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# Value versus Growth on the Dhaka Stock Exchange: Risk- Return Relationship

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## ABSTRACT

This paper examines the risk-return relationship in Dhaka Stock Exchange during 2000- 2009. The P/E and the P/B ratios are used to classify value and growth stocks. The risk-return relationship is positive and statistically significant for P/E sorted portfolios. However P/B sorted portfolios cannot be satisfied the positive risk-return relationship. The value stocks portfolio is less risky but produces higher returns than that of growth stocks portfolio. This paper sheds light on the discussion of efficiency of value stocks portfolio and growth stocks portfolio and also their risk -adjusted performance. The study found that value stocks portfolio is more efficient than that of growth stocks portfolio. The risk –adjusted performance of value stocks portfolio is better than that of growth stocks portfolio i.e. value stocks portfolio outperforms growth stocks portfolio. However, the paper shows that a P/E based search process does a better job of identifying value stocks and arriving at more consistent and sizeable value premium than does a search process based on P/B ratio in the Dhaka Stock Exchange during the study period.

**Keywords**: *value stocks, growth stocks, value premium, risk, price/earnings ratio, price/book value ratio*

## 1. INTRODUCTION

Value is often discussed in contrast with growth, but sometimes the lines between the two approaches become quite fuzzy in practice. The best way to define value investing is to contrast it to growth investing.

The value investor is looking for a company with sound fundamentals that may trade below its "intrinsic value" for some reasons. The market should eventually correct its inaccurate valuation and send stock prices sharply upward when that correction occurs. The value stocks are characterized by low multiples and high payout ratios and strong yields.

Growth investors tend to focus more on the company's value as an ongoing concern. Factors like the quality of the management, industry growth prospects, the company's positioning in the industry, operations in a niche area, favorable demographics, increasing affluence, the domestic construction growth and the outsourcing story are major drivers of growth stocks. The stocks that are bought by growth investors often appear expensive at first glance but such stocks must be looked at from a future perspective. Growth stocks are characterized by high multiples, low payout ratios and low yields.

## 2. REVIEW OF LITERATURE

Value investing was first developed in the 1930s by Graham and Dodd (1934). In the early 20th century, investors were guided mostly by speculation and insider information. Graham believed, however, that the true value of a stock could be determined through research.

In the late 1960s and in the 1970s, there was a strong belief in efficient capital markets. Fama developed Efficient Market Hypothesis (EMH). "Fama (1970) defined efficient market as a market in which prices at any time "fully reflect" available information is called "efficient". This implies that portfolio managers cannot systematically outperform the market. The expected return of a stock is solely a function of risk. With the knowledge that investors cannot outperform the market, the best strategy is to hold diversified portfolios.

At the end of the 1970s and during the 1980s, Academic research started to question whether stock returns were indeed consistent with the efficient market hypothesis or whether the market was segmented in terms of investment returns. Academics found anomalous abnormal returns for groups of stocks, which could not be explained in terms of risks (e.g. Banz 1981; DeBondt and Thaler 1985; Lakonishok et al. 1994; Daniel et al. 2002). A large body of academic research has confirmed the existence of a value premium (the difference in returns between value and growth stocks), namely, that value stocks outperform growth stocks.

"Basu (1977) reported that the average annual rates of return decline (to some extent monotonically) as one moves from the low P/E to high P/E portfolios".

More recently, Kwag and Lee, 2006, Arshanapalli and Nelson (2007), Phalippou (2008) and Athanassakos (2009) found evidence consistent with a positive value premium. Empirical research has, however, been done about the U.S. and other international stock markets. No study has yet been conducted on the performance of value and growth stocks in the Dhaka Stock Exchange (DSE). In this study, the performance of value and growth stocks have been analyzed employing a search process that involved P/E

ratio, and P/B ratio, on Dhaka Stock Exchange during the period from 2000 to 2009.

## 3. RATIONALE OF THE STUDY

Many empirical studies have been done on value and growth investing. However, most of these studies concentrated on the US stock markets; a few of them focused on non-U.S. markets. Value and growth stocks may indeed perform differently in non-U.S. markets because of differences in the ways investors behave in those markets. "Bauman and Johnson (1996) reported that both the quality and the availability of investment research information varies considerably from one country to another". Moreover, no research has yet been carried out on value and growth investing in the Dhaka Stock Exchange (DSE) which provides a reason for conducting this study.

## 4. OBJECTIVES OF THE STUDY

The main objective of this study is to evaluate the risk-adjusted performance of value and growth investing strategies and test whether the value stocks outperform growth stocks in Dhaka Stock Exchange (DSE). The situation or the underlying reasons are far less settled when it comes to providing an explanation for the differences between the performance of value and growth portfolios. This paper focus on risk-return relationship, efficiency and risk-adjusted performance of value and growth portfolios in DSE.

## 5. METHODOLOGY AND DATA DESCRIPTION

### 5.1 Secondary Data

Since the data required from the Dhaka Stock Exchange before 2000 is not published in DSE website and is not available in any other easily accessible way, the study is limited to data which are already available in soft copy, compiled and printed. The data for all stocks listed on DSE have been collected from four sources. One is DSE website. The second is the publications of central library of the Dhaka Stock Exchange such as Various Issues of Monthly Review, fortnightly capital market, and Annual Report of the Dhaka Stock Exchange during the study period. The third is the website of Securities and Exchange Commission of Bangladesh. The fourth is the publications of SEC such as Quarterly Review and Annual Report.

### 5.2 Sample Selection

The Dhaka Stock Exchange is small with number of securities varying from 241 in 2000 to 415 in 2009. Due to time constraints, it is not possible to use the entire population for this study. The method of selecting value and growth stocks is done by systematic sampling. The total observations are 678 individual listed stocks that are taken from the population of 3390 individual stocks of the Dhaka Stock Exchange. The total observations consist of 308 individual stocks that are equally divided into two categories for value and growth stocks based on P/E ratio and similarly 370 individual stocks that are also equally divided into two categories for value and growth stocks based on P/B ratio. However, stocks of life insurance companies and mutual funds have been excluded in the sampling of this study. The Companies which have merged, filed for bankruptcy, or have been delisted from exchange are usually excluded from the sample. The number of delisted firms over the period 2000 -2009 is small resulting in small loss of information.

### 5.3 Portfolio Formation

The construction of portfolios is as per Fama and French approach. The value and growth stocks portfolios have been sorted based on some important financial ratios such as Price-to- Earnings ratio (P/E ratio) and Price-to-Book value ratio (P/B ratio). The study has used historical data to calculate these ratios for all individual stocks listed on the DSE. In order to form value and growth stocks portfolio, the stocks have been divided into two deciles, i.e. 10 % groups classified depending on the level of their ratios. The lowest decile, is the group comprising stocks with low P/E and P/B ratios is selected as value stocks. On the other hand, the highest decile, is the group comprising stocks with high P/E and P/B ratios is selected as growth stocks. For the price/earnings ratio and price/book value ratio, only positive ratios have been used to classify stocks into decile portfolios. The stocks with negative ratios (negative P/E ratios and negative P/B ratios) are excluded because of "Lakonishok et al. (1994) reported that negative ratios cannot be interpreted in terms of expected growth rates". The stocks, which are very irregular in terms of trading, calling AGM and publishing financial data, are also excluded because these stocks failed to provide up to date data on a regular basis or provided partial data.

Most of the Bangladeshi company's 'year end' is December and therefore, decile portfolios are formed in January of each year based on 'prior year end' data of DSE from 2000 to 2009 when the majority of the new information becomes available to the public. Stocks in each portfolio are equally weighted and this kind of portfolio construction has been done for each year similarly during the sample period.

### 5.4 Returns

To calculate returns for value and growth portfolios, total annual return for each stock is calculated by dividing the capital gain/loss with the initial purchase price and then adding the dividend paid during the sample period. The returns of each stock of the portfolio are summed and then divided by the number of stocks in each portfolio in order to get the mean annual portfolio return.

### 5.5 Portfolio Performance

The performance of value and growth portfolios has been examined in terms of a number measures such as

mean annual portfolio returns, risk-return ratio, and Sharpe ratio. The risk-return ratio is simpler version of Sharpe ratio but it does not adjust the risk while evaluating the performance of value and growth portfolios. The risk-return ratio measures the portfolio's risk level, using the portfolio's return and its risk. When risk-return ratio of a portfolio is higher than those of its peers, it means that the portfolio delivers a better return for a given unit of risk.

[1] The 31st December is the bank holiday in Bangladesh. The Dhaka stock market remains closed on that day. Therefore, the 30th December is the calendar year end in the DSE.

[2] Holding the stock in record date or book closure date is treated as the enjoyment of dividend of that particular year.

However, the Sharpe ratio evaluates the risk-adjusted performance of value and growth portfolios. In order to be able to determine which portfolio is actually the most profitable, one has to compare the returns on a risk-adjusted basis. The portfolios all have different risks and hence will have different returns. Without adjusting risk for these differences, a comparison between them would not be objective. An objective comparison therefore demands that the portfolios are adjusted for the respective risk.

There are a number of ways to calculate risk-adjusted returns. The three most commonly used methods are the Sharpe ratio, the Treynor ratio and Jensen's measure. It is important to pick the appropriate risk measure when comparing risk-adjusted portfolio performance. The Sharpe ratio can always be used since it measures risk by the standard deviation, i.e. total risk, which all portfolios have. The Treynor and Jensen measure can however only be used for well diversified portfolios since they only take into account the systematic risk, beta. Since beta has not been considered in this study, only Sharpe ratio (known as reward to variability) has been used for measuring risk-adjusted performance of value and growth portfolios.

### 5.6 Risk

The risk-return relation is one of the foundational tenants of finance theory and it is an important determinant of investment decisions. In the study the standard deviation of returns has been used as a measure of risk rather than other measures of risk such as beta. Beta has lost some of its supremacy. In a recent study Fama and French have given some insights into the so-called "death of beta". "Fama and French (1992) reported that β has no power when used alone to explain average returns". "Estrada (2000) reported that in emerging markets, systematic risk measured by beta is not significantly related to stock returns. The lack of explanatory power of systematic risk can be explained in several ways. One is that emerging markets are not fully integrated to the world market, in which case beta is not an appropriate measure of risk". Recent evidence shows that unsystematic risk is also priced. "Jiang and Lee (2004) reported that idiosyncratic volatility directly affects stock prices beyond its effect on the present value of expected future cash flows and/or changes in expected returns". Thus, standard deviation is an appropriate measure of risk which reflects both systematic and unsystematic risk.

Moreover, it captures the total variability in the asset or portfolio's return, whatever may be the source(s) of that variability.

## 6. RESULTS AND DISCUSSION

After the formation of value and growth portfolios, total annual return for each stock of the portfolio is calculated for comparison of their return performances. Rational investment decision making leads to the axiom that one must bear higher risk in order to earn higher return. However, there are instances where certain investment strategies consistently outperform others, even after adjusting for differences in traditional risk measures. But no single measure actually looked at both risk and return together. Therefore, it is important to examine factors, including those which indicate an investment's risk level. In this study, the correlation and regression of risk and return, risk-return ratio and Sharpe ratio have been used for evaluating the performance of value and growth portfolios considering risk.

[3]The definition of the risk-free rate, denoted is the rate that an investor can earn with certainty, without taking any risk. A risk-free asset, generating the risk-free rate, has a standard deviation of zero. 364-day Treasury bill rate of Bangladesh has been used as risk free return while calculating the Sharpe ratio.

**Table 1:** Correlation between risk and return for value and growth portfolios, 2000- 2009

**Correlations**

| | | RVSP (P/E) | RGSP (P/E) | STDVSP (P/E) | STDGSP (P/E) | RVSP (P/B) | RGSP (P/B) | STDVSP (P/B) | STDGSP (P/B) |
|---|---|---|---|---|---|---|---|---|---|
| RVSP(P/E) | Pearson Correlation | 1 | .871** | .876** | .868** | .566 | .837** | -.018 | .347 |
| | Sig. (2-tailed) | . | .001 | .001 | .001 | .088 | .003 | .962 | .327 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| RGSP(P/E) | Pearson Correlation | .871** | 1 | .618 | .955** | .786** | .741* | .031 | .277 |
| | Sig. (2-tailed) | .001 | . | .057 | .000 | .007 | .014 | .933 | .438 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| STDVSP(P/E) | Pearson Correlation | .876** | .618 | 1 | .627 | .158 | .911** | -.131 | .319 |
| | Sig. (2-tailed) | .001 | .057 | . | .052 | .663 | .000 | .719 | .370 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| STDGSP(P/E) | Pearson Correlation | .868** | .955** | .627 | 1 | .767** | .673* | -.069 | .295 |
| | Sig. (2-tailed) | .001 | .000 | .052 | . | .010 | .033 | .849 | .407 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| RVSP(P/B) | Pearson Correlation | .566 | .786** | .158 | .767** | 1 | .225 | .089 | .145 |
| | Sig. (2-tailed) | .088 | .007 | .663 | .010 | . | .531 | .807 | .689 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| RGSP(P/B) | Pearson Correlation | .837** | .741* | .911** | .673* | .225 | 1 | -.143 | .246 |
| | Sig. (2-tailed) | .003 | .014 | .000 | .033 | .531 | . | .693 | .493 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| STDVSP(P/B) | Pearson Correlation | -.018 | .031 | -.131 | -.069 | .089 | -.143 | 1 | -.025 |
| | Sig. (2-tailed) | .962 | .933 | .719 | .849 | .807 | .693 | . | .946 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| STDGSP(P/B) | Pearson Correlation | .347 | .277 | .319 | .295 | .145 | .246 | -.025 | 1 |
| | Sig. (2-tailed) | .327 | .438 | .370 | .407 | .689 | .493 | .946 | . |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

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

*. Correlation is significant at the 0.05 level (2-tailed).

RVSP (P/E) = Return for Value Stocks Portfolio Based on Price – to – Earnings Ratio.
RGSP (P/E) = Return for Growth Stocks Portfolio Based on Price – to – Earnings Ratio.
STDVSP (P/E) = Standard Deviation of Returns for Value Stocks Portfolio Based on Price – to – Earnings Ratio.
STDGSP (P/E) = Standard Deviation of Returns for Growth Stocks Portfolio Based on Price – to – Earnings Ratio.
RVSP (P/B) = Return for Value Stocks Portfolio Based on Price – to – Book Ratio.
RGSP (P/B) = Return for Growth Stocks Portfolio Based on Price – to – Book Ratio.
STDVSP (P/B) = Standard Deviation of Returns for Value Stocks Portfolio Based on Price – to – Book Ratio.
STDGSP (P/B) = Standard Deviation of Returns for Growth Stocks Portfolio Based on Price – to – Book Ratio.

### 6.1 Risk-return Relationship of Value and Growth Portfolio

The risk-return relationship has been examined by the correlation between risk and return, the scatter plot of risk and return, the standard deviation of returns, risk-return ratio, and the Sharpe ratio for value and growth portfolios based on both the P/E and the P/B ratios.

**Portfolio Sorted by P/E Ratio:**

The correlation between the risk and return is 0.88 (Table 1) for P/E sorted value stocks portfolio and this result is statistically significant at the 1 percent level (2-tailed) The estimation results of regression of mean annual return for value stocks portfolio based on P/E ratio ($RVSP_{P/E}$) on risk as measured by standard deviation of mean annual returns for value stocks portfolio based on P/E ratio ($STDRVSP_{P/E}$) is shown in equation (1).

$$RVSP_{P/E}(t) = -22.96 + 1.07\,(STDRVSP_{P/E})(t) \quad (1)$$

t- value (-1.27) (5.135) **

$\bar{R}^2$ =0.74; F (1, 8) = 26.37**; DW= 0.84; N= 10

The estimated coefficient is positive and statistically significant at the 1 percent level (2-tailed). The value of the coefficient indicates if risk for value stocks portfolio increases by 1 percent then return for value stocks portfolio increases by 1.07 percent. The adjusted R- square is 0.74 which

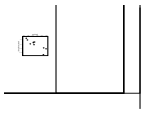

**Fig 1:** Risk vs. return scatter plot of value portfolios based on P/E ratio, 2000 -2009

indicates 74 percent variation in returns of value stocks portfolio is accounted for by risk for value stocks portfolio. Therefore, the return for value stocks portfolio based on P/E ratio is positively correlated with the risk. The value of F-Statistic shows that the risk- return relationship is significant at the 1 percent level for value stocks portfolio sorted by P/E ratio.

The correlation between the risk and return is 0.96 (Table 1) for P/E sorted growth stocks portfolio and this result is statistically significant at the 1 percent level (2-tailed).The estimation results of regression of mean annual return for growth stocks portfolio based on P/E ratio ($RGSP_{P/E}$) on risk as measured by standard deviation of mean annual returns for growth stocks portfolio based on P/E ratio ($STDRGSP_{P/E}$) is shown in equation (2).

$$RGSP_{P/E}(t) = -31.33+0.80\ (STDRGSP_{P/E})(t) \quad (2)$$

t- value (-3.750)** (9.090)**

$\overline{R}^2 =$ 0.91; F (1, 8) = 82.63**; DW= 1.79; N= 10

The estimated coefficient is positive and statistically significant at the 1 percent level (2-tailed).The value of the coefficient indicates if risk for growth stocks portfolio increases by 1 percent then return for growth stocks portfolio increases by 0.80 percent.

The adjusted R- square is 0.91 which indicates that 91 percent of variation in returns of growth stocks portfolio is accounted for by risk for growth stocks portfolio. Thus, the return for growth stocks portfolio based on P/E ratio is also positively correlated with the risk. The value of F-Statistic shows that the risk -return relationship is significant at the 1 percent level for growth stocks portfolio based on P/E ratio. Thus, based on P/E ratio the risk return relationship is positive for both the value and growth portfolios.

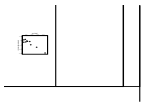

**Fig 2:** Risk vs. return scatter plot of growth portfolios based on P/E ratio, 2000 -2009

**Portfolio Sorted by P/B Ratio:**

The correlation between the risk and return for P/B sorted value stocks portfolio is very low i.e. $r = 0.089$ (Table 1) and the relation is not statistically significant.

The estimation results of regression of mean annual return for value stocks portfolio based on P/B ratio ($RVSP_{P/B}$) on risk of value stocks portfolio based on P/B ratio ($STDRVSP_{P/B}$) is shown in equation (3).

$$RVSP_{P/B}(t) = 31.83 + 0.14\,(STDRVSP_{P/B})(t) \quad (3)$$

t- value (0.567) (0.252)

$\overline{R}^2 =$ 00; F (1, 8) = 0.06; DW= 1.02; N= 10

The estimated coefficient is positive but statistically insignificant. The adjusted R- square indicates that risk does not explain variation in returns for value stocks portfolio based on P/B ratio. The value of F-statistics shows that the risk-return relationship is not significant.

**Fig 3:** Risk vs. return scatter plot of value portfolios based on P/B ratio, 2000 – 2009

The correlation between the risk and return is 0.26 for P/B sorted growth stocks portfolios and this result is not statistically significant. The estimation results of regression of mean annual return for growth stocks portfolio based on P/B ratio ($RGSP_{P/B}$) on risk of growth stocks portfolio based on P/B ratio ($STDRGSP_{P/B}$) is shown in equation (4).

$$RGSP_{P/B}(t) = 4.76 + 0.20\,(STDRGSP_{P/B})(t) \quad (4)$$

t-value (0.238) (0.718)

$\overline{R}^2 = 00$; F (1, 8) = 0.52; DW= 2.25; N= 10

The estimated coefficient is positive but statistically insignificant. The adjusted R- square indicates that risk does not explain variation in returns for growth stocks portfolio based on P/B ratio. The value of F-statistics shows that the risk-return relationship is not significant.

**Fig 4:** Risk vs. return scatter plot of growth portfolios based on P/B ratio, 2000 – 2009

Thus, based on P/B ratio the risk- return relationship is positive but very weak and statistically insignificant for both the value and growth portfolios.

In sum, the risk-return relation is positive and statistically significant for the value and growth portfolio based on P/E ratio. On the other hand, the risk-return relation is positive but statistically insignificant for the value and growth stocks portfolio based on P/B ratio. The positive relationship is satisfied by the P/E ratio but the P/B ratio does not satisfy this relationship. Hence, finally the general conjecture that there is a positive relationship between the risk and the return for value and growth stocks portfolios can be rejected.

### 6.2 Portfolio Risk

As mentioned before, risk is commonly measured by the standard deviation, which is the square root of variance. Thus it is a measure of variation from the average return of a portfolio. Standard deviation is also used to measure volatility and portfolio risk. For a portfolio, risk is determined by a measure of price movement and diversion. A higher standard deviation means a higher risk.

The relative risk as measured by coefficient of variation for P/E sorted value and growth portfolios, are 96.71 and 164.41 (Table 2) respectively. For P/B sorted portfolio, the corresponding risk of value and growth portfolios are 133.11 and 218.91 (Table 2) respectively. These results indicate that value portfolio is less risky than growth portfolio.

These findings are inconsistent with those of other researchers, such as Fama and French (1992, 1993, 1996, 1998), Doukas et al. (2004), and Banko et al (2006). They have argued, “risk differences may be the reason for the discrepancy in returns between the value and growth stocks”.

### 6.3 Performance of Value and Growth Portfolio: Risk-Return Ratio

The risk- return ratio is a simpler version of the Sharpe ratio. It measures the return per unit of risk, but does not take into account the excess return from a portfolio's return, above that of a risk-free instrument. Therefore, the risk-return ratio measures the portfolio's risk level, using the portfolio's return and its risk. When risk-return ratio of a portfolio is higher than those of its peers, it means that the portfolio delivers a better return for a given unit of risk. So from the risk-return ratio standpoint, a portfolio is "better" or "efficient" if for a given level of risk it gives the maximum return.

[4] The standard deviation of returns is used as a measure of risk rather than other measures of risk such as beta. Beta has lost some its supremacy in recent study. Fama and French (1992) give some insight into the so-called "death of beta". The standard deviation of stock returns reflects total risk i.e. systematic and unsystematic risk. As recent evidence shows that unsystematic risk is also priced, as well and hence a total risk measure may be a better and all inclusive measure of risk (see Jiang and Lee 2004)

**Portfolio Sorted by P/E Ratio:**

The risk-return ratio for value stocks portfolio and growth stocks portfolio are 1.03 and 0.61 (Table 2) respectively based on P/E ratio. The results indicate that P/E sorted value stocks portfolio gives 1.03 unit returns against 1 unit of risk and P/E sorted growth stocks portfolio gives 0.61 unit returns against 1 unit of risk. Figure 5 shows the risk- return ratios of P/E sorted value and growth portfolios that explain performance of value and growth portfolios based on risk (without adjusting risk).The figure exhibits that risk-return ratios for all the value portfolios are positive except the portfolio of 2005.On the other hand, the risk-return ratios for all the growth portfolio are positive except those of 2003 and 2005. However, the magnitude of risk - return ratio for all the value portfolios are higher than those of growth portfolios except that of 2005.The risk-return ratio for value portfolio of 2005 is negative. On the other hand, the risk-return ratio for growth portfolio of 2003 and 2005 are negative. The 1st and 2nd largest spread of risk-return ratios are found for P/E sorted value portfolio of 2000 and 2001 and these ratios are 7.37 times and 8.20 times higher respectively than those of growth portfolios. After 2001, the spreads between risk- return ratio of value and growth portfolios have a decreasing trend. It might have happen because of some initiatives (such as automated trading system that started in 1998) that were taken to recover the Dhaka Stock Exchange after the great crash of 1996. On risk-return ratio basis, the value portfolio outperforms the growth portfolio consistently. Especially during the beginning years of the study period, the value portfolio outperforms growth portfolio remarkably in terms of risk -return ratio.

**Table 2:** Risks and returns for value and growth portfolios, 2000-2009

| Year | Price/earnings ratio | | | | Price/book ratio | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean Return (%) | | Standard Deviation (%) | | Mean Return (%) | | Standard Deviation (%) | |
| | Value | Growth | Value | Growth | Value | Growth | Value | Growth |
| 2000 | 59.21 | 9.42 | 67.08 | 78.72 | 56.46 | -5.68 | 71.40 | 35.94 |
| 2001 | 36.73 | 3.76 | 63.08 | 52.94 | 23.26 | -6.18 | 96.65 | 173.20 |
| 2002 | 4.54 | 18.37 | 23.60 | 26.38 | 59.88 | 4.02 | 115.97 | 30.33 |
| 2003 | 28.75 | -10.73 | 70.68 | 26.73 | -29.21 | 3.08 | 180.21 | 27.89 |
| 2004 | 96.31 | 14.47 | 130.66 | 43.47 | -11.73 | 51.17 | 68.73 | 56.85 |
| 2005 | -14.5 | -15.4 | 16.12 | 40 | 1.23 | -25.09 | 61.67 | 17.29 |
| 2006 | 31.28 | 7.61 | 63.37 | 58.85 | 71.83 | -12.04 | 85.32 | 24.26 |
| 2007 | 106.86 | 78.41 | 146.65 | 139.59 | 23.7 | 88.16 | 50.23 | 73.25 |
| 2008 | 49.68 | 47.92 | 42.59 | 87.61 | 72.23 | 1.89 | 94.03 | 50.12 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2009 | 174.83 | 146.55 | 129.13 | 214.46 | 182.69 | 62.47 | 127.96 | 88.33 |
| Portfolio Performance 2000-09 | | | | | | | | |
| Period average | 57.37 | 30.04 | | | 45.03 | 16.18 | | |
| Standard Deviation | 55.48 | 49.39 | | | 59.94 | 35.42 | | |
| Coefficient of Variation | 96.71 | 164.41 | | | 133.11 | 218.91 | | |
| Risk-return ratio | 1.03 | 0.61 | | | 0.75 | 0.46 | | |

[5] Standard deviation is a general statistical measure of volatility. Standard deviation has been a classical portfolio risk measure since Markowitz used it in the 1950s.

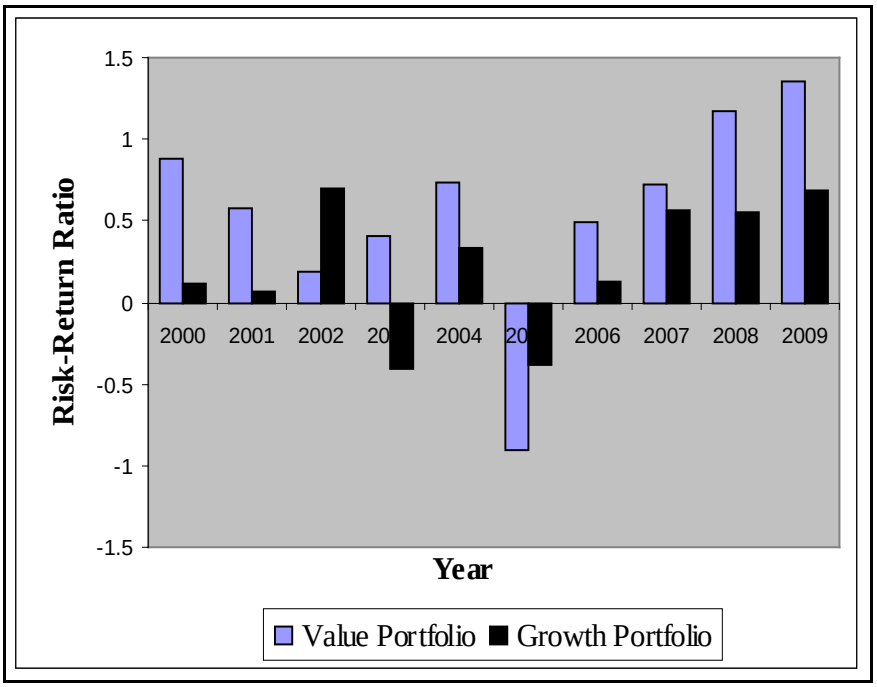


**Fig 5:** Risk -return ratio for P/E sorted value and growth portfolios, 2000-2009

**Portfolio Sorted by P/B Ratio:**

The risk-return ratio for value stocks portfolio and growth stocks portfolio are 0.75 and 0.46 (Table 2) respectively based on P/B ratio. The results indicate that P/B sorted value stocks portfolio gives 0.75 unit returns for 1 unit of risk and P/B sorted growth stocks portfolio gives 0.46 unit returns for 1 unit of risk.

Figure 6 shows the risk-return ratios of P/B sorted value and growth portfolios that explain performance of value and growth stocks portfolio based on risk (without adjusting risk). Risk-return ratios for all the value portfolios are positive except those of 2003 and 2004. On the other hand, the risk-return ratios for all the growth portfolios are positive except those of 2000, 2005, and 2006. However, the magnitude of risk-return ratio for all the value portfolios are higher than those of growth portfolios except those of 2003, 2004 and 2007.The risk-return ratios for value portfolio of 2003 and 2004 are negative. On the other hand, the risk-return ratio for growth portfolios of 2000, 2005, and 2006 are negative. The spread of risk-return ratio for value portfolios in beginning years of the study such as 2000 and 2001 are 6 times and 7.74 times higher respectively than those of growth portfolios. After 2001, the spreads between risk- return ratio of value and growth portfolios have a

decreasing trend except that of 2008. Again, it might be due to the initiatives that were taken to recover the Dhaka Stock Exchange after the great crash of 1996. On risk-return ratio basis, the value portfolio outperforms the growth portfolio consistently. Especially in the beginning years of the study, the value portfolios outperform growth portfolios remarkably on risk-return ratio basis for the P/B sorted portfolios.

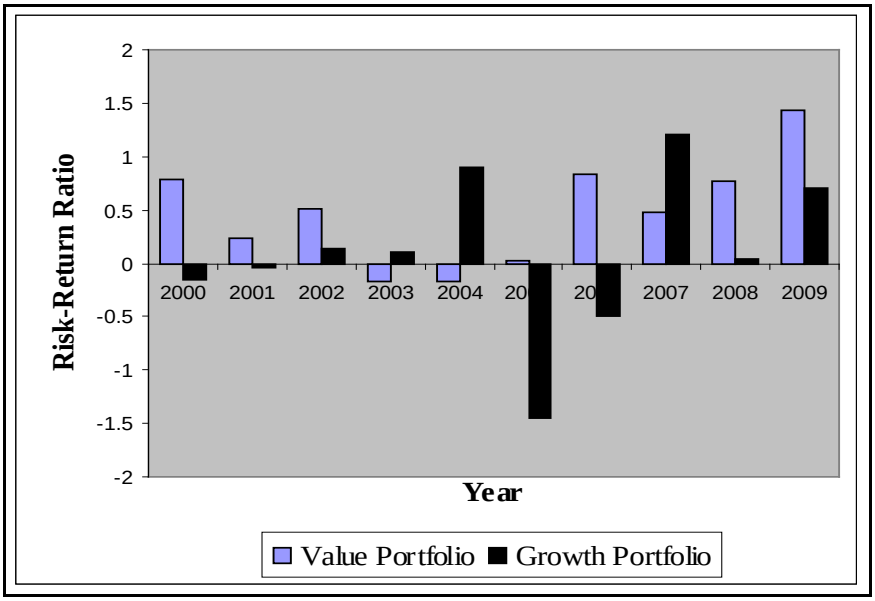


**Fig 6:** Risk-return ratio for P/B sorted value and growth portfolios, 2000-2009

The risk-return ratio for value stocks portfolio is higher than that of the growth stocks portfolio based on both the P/E and the P/B ratios. These results indicate that the risk for value stocks portfolio is more justified and rational compared with the risk for growth stocks portfolio based on both the P/E and the P/B ratios. So from the stand point of risk-return ratio, value portfolio is more efficient than that of growth portfolio and value portfolio outperforms growth portfolio. Especially, in the beginning years of the study, the value portfolios outperform growth portfolios remarkably in terms of risk-return ratio. Finally, it is observed that the P/E sorted portfolios have done better job than those of P/B sorted portfolios in terms of risk-return ratio.

### 6.4 Risk - Adjusted Performance of Value and Growth Portfolio: The Sharpe Ratio

The Sharpe ratio measures an investment's excess return (or Risk Premium) against per unit of risk. The Sharpe ratio is used to characterize how well the return of an asset compensates the investor for the risk taken; the higher the Sharpe ratio the better it is. Without any risk, an investor can earn a risk-free return rate on a riskless security. But investment in securities is risky. The return on any security above the risk-free return is called risk premium which is the reward for the risk. Sharpe ratio is the ratio of the risk premium to the risk. It is important to conduct portfolio comparisons on a risk-adjusted basis.

Since investors are risk-averse, if faced with two investments with the same expected return the one with the lowest risk will be preferred and therefore they expect compensation for the level of risk of the portfolio. That means that the returns on two different portfolios are compared on a fair basis, adjusting for the fact that riskier portfolios should earn higher expected returns than less risky portfolios. There are a number of ways to calculate risk-adjusted returns; all of them require data such as the portfolios' standard deviation, rate of return, overall market performance and the risk-free rate. The three most commonly used methods for measuring risk-adjusted portfolio performance are as mentioned earlier, the Sharpe ratio, the Treynor ratio and Jensen's measure. As pointed out before, the Sharpe ratio has been used because of its several advantages. It is calculated by subtracting the risk-free rate of return (364-day Treasury bill rates of Bangladesh) from the mean annual portfolio return and dividing the result by the standard deviation of the portfolio returns. It should be noted that the greater a portfolio's Sharpe ratio, the better its risk-adjusted portfolio performance. Table 3 presents the risk -adjusted portfolio performance as measured by Sharpe ratio.

**Portfolio Sorted by P/E Ratio:**

The mean Sharpe ratios for P/E sorted value and growth stocks portfolios are 0.41 and 0.09 respectively. The results indicate that based on P/E ratio, the value stocks portfolio produces 0.41 unit risk premium for 1 unit of risk. On the other hand, the growth stocks portfolio produces

negligible risk premium that is, 0.09 unit for 1 unit of risk. The mean spread between Sharpe ratio of value and growth portfolios based on P/E ratio is 0.32 which indicates that value stocks portfolio produces 0.32 units more risk premium then the growth stocks portfolio for a given unit of risk. However, the mean Sharpe ratio for value stocks portfolios is higher than the mean Sharpe ratio of growth stocks portfolios. This result indicates better risk-adjusted performance of value stocks portfolio compared growth stocks portfolio. Figure 7 shows the risk -adjusted portfolio performance as measured by Sharpe ratio based on P/E ratio. The figure shows that the risk -adjusted performance of P/E sorted value portfolios is better than those of growth portfolios except those of 2002 and 2005. Only growth portfolio of 2002 has done better than the value portfolio. The value portfolio of 2002 and 2005 witnessed negative risk premium and similarly the growth portfolio of 2001, 2003 and 2005 witnessed negative risk premium.

**Table 3:** Sharpe ratios for value and growth portfolios, 2000-2009

| Year | Price/earnings ratio | | | Price/book ratio | | |
|---|---|---|---|---|---|---|
| | Low P/E (Value) | High P/E (Growth) | (Spread between Value and Growth) | Low P/E (Value) | High P/E (Growth) | (Spread between Value and Growth) |
| 2000 | 0.7679 | 0.0218 | 0.7460 | 0.6829 | -0.3723 | 1.0552 |
| 2001 | 0.4650 | -0.0688 | 0.5337 | 0.1641 | -0.0784 | 0.2425 |
| 2002 | -0.0492 | 0.4803 | -0.5294 | 0.4672 | -0.0554 | 0.5226 |
| 2003 | 0.2667 | -0.7718 | 1.0385 | -0.2170 | -0.2445 | 0.0275 |
| 2004 | 0.6889 | 0.1879 | 0.5009 | -0.2623 | 0.7893 | -1.0516 |
| 2005 | -1.3337 | -0.5600 | -0.7737 | -0.0936 | -1.8560 | 1.7624 |
| 2006 | 0.3626 | -0.0117 | 0.3744 | 0.7446 | -0.8384 | 1.5830 |
| 2007 | 0.6707 | 0.5008 | 0.1699 | 0.3026 | 1.0875 | -0.7849 |
| 2008 | 0.9669 | 0.4499 | 0.5169 | 0.6778 | -0.1319 | 0.8096 |
| 2009 | 1.2881 | 0.6437 | 0.6444 | 1.3613 | 0.6110 | 0.7503 |
| Period average | 0.4094 | 0.0872 | 0.3222 | 0.3828 | -0.1089 | 0.4917 |

The Sharpe ratios of value portfolios for 2000 and 2001 are 35.22 and 7.76 times (calculated from table 3) higher respectively than those of growth portfolios. After 2001, the spreads between Sharpe ratio of value and growth portfolios have a decreasing trend except that of 2006.

These results indicate that in the beginning years of the study period, the risk- adjusted performance of value portfolios is much better than those of growth portfolios.

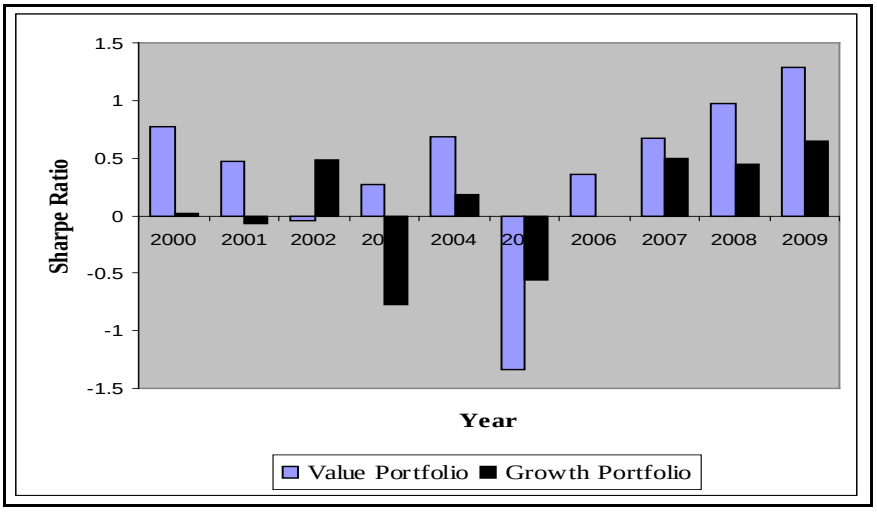


**Fig 7:** Sharpe ratio for P/E sorted value and growth portfolios, 2000-2009

**Portfolio Sorted by P/B Ratio:**

The mean Sharpe ratios for value and growth stocks portfolios are 0.38 and -0.11 respectively based on P/B ratio. The results indicate that based on P/B ratio, the value stocks portfolio produces 0.38 unit risk premium for 1 unit of risk. On the other hand, the growth stocks portfolio produces negative risk premium that is, -0.11 unit negative risk premium for 1 unit of risk. A negative Sharpe ratio is considered bad. It means it is better, on a risk -adjusted basis, to hold cash.

The spread between Sharpe ratio of value and growth portfolios based on P/B ratio is 0.49 which indicates that value portfolio produces 0.49 units more risk premium then the growth portfolio for a given unit of risk. The mean Sharpe ratio for value portfolios is higher than those of growth portfolios. In fact, growth stocks portfolios did not yield any risk premium rather they produce negative risk premium. These results indicate better risk-adjusted performance of value portfolio compared with growth portfolio based on P/B ratio.

Figure 8 shows the risk -adjusted portfolio performance as measured by Sharpe ratio based on P/B ratio. The figure exhibits that the risk -adjusted performance of P/B sorted value portfolios are better than those of growth portfolios except the portfolios of 2004 and 2007.

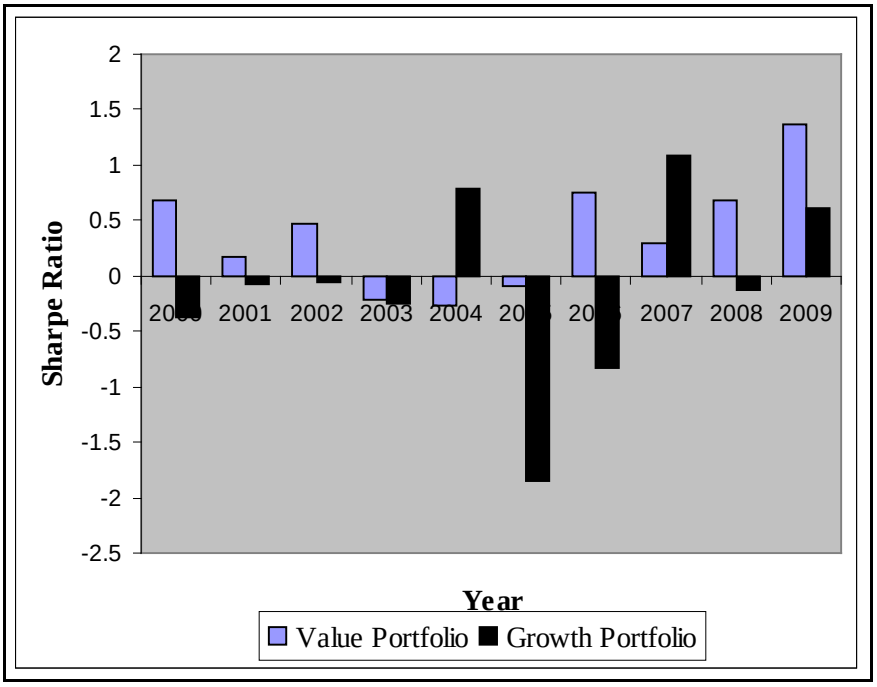


**Fig 8:** Sharpe ratio for P/B sorted value and growth portfolios, 2000-2009

The growth portfolios of 2004 and 2007 have done better than those of value portfolios. The value portfolios of 2003, 2004 and 2005 witnessed negative risk premium. On the other hand, all growth portfolios witnessed negative risk premium except those of 2004, 2007 and 2009.

The Sharpe ratios of value portfolios for 2000, 2001 and 2002 are 2.83 times, 3.09 times and 9.43 times higher respectively than those of growth portfolios. After 2002, the spreads between Sharpe ratio of value and growth portfolios have a decreasing trend except that of 2008. These results indicate that in the beginning years of the study period, the risk -adjusted performance of value portfolios is better than those of growth portfolios.

## 7. CONCLUSIONS

The study found significant positive relationship between risk and return for the value and growth portfolios based on P/E ratio. On the other hand, the risk-return relation is positive but statistically insignificant for the value and growth stocks portfolio based on P/B ratio. However the P/B sorted value and growth portfolios do not satisfy the positive risk-return relationship. Hence, finally the general conjecture that there is a positive relationship between the risk and the return for value and growth stocks portfolios can be rejected.

The relative risk as measured by coefficient of variation indicates that value portfolio is less risky than that of growth portfolio.

From the stand point of risk-return ratio, value portfolio is more efficient than that of growth portfolio and value portfolio outperforms growth portfolio. Especially, in the beginning years of the study, the value portfolios outperform growth portfolios remarkably in terms of risk-return ratio.

The risk-adjusted performance as measured by Sharpe ratio indicates better risk-adjusted performance of value portfolio compared with growth portfolio. However, in the beginning years of the study, the risk-adjusted performance of value portfolios is comparatively much better than those of growth portfolios. However, it is observed that the P/E sorted portfolios do a better job than the P/B sorted portfolios.

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