis-à-vis univariate sorted portfolios.

Further, an analysis of risk adjusted returns shows that profits of univariate earnings growth based portfolios, and high value portfolio is captured by Capital Asset Pricing Model. Fama-French 3 factor model absorbs returns earned by low value stocks. Thus, return earned by univariate growth and value investing style is merely a compensation for risk, which is explained by standard risk models.

However, profits associated with combination of growth and value can be successfully exploited by investors in the Indian market. Returns on independently and conditionally sorted low value-high growth portfolios remain unexplained by standard risk models. Even Fama-French 5 factor model is unable to capture these profits.

The study is useful for various stakeholders and has strong implications for portfolio managers, market regulators and academic community.

Till now value and growth characteristics have been identified on the same continuum. We explode this myth and conclude that these are two separate dimensions. Low P/E and P/B stocks are relatively distressed, and investor overreaction may be leading to a profitable value strategy. Whereas, growth strategies are profitable due to future growth potential of stocks with higher past growth. These investing styles are found to be countercyclical in nature and time diversification benefits can be achieved by combining the two, as reflected by risk adjusted returns provided by bivariate strategies which are not even explained by multifactor asset pricing models. These alpha generating strategies can be profitably exploited by global portfolio managers who focused only on value or growth trading style till now. They should consider both dimensions for appropriate portfolio design.

Countercyclical anomalies can pose higher challenges than standalone anomalies for market regulators. The study highlights the problem of information inefficiency in Indian securities market. Market regulators and policy makers should address this problem by employing more efforts to strengthen the corporate governance norms and expanding the investor base by stronger financial inclusion policies.

The study contributes to academic literature as value and growth have been identified as separate dimensions for strategy design. This work can be extended to other countries.

Table 1. Unadjusted returns of value sorted and growth sorted portfolios (Univariate Analysis)

Panel A: Value sorted portfolios

Price-to-Earnings based portfolios

Portfolios	PE1	PE10	PE1-PE10
Mean	0.0195	0.0056	0.0138
t-value	2.2521	0.6517	4.2216

Price-to-Book based portfolios

Portfolios	PB1	PB10	PB1-PB10
Mean	0.0169	0.0078	0.0091
t-value	1.7506	1.2321	1.4912

Panel B: Growth sorted portfolios

Net Sales simple average growth based portfolios

Portfolios	$NS1_{SA}$	$NS10_{SA}$	$NS10_{SA}$-$NS1_{SA}$
Mean	0.0118	0.0148	0.0030
t-value	1.4235	1.6818	1.0864

Net Sales weighted average growth based portfolios

Portfolios	$NS1_{WA}$	$NS10_{WA}$	$NS10_{WA}$-$NS1_{WA}$
Mean	0.0113	0.0143	0.0029
t-value	1.3869	1.6369	0.9905

Net Sales compound annual growth based portfolios

Portfolios	$NS1_{CAGR}$	$NS10_{CAGR}$	$NS10_{CAGR}$-$NS1_{CAGR}$
Mean	0.0135	0.0160	0.0025
t-value	1.6213	1.8261	0.7894

Earnings simple average growth based portfolios

Portfolios	$E1_{SA}$	$E10_{SA}$	$E10_{SA}$-$E1_{SA}$
Mean	0.0084	0.0155	0.0072
t-value	1.0188	1.7258	2.4406

Earnings weighted average growth based portfolios

Portfolios	$E1_{WA}$	$E10_{WA}$	$E10_{WA}$-$E1_{WA}$
Mean	0.0104	0.0164	0.0060
t-value	1.2376	1.8676	1.9209

Earnings compound annual growth based portfolios

Portfolios	$E1_{CAGR}$	$E10_{CAGR}$	$E10_{CAGR}$-$E1_{CAGR}$
Mean	0.0092	0.0141	0.0049

t-value	1.0412	1.6228	1.6765

The above table shows mean excess returns for value and growth sorted univariate portfolios. All returns are tested for significance at 5% level on two tailed basis.

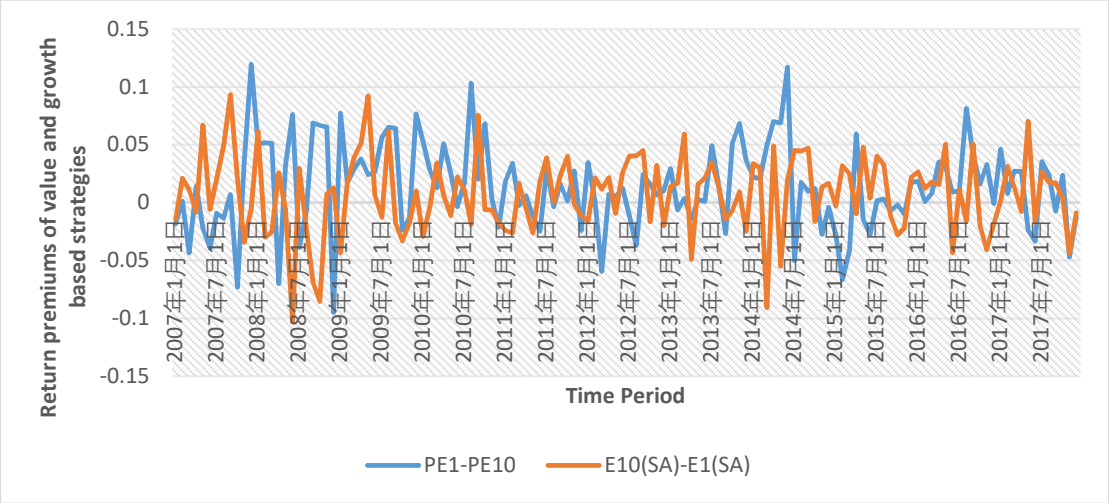

Figure 1. Correlation between Value and Growth based strategy

The above figure represents correlation between return premiums of Price-to-Earnings based value strategy and Earnings simple average growth based strategy.

Note: Mean Correlation between return premiums of Price-to-earnings based strategy and Simple average earnings growth based strategy = -0.214

Table 2. Unadjusted returns of Bivariate value and growth based portfolios

Panel A: Bivariate growth and value based Portfolios (Independent sorted)

Portfolios	PE1E3	PE3E1	PE1E3-PE3E1
Mean	0.0243	0.0082	0.0161
t-value	2.8805	1.1029	4.8003

Panel B: Bivariate growth and value based Portfolios (Conditional I sorted)

Portfolios	PE1E3	PE3E1	PE1E3-PE3E1
Mean	0.0237	0.0078	0.0159
t-value	2.7813	1.0534	4.7689

Panel C: Bivariate growth and value based Portfolios (Conditional II sorted)

Portfolios	E3PE1	E1PE3	E3PE1-E1PE3
Mean	0.0239	0.0083	0.0156
t-value	2.8069	1.1516	4.6698

The above table shows mean excess returns for value and growth based bivariate portfolios.

Three types of bivariate sorted strategies- Independent, Conditional I and Conditional II are used.

In Independent sorted strategy, securities are first ranked on the basis of P/E ratios into 3 equally weighted portfolios. Then securities are independently sorted on the basis of earnings growth into 3 equally weighted portfolios.

In Conditional I (Value-Growth) strategy, securities are sorted in ascending order into 3 equally weighted portfolios on the basis of P/E ratios. Within these groups, stocks are further sorted into 3 equally weighted portfolios on the basis of earnings growth.

In the Conditional II (Growth-Value) strategy, the process is reversed. Stocks are first sorted on the basis of earnings growth, then on the basis of P/E ratio.

All returns are tested for significance at 5% level on two tailed basis.

Table 3: Capital Asset Pricing Model based results

Panel A: Univariate sorted portfolios

Price-to-Earnings based portfolios

Portfolios	PE1	PE10
a	0.0208	-0.0053
t-value	2.6289	-0.9139
b	1.2713	1.3345
t-value	25.1149	35.9718
d	-0.0091	0.0061
t-value	-1.0236	0.9303
Adjusted R-squared	0.8277	0.9080

Earnings growth based portfolios

Portfolios	E1	E10
a	0.0057	0.0081
t-value	0.7739	1.2799
b	1.2162	1.3812
t-value	26.0631	34.2566
d	-0.0036	0.0014
t-value	-0.4426	0.1964
Adjusted R-squared	0.8379	0.8994

Panel B: Bivariate sorted portfolios

Bivariate growth and value based Portfolios (Independent sorted)

Portfolios	PE3E1	PE1E3
a	-0.0041	0.0211
t-value	-0.6866	2.9947
b	1.1146	1.2626
t-value	29.3876	28.0596
d	0.0089	-0.0033
t-value	1.3438	-0.4192
Adjusted R-squared	0.8684	0.8571

Bivariate growth and value based Portfolios (Conditional I sorted)

Portfolios	PE3E1	PE1E3
a	-0.0017	0.0206
t-value	-0.2891	2.8542
b	1.1106	1.2759
t-value	29.8852	27.7003
d	0.0054	-0.0034
t-value	0.8331	-0.4238
Adjusted R-squared	0.8719	0.8538

Bivariate growth and value based Portfolios (Conditional II sorted)

Portfolios	E1PE3	E3PE1
a	-9E-05	0.0213
t-value	-0.0155	2.9463
b	1.0825	1.2699
t-value	29.2361	27.4818
d	0.0043	-0.0042
t-value	0.6557	-0.5108
Adjusted R-squared	0.8669	0.8519

The above table reports Capital Asset Pricing Model based results for best performing portfolios (Price-Earnings based and Simple average earnings growth based) as these are used further for bivariate formation. We regress excess portfolio returns on returns of market factor using CAPM specification. Alpha (a) measures extra normal return.

Table 4. Fama-French Three Factor Model based results

Portfolios	PE1	PE1E3 (Independent sorted)	PE1E3 (Conditional I sorted)	E3PE1 (Conditional II sorted)
a	0.0099	0.0139	0.0131	0.0144
t-value	1.6907	2.7048	2.4952	2.6985
b	1.2211	1.2150	1.2271	1.2213
t-value	33.7753	38.5212	38.1123	37.3398
s	0.9863	0.9398	0.9630	0.9613
t-value	10.5485	11.5218	11.5657	11.3654
l	0.9437	0.6575	0.6827	0.6399
t-value	6.7635	5.4010	5.4943	5.0692
d	-0.0082	-0.0065	-0.0065	-0.0079
t-value	-1.2219	-1.1005	-1.0855	-1.2983
Adjusted R-squared	0.9136	0.9309	0.9298	0.9271

The above table reports Fama-French Three Factor Model based results. We regress excess portfolio returns on returns of market factor and factor mimicking portfolios that proxy for size and value. Alpha (a) measures extra normal return. We report results of only those portfolios that have unexplained returns by Capital Asset Pricing Model.

Table 5. Fama-French Five Factor Model based results

Portfolios	PE1E3 (Independent sorted)	PE1E3 (Conditional I sorted)	E3PE1 (Conditional II sorted)
a	0.0149	0.0142	0.0150
t-value	2.8467	2.6701	2.7696
b	1.2168	1.2294	1.2223
t-value	39.0004	38.5378	37.6704
s	0.9033	0.9314	0.9205
t-value	10.6396	10.7288	10.4255
l	0.6374	0.6623	0.6212
t-value	5.3080	5.3942	4.9748
r	-0.1084	-0.1065	-0.1054
t-value	-2.4957	-2.3959	-2.3320
i	-0.0018	0.0103	-0.0169
t-value	-0.0274	0.1506	-0.2455
d	-0.0072	-0.0076	-0.0081
t-value	-1.1700	-1.2075	-1.2761
Adjusted R-squared	0.9332	0.9318	0.9289

The above table reports Fama-French Five Factor Model based results. We regress excess portfolio returns on returns of market factor and factor mimicking portfolios that proxy for size, value, profitability and investment rate. Alpha (a) measures extra normal return. We report results of only those portfolios that have unexplained returns by Fama-French Three Factor Model.

Notes

[1] Some studies use Book-to-Market and Earnings-to-Price ratios instead of Price-to-book and Price-to-Earnings ratios used by us. Therefore, interpretation of our results is reversed.

[2] Forward trading in the Indian securities market was banned from July 2001. Thus, we have taken data after this period to maintain uniformity in prices throughout the time series. Since we are working on Calendar years, we have taken data from December 2001.

[3] Problem of multicollinearity in 2*3 size-value partition was addressed by Sehgal and Vasishth (2015). 2*2 size-value partition was recommended in this study.

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