

Price-Earnings and Price-to-Book Benchmark Techniques as Predictors of Equity Returns in India.

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Abstract:

Among the different benchmark techniques used by investors to determine the relative merit of equities, while the 'price-earnings' is a favourite, recent studies report the overriding importance of the book value. Hence this study explores the comparative ability of the two techniques namely 'price-earnings' ratio and 'price-to-book' ratio, in reaping superior equity returns in India. The study considers 80 companies listed in Bombay Stock Exchange for a period of 8 years from 2001 to 2008 and identifies an inverse association between the benchmark ratios and the equity returns in India, which magnifies as the duration of investment period expands. On the basis of the lowest and highest rank of benchmark ratios 'value' and 'glamour' portfolios were constructed respectively. Comparing the annualised returns of these portfolios, the study concludes that though both the benchmark techniques are capable of identifying the value stocks that can earn significantly higher returns; the 'price-to-book' is rather a superior technique in India.

Keywords: Benchmark Valuation Techniques, Equity Investment Strategy, Price-to-book Ratio, Price-Earnings Ratio, Valuation Ratios.

1. Introduction:

With the ever increasing investment culture worldwide, the erstwhile rule of intuition based speculation is replaced by the conscious demand of research based investment. Economists and financial practitioners have sought to identify variables that predict equity returns in the market for the last two decades. After examining various metrics as future predictors of share price performance, they have found few *benchmark techniques* including size, interest rate, beta, price-to-book ratio (P/B), price-earnings ratio (P/E), and dividend yield (DY) to be rather good indicators among many others. According to the mispricing view, the stocks with low P/E or P/B ratios (or value stocks) earn significantly higher returns than stocks with high P/E or P/B ratios (or glamour stocks). Thus, there is an inverse relation between the P/E or P/B ratios and stock returns, and an investor can achieve systematically higher returns by investing the right stock having low P/E or P/B ratio (value stocks). Apart from testing the validation of this mispricing view, the aim of this study is to examine the comparative ability of the two popular benchmark techniques, namely the P/E and the P/B ratios to forecast stock return in India.

2. Relevance of the study:

While the price-multiple methods can be applied to many accounting variables, earnings have been the most common denominator. The importance of the P/E amongst investors and empirical success of the low P/E strategy lead naturally to the question that whether there are other measures of value that can be utilised to predict the performance of common stocks instead of the P/E. Any summary measure that claims to value equity accurately warrants critical examination before being accepted universally. Meanwhile any summary measure with implications similar to the P/E deserves publicity because the P/E's reliability is seriously limited as it cannot be applied in all situations. Recent empirical studies as well as investment analysis report the importance of the book value. Probably the strongest argument in support of the P/B ratio is that it can be used as a yardstick of value of firms with negative earnings whereas the P/E cannot. Hence it is a natural extension to investigate the accuracy of P/B strategy in contrast to the popular P/E strategy. In this respect, this study provides a test of these two valuation ratios' comparative ability to

predict stock returns in India.

3. Brief literature review:

In contrast to the earlier research in 1960's and 1970's, recent studies provide evidence that medium to long term stock returns can be explained by variables like dividend yields, price earnings ratios, price to book ratios among others (Fama and French 1988 and 1989; Campbell and Schiller 1988). Similarly, Harvey (1995) asserts that emerging market returns (the category that India belongs to) are more predictable than developed market returns.

Empirical studies are flooded with the evidence that relative valuation techniques (including P/E and P/B) are pretty useful and can help the investors in picking the value stocks rather than glamour stocks, for reaping larger returns. Studies have identified that stocks with lowest P/E ratio (Basu 1977; Oppenheimer 1984; Basu 1983; Lakonishok *et al.* 1994) earn significantly larger returns than stocks with highest P/E ratio.

Studies in other countries also confirm the finding that factors other than beta can explain returns. Chan et al. (1991) reveal a significant relationship between equity returns and book-to-market (reverse of P/B) ratio. Pandey and Chee (2002) used yearly panel data from 1993 to 2000 and found that size, beta, E/P (reverse of P/E) ratio, dividend yield and book-to-market (reverse of P/B) ratio play a significant role in predicting the expected stock returns in Malaysia.

Comparing the valuation accuracy of different valuation techniques, while few studies claim that P/E benchmark valuation method performs better than P/B valuation method (Agnes and McNamara 2000); some other studies concluded that the P/B ratio better reflects expected future return on equity (Penman 1996; Chan and Chen 1991; Fama and French 1992 and 1995).

These conflicting remarks on the superiority of P/E against P/B in predicting stock returns coupled with dearth of studies pertaining to Indian capital market in this regard raise doubt whether popular acceptability of P/E benchmark technique is challenged by the P/B benchmark technique in India, which is sought to be answered in this research study.

4. Study objectives and methodology:

The study is centred on the following research objectives;

- i. To ascertain whether the price-earnings (P/E) and price-to-book (P/B) benchmark techniques can be a basis to identify value stocks that can earn larger returns in India.
- ii. To compare the ability of the P/E benchmark technique against the P/B benchmark technique in reaping superior equity returns in India.
- iii. To identify the impact, if any, of different investment periods on such benchmark technique based equity returns in India.

Data for 80 companies comprising of 8 different industries listed in *Bombay stock exchange* (BSE) using judgemental sampling technique are taken up from *capitaline* database for the time period of 08 years from January 1st, 2001 to December 31st, 2008. The industries considered were capital goods industry, finance industry, fast moving consumer goods industry, healthcare industry, housing related industry, information technology industry, metal & mining industry and oil, gas & power industry. For the sample equities, the P/Es and P/Bs have been calculated with half year intervals on January and July every year purposively, by dividing the market capitalisation of the equity for the corresponding month by the previous fiscal *profit after taxes* (PAT) and *book values* (BV) respectively (Aras and Yilmaz 2008). All the sample equities were ranked in the ascending order of their P/E and P/B respectively. The first ten equities with lowest P/Es were taken as P/E based equal-weighted value portfolio (value portfolio _{P/E}) and the last ten equities with highest P/Es were taken as P/E based equal-weighted glamour portfolio (glamour portfolio _{P/E}). Similarly P/B based equal-weighted value portfolio (value portfolio _{P/B}) and P/B based equal-weighted glamour portfolio (glamour portfolio _{P/B}) were also constructed.

The equity returns were computed individually for multiple investment periods of 6 month, 1 year, 2 year, 3

year and 4 year durations separately with half year intervals of January and July every year in terms of annualised changes in 'average market capitalisation', as it would then take care of adjustments for bonus, rights and stock splits. Subsequently annualised portfolio returns were also calculated for different investment periods. The statistical relationship between the financial ratios and equity returns for different investment periods were identified with the help of Karl Pearson's correlation analysis. The study examines the 'value-glamour return spread' for each of the benchmark techniques and applies paired *t* test of significance to detect whether each of these two techniques can be a basis to determine the level of equity returns in India or not. Further comparison of 'value portfolio P/E - value portfolio P/B return spread' and paired *t* test is carried out to compare the ability of the benchmark technique P/E against the P/B in reaping superior equity returns in India. Finally the 'investment period return spreads' of Value Portfolios were also examined to identify the impact of different investment periods on annualised returns of Value Portfolios. All calculations were carried out applying SPSS software.

5. Statistical relationship between the financial ratios and equity returns:

In confirmation to the mispricing view, the Karl Pearson's coefficients of correlations (*Figure-1*) between the benchmark techniques and the equity returns for different investment periods reveal that there exists an inverse association between the benchmark techniques (both the P/E and P/B) and the annualised return % of the equities across all the investment periods. This means that as the benchmark techniques reduces the subsequent equity returns increases and vice versa. Moreover the declining linear trend lines hint that as the duration of investment period expands such inverse association also levers up. During longer investment periods (two to four years) the negative correlation coefficients are higher than the all period average coefficients (-0.358 in case of P/E and -0.437 in case of P/B) which is not true during relatively shorter investment periods (six months to one year). This means that the benchmark techniques and equity returns exhibit a stronger inverse association in case of longer investment periods (two to four years) than comparatively shorter ones.

Further it is noticed that for all periods the P/Bs have greater negative association with subsequent equity returns rather than what the P/Es have, resulting almost parallel linear trend lines of respective correlation coefficients, where the correlation with P/B linear trend line lies below the linear trend line of correlation with P/E and this difference is found to be statistically significant at 1% level. This indicates a proportionate reduction in P/B suggests a reasonably higher proportionate increase in equity returns than what the same proportionate reduction in P/E suggests.

6. Portfolio returns:

The annualised returns of the portfolios are summarised in *Table-1*. It can be observed that whether on the basis of P/E or P/B, the value portfolios always earned more than the glamour portfolios. Across all investment periods P/B based value portfolio (value portfolio P/B) earned more than the P/E based Value Portfolio (value portfolio P/E). Further as the duration of investment period expands from six months to four years the portfolio returns also scale up.

7. Value - glamour return spread:

In this section the annualised returns of P/E & P/B based value portfolios are compared with the annualised return of P/E & P/B based glamour portfolios respectively. The comparison would facilitate in identifying whether the P/E and P/B benchmark techniques can be a basis to determine the level of equity returns in India and to compare the ability of the P/E benchmark technique against the P/B benchmark technique in fetching equity returns in India.

7.1. P/E based value-glamour return spread:

The comparison of P/E based value portfolio P/E and glamour portfolio P/E as well as their linear trends (*Table-1* & *Figure-2*) reveal that in all the periods the P/E based value-glamour spread is positive (i.e. value portfolio P/E annualised returns % are rather greater than that of the glamour portfolio P/E). The all period mean annualised return of value portfolio P/E is 480.94%, which is almost six times of the all period mean annualised return of glamour portfolio P/E (83.29%) and accordingly in terms of annualised return, the all period average P/E based value-glamour spread is 397.65% (the difference between all period mean

annualised returns of value portfolio P/E and glamour portfolio P/E).

But the paired t test unearth that the P/E based value-glamour spread is significant only in case of the longest four year investment period and insignificant for all other investment periods of lesser time duration at 5% significance level. This suggests that the P/E benchmark technique of equity investment is significantly successful only in case of longest investment period (four year) rather than relatively shorter ones.

7.2. P/B based value-glamour return spread:

Similarly the comparison of P/B based value portfolio P/B and glamour portfolio P/V as well as their linear trends (*Table-1 & Figure-3*) unveil that in all the periods the *P/B based value-glamour spread* is positive (i.e. value portfolio P/B annualised returns are rather higher than the annualised returns of the glamour portfolio P/B). The all period mean annualised return of value portfolio P/B is 834.17%, which is more than thirty-four times of the all period mean annualised return of glamour portfolio P/B (24.05%) and accordingly in terms of annualised return, the all period average P/B based value-glamour spread is 810.12% (the difference between all period mean annualised returns of value portfolio P/B and glamour portfolio P/B).

Further the paired t test bring to light that the P/B based value-glamour spread is significant in case of the longer investment periods of two to four years and insignificant for all other periods of relatively lesser time durations at 5% significance level. This suggests that the P/B benchmark technique of equity investment is successful only in case of longer investment period (two to four year) rather than shorter ones.

7.3. P/E vs. P/B based value-glamour return spread:

Comparing the value-glamour spread of P/E and P/B in terms of annualised return, the all period average P/B based value-glamour spread at 810.12% is more than twice the P/E based value-glamour spread of 397.65%. Further, it can be said that the P/B value-glamour spread becomes significant relatively earlier in two or more years investment periods, whereas the P/E value-glamour spread becomes significant only in case of the longest four year investment period. Hence in case the P/E benchmark technique is followed significantly higher returns can be obtained from value portfolio rather than glamour portfolio only in case the investment is made for the longest four year period. Whereas in case the P/B benchmark technique is followed significantly higher returns can be obtained from value portfolio rather than glamour portfolio even in relatively shorter investment periods (two to three years) as well.

8. Value portfolio P/E - value portfolio P/B return spread:

Subsequently the comparison of P/E based value portfolio and P/B based value portfolio as well as their linear trends (*Table-1 & Figure-4*) reveal that during all investment periods, the annualised returns of the value portfolio P/B are higher than that of value portfolio P/E . The all period mean annualised return of value portfolio P/B (834.17%) is 73.44% higher than the all period mean annualised return of value portfolio P/E (480.94%).

Moreover the paired t test discloses that the *value portfolio P/B and value portfolio P/E return spread* is significant irrespective of the investment period time duration at 5% significance level, whereas such spread becomes significant even at 1% level of significance in case of relatively longer investment periods (three to four years). This suggests that no matter what is the time duration of the investment period, the P/B benchmark technique of value stock investment is always capable of reaping significantly greater returns than the P/E benchmark technique of value stock investment and more so significantly during relatively longer investment periods (three to four years).

9. Investment period return spread of value portfolios:

Next let us consider the changes in annualised returns of value portfolios based on both the bench mark techniques as the duration of investment period changes. As is earlier observed in *Table-1*, the value portfolio returns escalate as the time duration of investment periods increase from six months through four years. Both value portfolio P/E and value portfolio P/B earn greater annualised returns during longer investment periods (three to four years) rather than the all period average annual returns (480.94% and

834.17% respectively), as well as than what they earn during relatively shorter investment periods (six months to two years).

Moreover the paired *t* test (*Table-2*) suggest that during longer investment periods (three to four years) both P/E and P/B based value portfolios earn significantly higher annualised returns than what they earn during relatively shorter periods (six months to two years), at 95% confidence level. But during two year investment period, while P/E based value portfolio earns significantly higher annualised returns than what it earns during the shortest six month investment period, the P/B based value portfolio earns significantly higher annualised returns than what it earns during all relatively shorter periods (six months to one year). This again establishes the supremacy of P/B benchmark technique in contrast to the P/E.

Summary and conclusion:

The study identifies an inverse association between the benchmark techniques (both the P/E and P/B) and the annualised equity returns in India. Moreover as the duration of investment period expands such inverse association also magnifies and exhibits a stronger inverse association in case of longer investment periods (two to four years) than comparatively shorter ones. Further it is noticed that for all investment periods, the P/Bs have significantly greater negative association with subsequent equity returns rather than what the P/Es have.

Across all the investment periods, in confirmation to the mispricing view both the *P/E and P/B based value-glamour spreads* are found to be positive. However the comparison of the value-glamour spreads reveal that P/B is superior with an all period average value-glamour spread of 810.12% which is more than twice the P/E based value-glamour spread of 397.65%. Additionally the P/B based value-glamour spread becomes significant relatively earlier in two or more years investment periods, while the P/E based value-glamour spread becomes significant only in case of the longest four year investment period. Further irrespective of the duration of investment periods, the (lowest) P/B based value portfolios always earned significantly larger returns than the (lowest) P/E based value portfolios. *Therefore it is conclusive that though both the benchmark techniques are capable of identifying the value stocks that can earn significantly higher returns; the P/B is a superior technique in India.*

The study also discovers that annualised returns of both the benchmark technique based value portfolios escalate as the duration of investment expands from six months through four years. During longer investment periods (three to four years) both the P/E and P/B based value portfolios earn significantly larger annualised returns than what they earn during relatively shorter periods (six months to two years). But during two year investment period, while the P/E based value portfolios earned significantly larger annualised returns against only the shortest six month investment period, the P/B based value portfolios earned significantly larger annualised returns against all relatively shorter investment periods (six months to one year), *which again confirms the superiority of P/B benchmark technique* in contrast to the P/E benchmark technique.

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Table- 1, Annualised returns (%) of benchmark technique based value and glamour portfolios.

Investment period	Annualised returns of P/E based portfolios			Annualised returns of P/B based portfolios		
	Value portfolio P/E	Glamour portfolio P/E	P/E based value-glamour spread	Value portfolio P/B	Glamour portfolio P/B	P/B based value-glamour spread

	(A)	(B)	(A-B)	(P)	(Q)	(P-Q)
Six month	260.76	49.56	211.20	306.92	14.69	292.23
One year	181.59	59.19	122.40	246.92	18.66	228.26
Two year	421.12	72.75	348.37	622.48	27.84	594.64
Three year	662.91	94.86	568.05	1144.33	27.7	1116.63
Four year	878.31	140.11	738.20	1850.21	31.38	1818.83
Average	480.94	83.29	397.65	834.17	24.05	810.12

This table represents the annualised returns obtained from the benchmark techniques based value and glamour portfolios as well as the value-glamour return spread during different investment periods, *Source: Empirical Research.*

Table- 2, Summarised paired *t* test of significance of mean differences of annualised returns of value portfolios.

Investment Period Pair	Significance of Mean Differences of Annualised Returns of	
	Value Portfolios <i>P/E</i>	Value Portfolios <i>P/B</i>
6 Month & 1 Year	<i>Insignificant</i>	<i>Insignificant</i>
6 Month & 2 Year	Significant	Significant
6 Month & 3 Year	Significant	Significant
6 Month & 4 Year	Significant	Significant
1 Year & 2 Year	<i>Insignificant</i>	Significant
1 Year & 3 Year	Significant	Significant
1 Year & 4 Year	Significant	Significant
2 Year & 3 Year	Significant	Significant
2 Year & 4 Year	Significant	Significant
3 Year & 4 Year	<i>Insignificant</i>	<i>Insignificant</i>

This table summarises the results of the paired *t* test of significance of mean differences of annualised returns of the benchmark techniques based value portfolios at 5% level of significance, *Source: Empirical Research.*

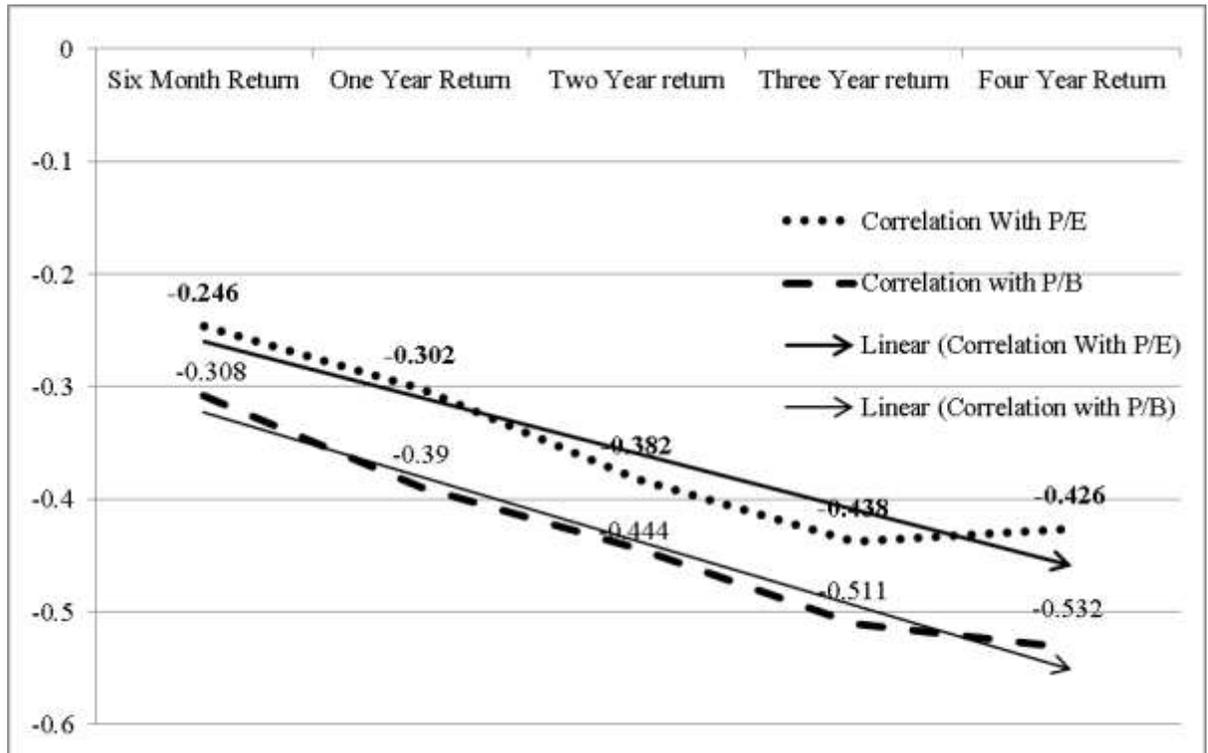


Figure-1, Correlation of annualised returns (%) with P/E and P/B.

The figure represents the coefficient of correlation between the annualised returns of equities and their benchmark ratios as well as their linear trends for different investment periods, *Source: Empirical Research.*

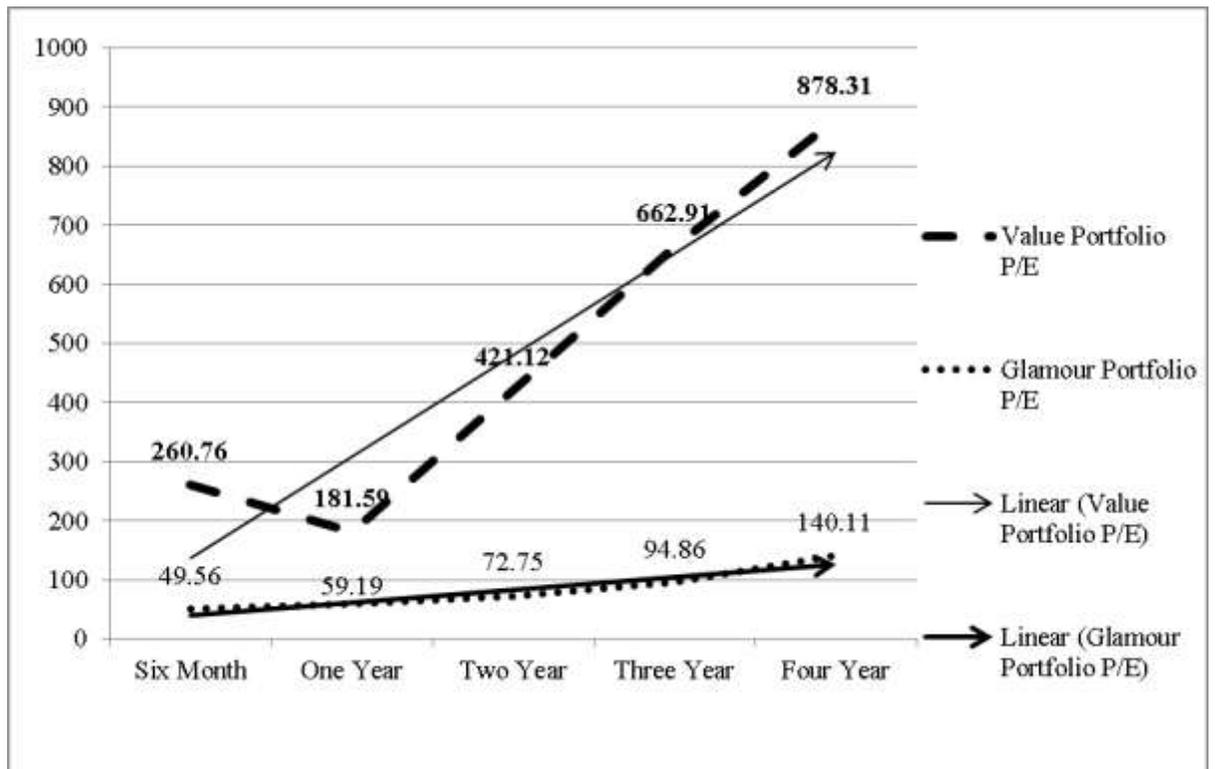


Figure-2, Comparison of annualised returns of P/E based value and glamour portfolios.
 This figure represents the annualised returns of P/E based value and glamour portfolios as well as their linear trend lines for different investment periods, *Source: Empirical Research.*

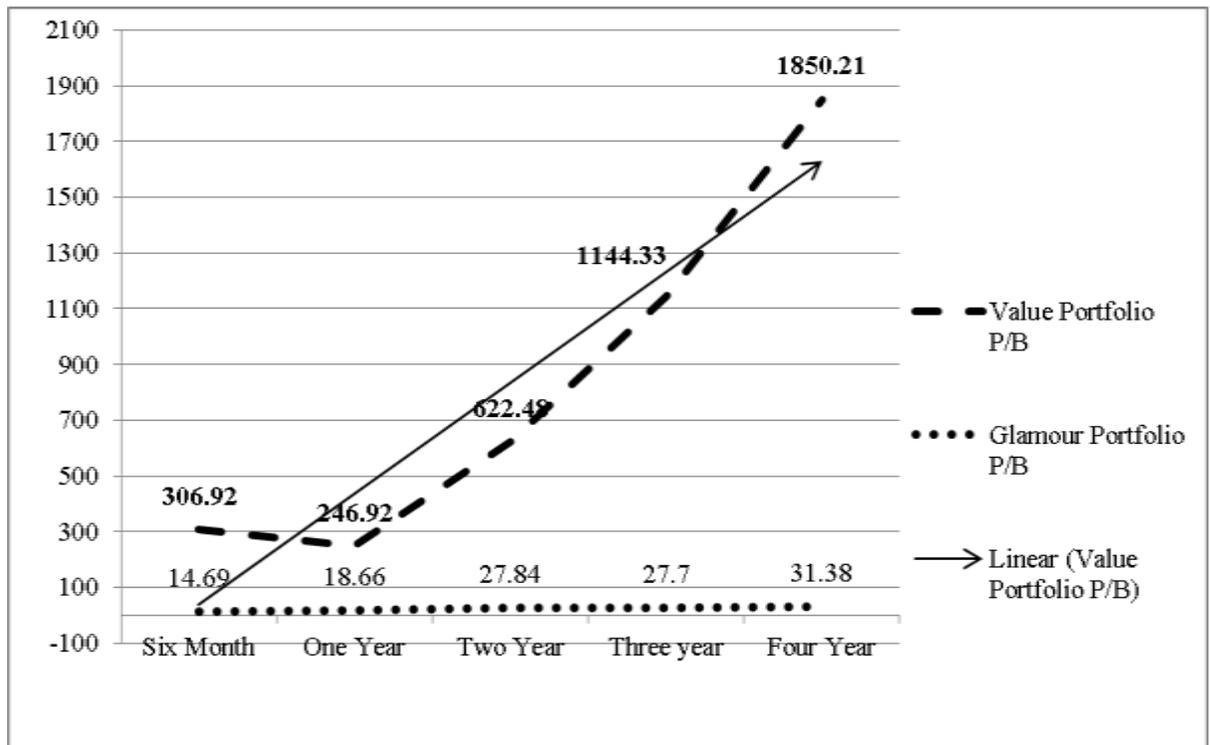


Figure-3, Comparison of annualised returns of P/B based value and glamour portfolios.

This figure represents the annualised returns of P/B based value and glamour portfolios as well as their linear trend lines for different investment periods, *Source: Empirical Research.*

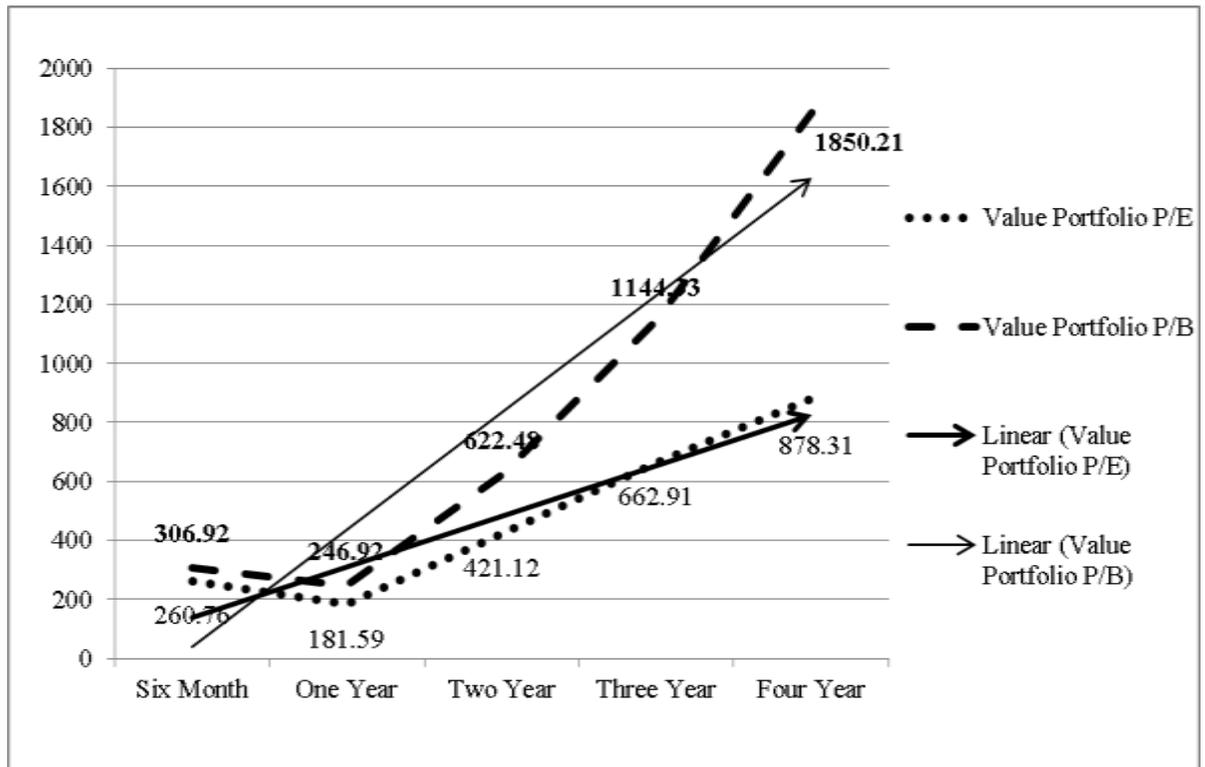


Figure-4, Comparison of annualised returns of P/E and P/B based value portfolios.

This figure represents the annualised returns of P/E and P/B based value and glamour portfolios as well as their linear trend lines for different investment periods, *Source: Empirical Research.*

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