

INVESTMENT PERFORMANCE ANALYSIS OF DOGS OF THE DOW, VALUE INVESTMENT STRATEGY, AND GROWTH INVESTMENT STRATEGY ON INDONESIA STOCK EXCHANGE

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ABSTRACT

There are a number of studies on stock investment strategies: value, growth, and Dogs of the Dow (DOD) with mixed results and findings. This study aims to find out the difference of the three in one study, taking the Indonesia market as the focus. Ten portfolios were created based on the most used criteria in previous studies: book-to-market and earning-to-price ratio, taken from stocks listed in LQ45 and using IDX composite as the market proxy. Using paired sample t-test, the portfolios' average returns, risk (standard deviation), and risk adjusted returns (Sharpe ratio, Treynor ratio, and Jensen's alpha) of the portfolios are compared to find out whether there are differences between the portfolios during the overall period of the study which is 54 quarters (2007-2020 Q2), bullish (38 quarters), and bearish (16 quarters). In terms of average return during the overall period, there is a difference between the portfolios except value vs DOD, and DOD vs market. During market positive, only growth vs market and DOD vs market that showed no significant difference. During market negative, only growth portfolios that demonstrated a difference with the market. Recommendation for next studies is: international comparison, other variables such as cash flow to price ratio or past sales growth, and compare small and big cap stocks.

Key words: value investing, growth investing, dogs to the Dow investing, investment strategies, portfolio performance analysis.

INTRODUCTION

The stock market has been said to be an important part of economic activity and growth (Masoud, 2013; Paramati & Gupta, 2011; Petros, 2011; Qamruzzaman & Wei, 2018; Tekin & Yener, 2019). As growing companies need to raise capital to expand their business, the stock markets provide this at lower cost. Moreover, companies especially in countries with developed stock markets are less reliant on bank financing, causing the risk of a credit crunch to reduce. Thus, the creation of funds drives economic development with efficient investment causing the role of private sector in the economies to be increasing, facilitating access to financial information, freedom of trade and capital movements. Therefore, stock markets are able to positively affect economic growth through encouraging savings and help firm financing (Petros, 2011; Tekin & Yener, 2019).

There are a number of past studies that examined the effectiveness and profitability of different investment strategies that could help investors as well as financial and investment intermediaries in managing their investment and portfolio. There are two well-known strategies, value investing and growth investing, that have been studied extensively in the stock market industry and provided mixed findings on the superiority between the two strategies. Most of the early studies found that value stocks perform better than growth stocks (Bauman & Miller, 1997; Bauman et. al, 1998; Broussard et. al, 2005; Capaul et. al, 1993) while some of the late studies found otherwise (Cordeiro & Machado, 2013; Cheh et al, 2008; Beneda, 2003).

Another investing strategy is Dogs of the Dow, a popular investment strategy in America where investors select ten highest yielding stocks from the 30 stocks in the Dow Jones Industrial Average (DJIA), by John Slater in 1988 and then popularized by O'Higgins & Downes in their book "Beating the Dow" that published in 1991 (Alles & Sheng, 2008; Carvalhal & Meireles, 2015; Dubova et. al, 2018).

The empirical evidence from the different markets in the past 10 years provided contradictory results but mostly showed that the Dogs of the Dow strategy was able to outperform the market (Alles et. al, 2008; Carvalhal, 2015; Chong & Luk, 2010; Ekaputra & Sukarno, 2012; Lin, 2017; Qiu et. al, 2013; Tissayakorn, 2013; Wang et. al, 2011; Yan et. al, 2015) although with different significance level in different market and some were showing that it did not outperform the market (Kim, 2019; Soomro & Haroon, 2015).

Given the mixed results of the findings in the past studies, this study would like to compare the DoD, value and growth investing strategies to find out:

1. Is there any performance difference in terms of the average return between Dogs of the Dow, Value, and Growth portfolio?
 - a. During overall period
 - b. During market positive (bullish) period
 - c. During market negative (bearish) period
2. Is there any performance difference in terms of the risk between Dogs of the Dow, Value, and Growth portfolio?
 - a. During overall period
 - b. During market positive (bullish) period
 - c. During market negative (bearish) period

3. Is there any performance difference in terms of the risk-adjusted return between Dogs of the Dow, Value, and Growth portfolio?
 - a. During overall period
 - b. During market positive (bullish) period
 - c. During market negative (bearish) period

LITERATURE REVIEW

Dogs of the Dow

Most of the DOD studies conducted the same research method as the original Dogs of the Dow strategy by selecting top 10 stocks with highest dividend yield and compare the return of the portfolio with some other variations of DoD strategies with the most popular ones such as top 5 and small dogs (lowest priced stocks out of the top 10), and then rebalancing every year. Most studies also found that the DoD portfolios were able to beat the market although with different significant level statistically and economically (Alles et. al, 2008; Carvalhal, 2015; Chong & Luk, 2010; Ekaputra & Sukarno, 2012; Lin, 2017; Qiu et. al, 2013; Tissayakorn, 2013; Wang et. al, 2011; Yan et. al, 2015), while some other studies found that the strategy did not work well in the market studied (Kim, 2019; Soomro & Haroon, 2015). The returns from DoD strategy based on the study in Indonesia and Taiwan markets were able to outperform the market (Ekaputra & Sukarno, 2012; Rinne & Vähämaa, 2010; Yan et al, 2015). The empirical evidence from Latin America, Japan, and China market also found that DoD's performance has significantly outperformed the market (Carvalhal & Meireles, 2015; Qiu et al, 2013; Wang et al, 2011). In all Latin America countries, except Mexico, DoD had superior performance in both growth and recession periods (Carvalhal & Meireles, 2015).

Two studies in Hong Kong market provided mixed results. According to Chong & Luk (2010), the top dividend-yielding stocks in Hong Kong stock market generated a negative return, while a portfolio with top dividend-yielding stocks in Hang Seng Index were able to generate a positive return, showing the dividend-yield DoD strategy tend to have better performance for blue-chip stocks in Hong Kong instead of small stocks. Another simulation by Qiu et al (2012), presented results that DoD investment strategy is superior to the average level of the market but not statistically significant. Similarly, three other studies in Indonesia, Thailand and Latin America markets showed that DoD investment strategy was able to outperform the market but not statistically significant (Gunawan, 2017; Silva, 2001; Tissayakorn et al, 2013). Another study in Pakistan market found that DoD portfolio outperformed the market only when there is phenomenal rise but there was no decisive evidence that for a long time period, the DoD strategy will outperform the market (Soomro & Haroon, 2015). Similarly, in the context of Indian market, a study revealed that the effectiveness of the 'Dogs' portfolio in Indian market to generate abnormal returns is still limited, as it outperforms when there is phenomenal rise in the market but still underperforms a falling market (Sahu, 2001). The most recent study in 2019 by Kim, showing that DoD strategy has not worked well in U. S market itself when trading costs and taxes are included. Kim mentioned that it is more likely to outperform the DJIA index and DoD strategy if investors hold an equally weighted investment of all firms in the long term (Kim D. K., 2019).

Value and growth investing

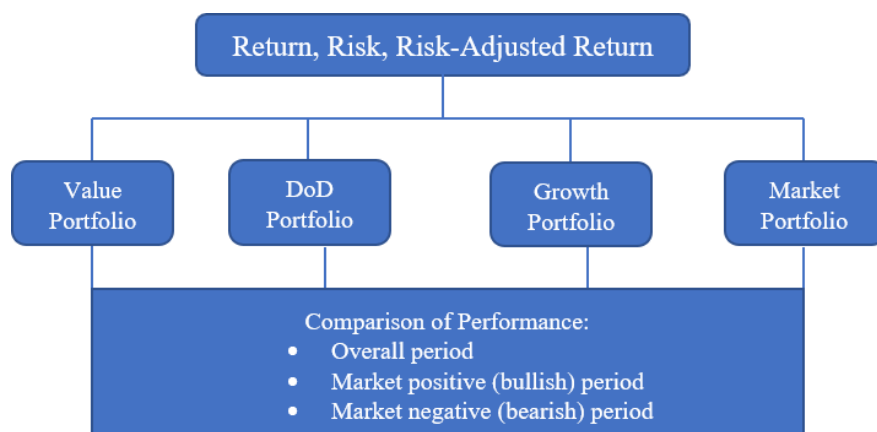
The growing interest in value and growth investing started back in 1992 from Fama and French study as well as Lakonishok et. al in 1994 where the ratio of book-to-market value and firm size became the main explanatory variables for the cross-section of average stock returns (Chan & Lakonishok, 2004). Since then, a number of extensive researches with different criteria of value and growth stocks keep coming from different studies of different markets, even to international comparisons. Some of the most common variables used in the studies of value and growth stocks, either studied as single criteria or combined, are price-to-earnings ratio, book-to-market, and price-to-book-value ratio (Bauman & Miller, 1997; Sareewiwatthana, 2013; Cordeiro & Machado, 2013; Beneda, 2003; Emm & Trevino, 2014; Gonenc & Karan, 2003). The next financial criteria of value and growth stocks after the three above that studied by more academics are dividend yield, price to cash flow ratio, cash flow per share, earnings per share, and the historical or past sales growth of the firms (Perez, 2017; Beukes, 2011; Lee, 2014; Akinde et. al, 2019; Kwag & Lee, 2006; Elze, 2010; Clare et. al, 2014; Broussard et.al, 2005; An et. al, 2017). Slightly less common variables included in the studies of value and growth investment strategy are return on assets, return on equity, EBIT/EV, and BV/EV (Mikutowski et. al, 2019; Holloway et. al, 2013; Davydov et. al, 2016; An, Cheh, & Kim, 2017).

The comparison between the value and growth stocks in the studies also generated mixed and different results across different market although many of the studies confirmed the conventional findings that value stocks outperform the growth stocks (Mikutowski et. al, 2019; Sareewiwatthana, 2013; Lee, 2014; Akinde et. al, 2019; Bauman & Miller, 1997; Kwag & Lee, 2006; Elze, 2010; Clare et. al, 2014; Broussard et.al, 2005; An et. al, 2017). In contrary, the more recent study of US market by Emm & Trevino (2014) over the 1940 to 2012 period with four portfolios: large-growth, large-value, small growth, and small-value found that among large companies, value has no longer outperform growth as both resulted in very similar average returns and risks among large companies.

Different results came from a study of Istanbul market where it is found that neither value nor growth stocks presented greater performance over national market index. The study also found that the differences of the returns between big portfolio is greater than small portfolio (Gonenc & Karan, 2003). Another empirical evidence from Brazil found that growth stocks generated higher returns than value stocks with book-to-market ratio as the best variable to classify the growth stocks (Cordeiro & Machado, 2013). Similarly, Beneda (2003) found that the average return of the stocks with high price-to-earnings ratio which identified as growth stocks, has beaten stocks with low price- to-earnings ratio over long periods, up to 18 years.

Therefore, looking at the mixed findings, this research would like to analyze the comparison of performance (average return, risk, and risk-adjusted return) between value, growth, DoD stock portfolios, and the market and find out whether there is a difference between the portfolios during the overall period of this study from 2007-2020 Q2 (total of 54 quarters), as well as during market positive and negative period. The following figure is the theoretical framework for this study.

Figure 1: Theoretical Framework



Source: Discussion of author and academic supervisor

METHODOLOGY

This is a descriptive study using the real company stock data in the market where the different stocks are formed into different groups or portfolios based on the criteria found in previous studies and equally weighted. The value portfolio consists of 4 portfolios: (1) stocks that have the highest book-to-market ratio (B/M), (2) stocks that have the highest earning-to-price ratio (E/P), (3) top 50% stocks that have the highest B/M and E/P ratio, (4) top 30% stocks that have the highest B/M and E/P ratio. The growth portfolio also consists of 4 portfolios: (1) stocks that have the lowest book-to-market ratio (B/M), (2) stocks that have the lowest earning-to-price ratio (E/P), (3) bottom 50% stocks that have the lowest B/M and E/P ratio, (4) bottom 30% stocks that have the lowest B/M and E/P ratio. The final portfolio consists of 10 stocks that have the highest dividend yield following the Dogs of the Dow strategy. The mean returns, risk, and risk-adjusted returns of the three portfolios are then compared against the market.

The data collected for this study is from secondary data that will be retrieved from Indonesia Stock Exchange website, Yahoo Finance and Mirae Asset Security stock price historical data over the period from 2007 to 2020 Q2 (54 quarters) as well as the company's website on the financial statement to find out the ratio needed as the criteria of the stock portfolio. IDX Composite is chosen as market proxy and benchmark for Indonesia stock market.

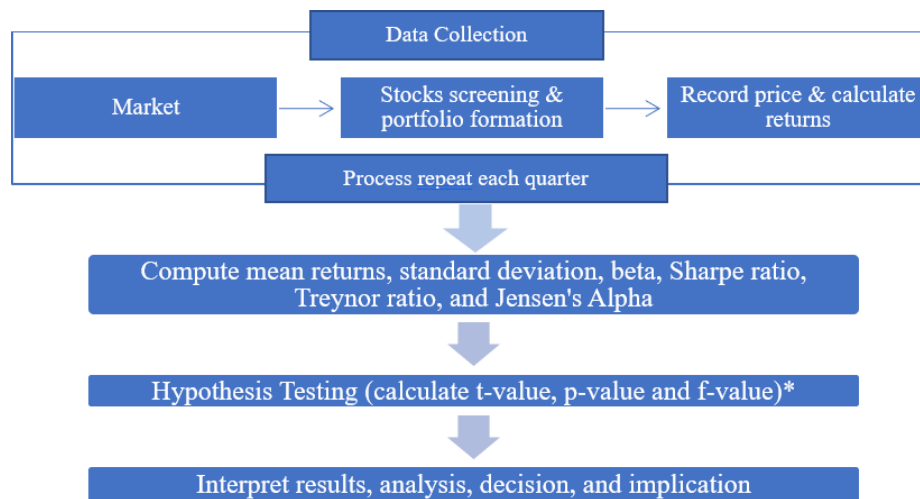
The value stock portfolio for this study is also formulated by choosing the top 30% of stocks with the highest book-to-market ratio (B/M), top 30% of stocks with the highest earning-to-price ratio (E/P), top 30% of stocks with highest both B/M and E/P, and top 50% of stocks with highest both B/M and E/P, from LQ45. Growth stock portfolio is formulated by choosing the bottom 30% of stocks with the lowest B/M, bottom 30% with the lowest E/P, bottom 30% of both B/M and E/P, and bottom 50% of both B/M and E/P from LQ45. DoD portfolio is formulated by choosing the top 10 of stocks with the highest dividend yield from LQ45. The 10 different portfolios are equally invested and rebalanced every quarter, making a total of 54 quarterly observation for each portfolio and a total of 540 total average return data of the portfolios.

In order to analyze the performance of the portfolio, descriptive statistics such as the means, minimum, maximum, standard deviations, and variance will be collected and analyzed for each of the portfolio. The performance of the portfolio will be measured by its average returns, the risks that include standard deviation and beta, as well as the risk-adjusted returns that include Sharpe ratio, Treynor ratio, and Jensen's alpha. In order to test the normality of the data distribution before going into the hypothesis testing, Kolmogorov-Smirnov test will be used. To test the difference of the portfolio performance, paired sample t-test will be used to evaluate the difference between the portfolios' return on each quarter. In the case that the data is not normally distributed, the Wilcoxon signed rank test will be done.

Data collection

All variables are computed using publicly available data. The stock prices at the beginning of each quarter are recorded to calculate the return of the portfolio. Dividends were assumed to be reinvested when calculating the returns and transaction costs as well as the taxes were not included in the calculation. In order to calculate the risk-adjusted return every quarter, the stock prices are also recorded every week to calculate the average return and standard deviation. This process is repeated each quarter. After all the data from total of 54 observations are collected (quarterly observations for 13.5 years), all the statistics and measurement such as mean returns, median, minimum, maximum, risks that include standard deviations & beta, and risk-adjusted returns that include Sharpe ratio, Treynor ratio, and Jensen's Alpha are computed. Hypothesis testing is done by calculating the t-value and p-value. The following chart shows the data collection and analysis process for this study.

Figure 2: Stage of data collection and analysis



Source: author's formulated data collection and analysis plan

Hypothesis

Return measures:

- H1 μ : The return of value stocks portfolio has a difference with growth stocks portfolio.
- H2 μ : The return of value stocks portfolio has a difference with DoD stocks portfolio.
- H3 μ : The return of value stocks portfolio has a difference with the market.
- H4 μ : The return of growth stocks portfolio has a difference with DoD stocks portfolio.
- H5 μ : The return of growth stocks portfolio has a difference with the market.
- H6 μ : The return of DoD stocks portfolio has a difference with the market.

Risk measures:

- H1SD: The risk of value stocks portfolio has a difference with growth stocks portfolio.
- H2SD: The risk of value stocks portfolio has a difference with DoD stocks portfolio.
- H3SD: The risk of value stocks portfolio has a difference with the market.
- H4SD: The risk of growth stocks portfolio has a difference with DoD stocks portfolio.
- H5SD: The risk of growth stocks portfolio has a difference with the market.
- H6SD: The risk of DoD stocks portfolio has a difference with the market.

Risk-adjusted measures (Sharpe Ratio, Treynor Ratio, Jensen's Alpha):

- H1RA: The risk-adjusted return of value stocks portfolio has a difference with growth stocks portfolio.
- H2RA: The risk adjusted return of value stocks portfolio has a difference with DoD stocks portfolio.
- H3RA: The risk adjusted return of value stocks portfolio has a difference with the market.
- H4RA: The risk adjusted return of growth stocks portfolio has a difference with DoD stocks portfolio.
- H5RA: The risk adjusted return of growth stocks portfolio has a difference with the market.
- H6RA: The risk adjusted returns of DoD stocks portfolio has a difference with the market.

RESULTS & DISCUSSION

Average return

During the overall period of 54 quarters from 2007 until 2020Q2, value stocks portfolio using E/P ratio and combination of B/M and E/P ratio (top 50% and 30%) in Indonesia market have the highest returns compare to other portfolios, but they also have the highest standard deviation. However, in terms of the volatility against the market, all four of the value portfolios have the lowest beta compare to the other portfolios. DOD portfolio is able to outperform all the growth portfolios as well as one value portfolio that is formed on high B/M ratio. Growth portfolio formed on low E/P and both low B/M and low E/P (bottom 30%) have the lowest average returns. The geometric mean of growth portfolio formed on low B/M, low B/M & E/P (bottom 50%), and low B/M & E/P (bottom 30%) slightly exceeded value portfolio that is formed on high B/M. But in terms of arithmetic mean, high B/M portfolio exceeded the two of growth portfolios which are low B/M & E/P (bottom 50%) and low B/M & E/P (bottom 30%) portfolio.

Table 1. Descriptive statistics of value, growth, and DOD portfolio during overall period

	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD	Market
Arithmetic mean	1.84%	2.39%	5.36%	0.36%	5.34%	1.64%	5.66%	1.03%	3.61%	2.44%
Geometric mean	0.06%	1.35%	3.98%	-0.79%	3.79%	0.45%	3.71%	0.06%	2.46%	1.82%
Median	2.35%	3.67%	6.97%	1.38%	5.28%	3.10%	5.35%	3.45%	3.91%	4.00%
Minimum	-50.01%	-33.45%	-41.66%	-36.40%	-43.13%	-39.10%	-45.95%	-41.26%	-41.22%	-28.00%
Maximum	80.82%	50.60%	65.26%	43.55%	80.19%	58.13%	71.69%	44.94%	63.12%	41.33%
Standard Deviation	18.67%	14.67%	16.80%	14.66%	18.08%	15.38%	20.00%	13.59%	15.40%	11.02%
Variance	3.49%	2.151%	2.82%	2.148%	3.27%	2.366%	4.00%	1.85%	2.372%	1.21%
Covariance vs market	1.76%	1.44%	1.67%	1.40%	1.75%	1.55%	1.71%	1.13%	1.50%	1.21%
Beta	0.51	0.67	0.59	0.65	0.53	0.65	0.43	0.61	0.63	1.00

Source: author's data collection and calculation

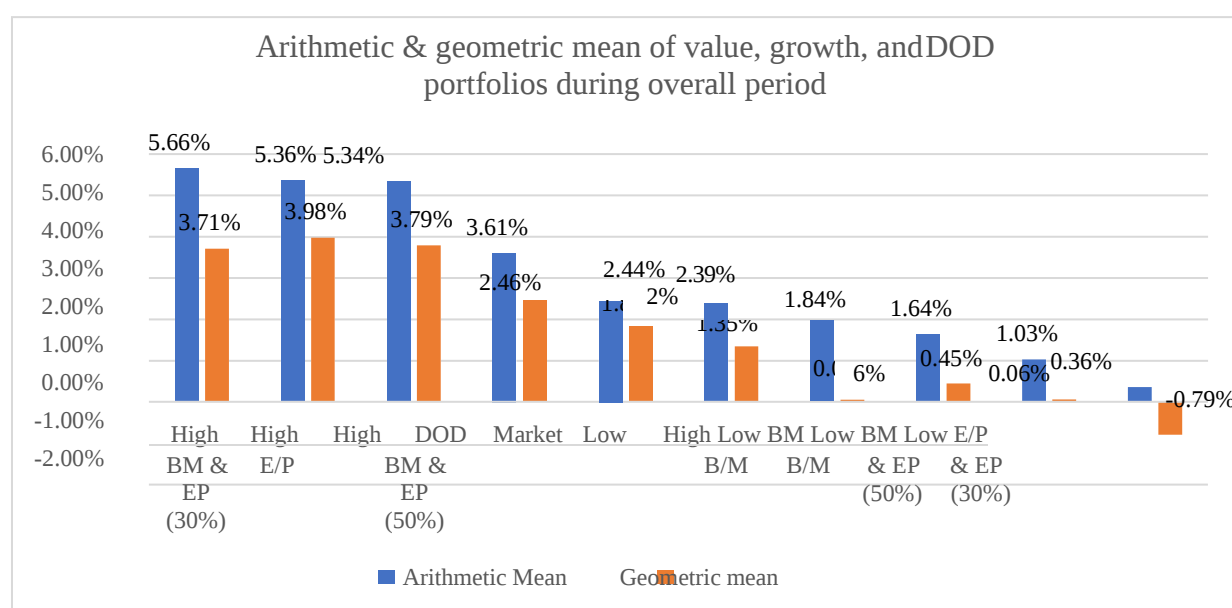


Chart 1. Arithmetic and geometric mean of value, growth, and DOD portfolio during overall period

Source: author's data collection and calculation

During the market positive period, three of the four value portfolios outperformed all four growth portfolios and DOD portfolio. High E/P portfolio had the highest average returns followed by high B/M and E/P (top 30%), and high B/M and E/P (top 50%). The last value portfolio which is high B/M outperformed two of the growth portfolios which are low E/P and low B/M and E/P (bottom 50%). All four growth portfolios had the lowest average returns during the market positive period with low E/P at the bottom as this portfolio had the lowest average returns. DOD portfolio was able to outperform one value portfolio and all four growth portfolios during this period.

Table 2. Descriptive statistics of value, growth, and DOD portfolio during market positive period

	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD	Market
Arithmetic mean	8.60%	9.27%	12.74%	6.69%	12.32%	8.54%	12.63%	6.88%	10.09%	7.98%
Geometric mean	7.66%	8.75%	12.12%	6.16%	11.52%	7.97%	11.67%	6.46%	9.46%	7.75%
Median	5.99%	6.73%	9.99%	5.47%	7.32%	4.73%	8.98%	6.56%	6.96%	5.74%
Minimum	-11.99%	-5.03%	-8.06%	-16.03%	-4.15%	-7.08%	-6.38%	-9.03%	-7.05%	0.96%
Maximum	80.82%	50.60%	65.26%	43.55%	80.19%	58.13%	71.69%	44.94%	63.12%	41.33%
Standard Deviation	15.69%	11.28%	12.57%	10.83%	14.74%	11.93%	15.74%	9.91%	12.60%	7.58%
Variance	2.46%	1.27%	1.58%	1.17%	2.17%	1.42%	2.48%	0.98%	1.59%	0.57%
Covariance vs market	0.93%	0.64%	0.83%	0.58%	0.97%	0.76%	0.88%	0.34%	0.82%	0.57%
Beta	0.38	0.50	0.53	0.50	0.45	0.54	0.36	0.35	0.51	1.00

Source: author's data collection and calculation

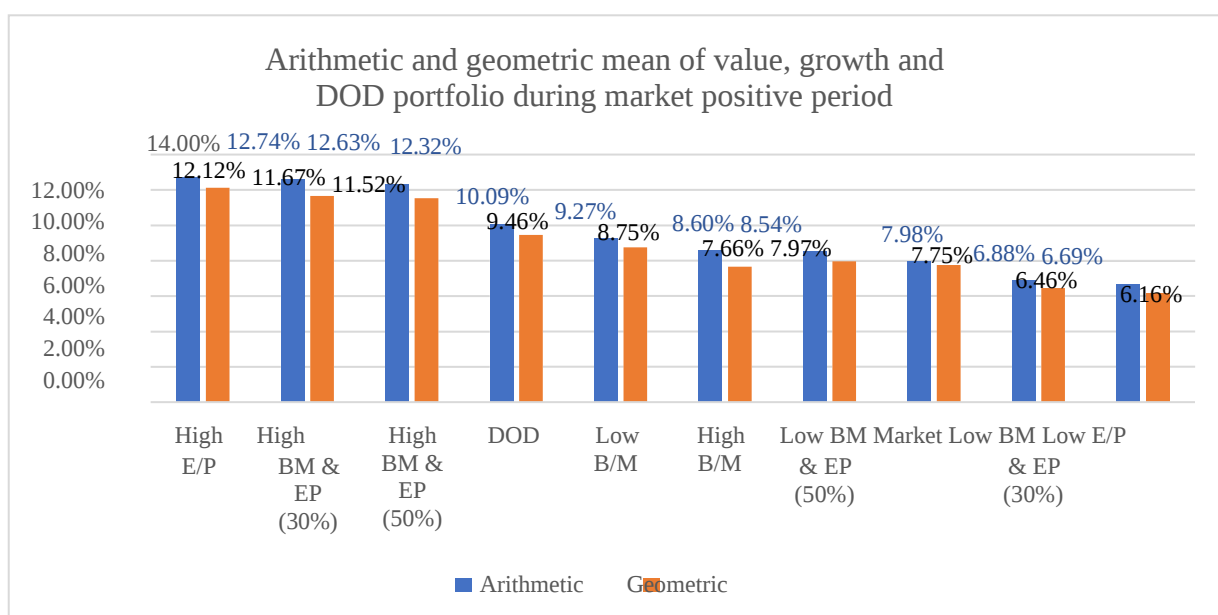


Chart 2. Arithmetic and geometric mean of value, growth, and DOD portfolio during market positive period

Source: author's data collection and calculation

During market negative period, three of the four value portfolios which are high E/P, high B/M and E/P (top 50%), and high B/M and E/P (top 30%) outperformed all four growth portfolios, but only two were able to beat DOD portfolio, which are high B/M & E/P (top 50%), and high B/M & E/P (top 30%). Two of the growth portfolios which are low B/M and low B/M & E/P (bottom 30%) outperformed one of the value portfolios which is high B/M. However, two other growth portfolios had the lowest return during the market negative period. As for DOD portfolio performance, it had the third least losses during the market negative period, beating two value portfolios and all four of growth portfolios.

Table 3. Descriptive statistic of value, growth, and DOD portfolio during market negative period

	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD	Market
Arithmetic mean	-11.69%	-11.37%	-9.39%	-12.29%	-8.64%	-12.16%	-8.28%	-10.69%	-9.37%	-8.64%
Geometric mean	-13.59%	-12.01%	-10.57%	-13.35%	-10.09%	-13.02%	-10.53%	-11.61%	-10.21%	-9.02%
Median	-9.85%	-10.12%	-10.31%	-8.80%	-9.76%	-11.29%	-8.35%	-9.29%	-11.05%	-5.33%
Minimum	-50.01%	-33.45%	-41.66%	-36.40%	-43.13%	-39.10%	-45.95%	-41.26%	-41.22%	-28.00%
Maximum	14.28%	5.15%	25.04%	8.50%	32.52%	4.39%	50.19%	8.37%	14.94%	-0.70%
Standard Deviation	16.71%	10.34%	14.30%	13.03%	15.92%	11.83%	20.31%	12.30%	11.89%	8.09%
Variance	2.79%	1.07%	2.04%	1.70%	2.53%	1.40%	4.13%	1.51%	1.41%	0.65%
Covariance vs market	1.17%	0.74%	0.90%	0.94%	0.97%	0.82%	1.06%	0.76%	0.72%	0.65%
Beta	0.42	0.70	0.44	0.55	0.38	0.59	0.26	0.50	0.51	1.00

Source: author's data collection and calculation

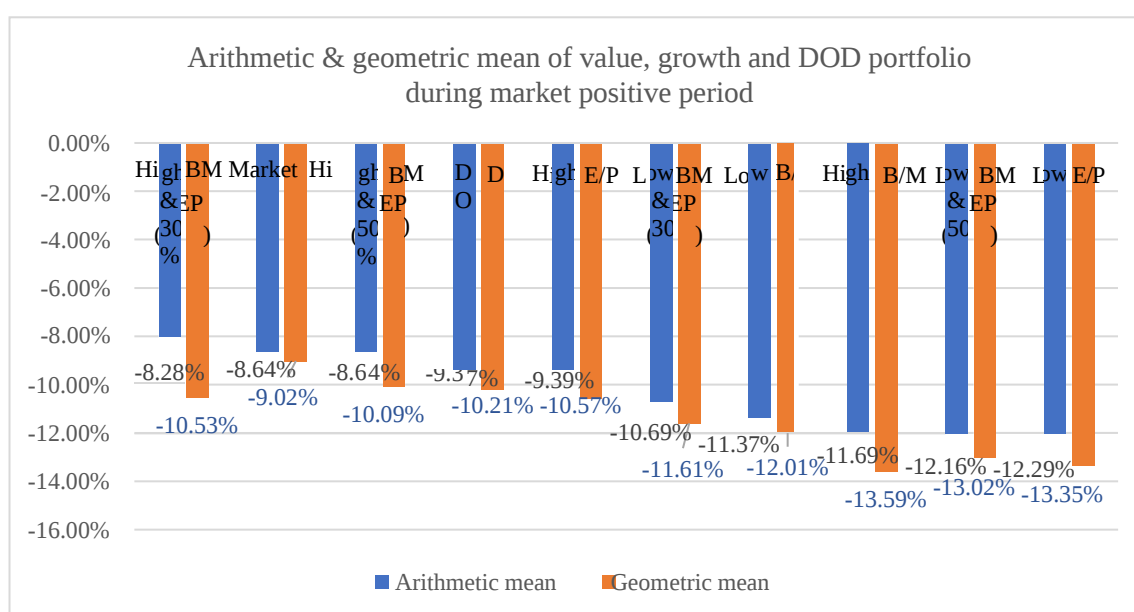


Chart 3. Arithmetic and geometric mean of value, growth, and DOD portfolio during market negative period

Source: author's data collection and calculation

Normality test

Using the Kolmogorov-Smirnov test, the data for average return during overall period, market positive and market negative period has normal distribution. The same results are true for Sharpe ratio, Treynor ratio, and Jensen's alpha of all the portfolios. However, for the Treynor ratio of high B/M & EP (top 30%) during overall period and market positive period showed data distribution that is not normal as the T value is more than the critical value. The outlier came from high B/M & E/P (top 30%) portfolio's Treynor ratio in 2010 Q3, where it has high average return compare to other portfolios and at the same time it also has very low beta. The average beta for the rest of portfolios were at 0.6 while high B/M & E/P (top 30%) portfolio had very low beta of 0.05, making the Treynor ratio to shoot high at 20.26, indicating that this portfolio moved much slower or less volatile than the market during the time.

Hypothesis testing

1. Overall period

In terms of the average return, value portfolios have outperformed growth portfolios and the market with statistically significant difference of average returns. However, there is no statistically significant difference between value portfolios and DOD indicating comparable average return performance between the two. Stocks with low earning-to-price ratio had the lowest returns and statistically significant difference compare to value portfolios, DOD, and the market. This is in line with the hypothesis in behavioral finance that investors make decision and make future forecast based on the past earning trends (Bauman & Miller, 1997) hence that could be the reason why the performance of low E/P stocks tend to be the lowest compare to other stock portfolios.

Table 4. T-test from quarterly returns of value, growth, and DOD portfolio during overall period

T-test of Quarterly returns	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.31993								
High E/P	-3.66021*	-2.39617*							
Low E/P	1.02446	1.936197	3.472005*						
High BM & EP (50%)	-4.12195*	-1.81572	0.042745	-3.01599*					
Low BM & EP (50%)	0.120415	1.088093	2.689588*	-1.55128	2.295496*				
High BM & EP (30%)	-3.25124*	-1.58463	-0.26693	-2.60304*	-0.37734	-1.93659			
Low BM & EP (30%)	0.37796	1.557356	2.469752*	-0.61112	2.063801*	0.599998	1.887153		
DOD	-1.34332	-1.00856	1.766397	-2.4601*	1.369129	-1.54193	1.186862	-1.5039	
Market	-0.40642	-0.05681	2.554706*	-2.03644*	2.115934*	-0.84109	1.748967	-1.15269	1.110672

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

* When t-value < -2.006 or > 2.006, H₀ is rejected; When t-value > -2.006 or < 2.006, H₀ is not rejected

In terms of the risk, high B/M stocks have high volatility and statistically significant compared to growth portfolios. For high E/P stocks however, it doesn't show statistically significant difference with growth portfolios despite high volatility. All portfolios show statistically significant difference of standard deviation against the market.

Table 5. F-value from standard deviation of value, growth, and DOD portfolio during overall period

F-test	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	1.6209225*								
High E/P	1.2348789	1.3126166							
Low E/P	1.6233855*	1.0015195	1.3146111						
High BM & EP (50%)	1.0660998	1.5204229	1.1583146	1.5227332					
Low BM & EP (50%)	1.4734842	1.100061	1.1932216	1.1017326	1.382126				
High BM & EP (30%)	1.146895	1.859028*	1.4162765	1.8618528*	1.2227045	1.6899317*			
Low BM & EP (30%)	1.8891676*	1.1654891	1.5298404	1.1637208	1.7720364*	1.2821092	2.1666769*		
DOD	1.4701204	1.1025781	1.1904976	1.1042535	1.3789708	1.0022881	1.6860738*	1.2850428	
Market	2.8699565*	1.7705698*	2.3240793	1.7678835*	2.6920149*	1.9477349*	3.2915389*	1.5191646	1.9521915*

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

* When F-value > 1.577, H₀ is rejected; When F-value < 1.577, H₀ is not rejected

In terms of Sharpe ratio and Jensen's alpha, there is statistically significant difference between value and growth portfolio, as well as between value and DOD. The rest of the pairs did not show any significant difference. In terms of Treynor ratio, only value portfolios that shows significant difference with growth portfolios. In summary, although some portfolios showed statistically significant difference with other portfolios, the risk-adjusted returns of most portfolios did not indicate significant difference. Only low E/P stocks that consistently show a difference with high B/M & E/P (50%) across Sharpe ratio, Treynor ratio, and Jensen's alpha.

Table 6. t-test from Sharpe Ratio of value, growth, and DOD portfolio during overall period

T-test of Sharpe Ratio	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.164367								
High E/P	-2.88919*	-1.899645							
Low E/P	0.1176006	0.400033	1.8063905						
High BM & EP (50%)	-3.80712*	-1.955359	-0.751285	-2.01644*					
Low BM & EP (50%)	-0.015607	0.2869614	1.6453336	-0.201025	1.8505703				
High BM & EP (30%)	-2.35771*	-0.996841	1.2131107	-1.18018	2.296082*	-1.023278			
Low BM & EP (30%)	0.1872365	0.7280316	1.8088061	0.1713836	1.949469	0.4262021	1.1853871		
DOD	-0.109775	0.0773834	2.223759*	-0.214901	2.252253*	-0.077808	1.103515	-0.28091	
Market	-1.04469	-1.051888	1.2294703	-1.205933	1.5886217	-1.114239	0.363394	-1.26600	-1.08407

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When t-value < -2.006 or > 2.006, H0 is rejected; When t-value > -2.006 or < 2.006, H0 is not rejected

Table 7. t-test from Treynor Ratio of value, growth, and DOD portfolio during overall period

T-test of Treynor Ratio	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.121232								
High E/P	-1.956565	-1.755187							
Low E/P	0.5767531	1.0161856	2.216780*						
High BM & EP (50%)	-3.04893*	-1.697909	-0.7279	-2.4146*					
Low BM & EP (50%)	0.1739994	0.6719732	1.7587208	-0.62089	1.9171568				
High BM & EP (30%)									
Low BM & EP (30%)	-0.188339	-0.227763	1.0694967	-1.0117	1.2054159	-0.80061			
DOD	0.1157081	0.2912621	1.9623771	-0.43186	1.9536937	-0.07002		0.31852	
Market	0.0573366	0.3179165	2.274473*	-0.72322	2.348610*	-0.19981		0.3344333	-0.09431

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When t-value < -2.006 or > 2.006, H0 is rejected; When t-value > -2.006 or < 2.006, H0 is not rejected
Note: Greyed box is for high B/M & E/P (top 30%) that does not have normal data distribution, hence the hypothesis testing is using Wilcoxon signed-rank test

Table 8. t-value and p-value for Treynor Ratio of high B/M & E/P (top 30%) vs the other portfolios during overall period from Wilcoxon signed-rank test

High B/M & E/P (30%) versus:	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	Low BM & EP (30%)	DOD	Market
t-value	571	616	707	605	675	595	632	633	588
p-value	0.139769	0.276069	0.759861	0.236451	0.561113	0.204082	0.341387	0.345774	0.183426
Significance	no	no	no	no	no	no	no	no	no

Source: author's data collection, calculation, and analysis

*When t-value < 515, H0 is rejected; When t-value > 515, H0 is not rejected

Table 9. t-test from Jensen's Alpha of value, growth, and DOD portfolio during overall period

T-test of Jensen's Alpha	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.155998								
High E/P	-2.58821*	-2.01822*							
Low E/P	0.6030418	1.0250194	2.3482984*						
High BM & EP (50%)	-3.201536*	-1.662189	-0.323783	2.204608*					
Low BM & EP (50%)	0.262639	0.9356887	2.1216402*	-0.526342	1.9563196				
High BM & EP (30%)	-2.388408*	-1.355899	-0.306681	-1.878468	-0.180842	1.687742			
Low BM & EP (30%)	-0.080919	0.1270646	1.5756789	-0.97139	1.4381741	0.794032	1.2875064		
DOD	0.0904342	0.2998274	2.1289315*	-0.458606	1.7930373	0.179341	1.4040902	0.1742628	
Market	-0.098051	0.1342817	2.3568581*	-0.867955	2.0097828*	0.526944	1.5164608	0.0159427	0.245204

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When t-value < -2.006 or > 2.006, H0 is rejected; When t-value > -2.006 or < 2.006, H0 is not rejected

2. Market positive period

High E/P stocks had the highest average returns and at the same time, the t-test also indicated that the difference is statistically significant compared to all growth stocks, DOD, and the market during the market positive period (bullish). There is also statistically significant difference between low E/P portfolio and DOD. But both growth and DOD portfolio do not have significant difference with the market. While all value portfolios except high B/M have statistically significant difference with the market.

Table 10. T-test from quarterly returns of value, growth, and DOD portfolio during market positive (bullish) period

T-test of Quarterly returns	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.295617								
High E/P	-3.29172*	-2.31055*							
Low E/P	1.135408	1.9268806	3.87350*						
High BM & EP (50%)	-3.55931*	-1.467474	0.5084837	-2.96086*					
Low BM & EP (50%)	0.0329796	0.8509983	2.899196*	-1.7847242	2.103688*				
High BM & EP (30%)	-2.900458*	-1.341373	0.0803275	-2.741493*	-0.2928262	1.8730152			
Low BM & EP (30%)	0.6270902	2.060886*	2.759031*	-0.1482217	2.055677*	1.1544244	1.953991		
DOD	-0.941735	-0.611536	2.84248*	-2.25155*	1.6612044	-1.238049	1.3942301	-1.595616	
Market	0.3373329	1.0049652	4.016409*	-1.008948	2.87172*	0.4795072	2.419514*	-0.695204	1.7167855

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When t-value < -2.0301 or > 2.0301, H0 is rejected; When t-value > -2.0301 or < 2.0301, H0 is not rejected

Looking at the standard deviation, there is a difference between value and growth. All portfolios have a difference with the market but DOD does not have significant difference with both value and growth.

Table 11. F-value from standard deviation of value, growth, and DOD portfolio during market positive period

F-test	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	1.934331*								
High E/P	1.5581881	1.2413977							
Low E/P	2.100488*	1.0858986	1.3480321						
High BM & EP (50%)	1.1327064	1.7077076	1.3756329	1.854397*					
Low BM & EP (50%)	1.7310362	1.1174412	1.1109289	1.2134279	1.5282303				
High BM & EP (30%)	1.0061447	1.946217*	1.5677628	2.113395*	1.1396665	1.741673			
Low BM & EP (30%)	2.505356*	1.2952054	1.607865	1.1927498	2.21183*	1.4473158	2.520751*		
DOD	1.5496294	1.2482541	1.0055231	1.3554774	1.3680769	1.1170646	1.5591515	1.6167453	
Market	4.289098*	2.217354*	2.752619*	2.041953*	3.786593*	2.477763*	4.315453*	1.7119713	2.767822*

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When F-value > 1.757, H0 is rejected; When F-value < 1.757, H0 is not rejected

During the market positive period, the risk-adjusted return of low E/P portfolio also consistently showed significant difference with high B/M & E/P (50%) across all measures (Sharpe ratio, Treynor ratio, and Jensen's alpha). However, the rest of portfolios did not show any consistent significant difference with each other. This could indicate that high B/M & E/P (50%) has the highest performance in terms of risk-adjusted return while low E/P is the opposite.

Table 12. t-test from Sharpe Ratio of value, growth, and DOD portfolio during market positive period

T-test of Sharpe Ratio	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.526732								
High E/P	-2.922476*	-1.7901768							
Low E/P	-0.0066593	0.8044781	2.0283841						
High BM & EP (50%)	-3.816385*	-1.7644237	-0.6113545	-2.178396*					
Low BM & EP (50%)	-0.6201452	-0.1656332	1.4569812	-1.2107923	1.6256822				
High BM & EP (30%)	-2.651468*	-0.7145387	1.2889265	-1.2576212	2.43632*	-0.6483791			
Low BM & EP (30%)	0.2440504	1.4836694	2.185747*	0.4803018	2.254654*	1.7276646	1.3444562		
DOD	-0.0880012	0.626655	3.050339*	-0.0802588	2.80989*	0.6505875	1.354043	-0.361214	
Market	-1.8632675	-1.5416843	0.421896	-2.059083*	0.7628593	-1.4685841	-0.4206517	-2.375641*	-2.299608*

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When t-value < -2.0301 or > 2.0301, H0 is rejected; When t-value > -2.0301 or < 2.0301, H0 is not rejected

Table 13. t-test from Treynor Ratio of value, growth, and DOD portfolio during market positive period

T-test of Treynor Ratio	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.0399114								
High E/P	-1.4081071	-1.3940072							
Low E/P	0.4152535	0.7941438	1.8471577						
High BM & EP (50%)	-2.458736*	-1.5195111	-0.9987034	-2.106144*					
Low BM & EP (50%)	-0.1738255	-0.3634541	1.0704628	-1.3251973	1.4071817				
High BM & EP (30%)									
Low BM & EP (30%)	0.0127672	0.1107552	0.9923659	-0.5527183	1.236252	0.3758784			
DOD	-0.0534635	-0.0033684	1.9496359	-0.5912119	2.0269649	0.1909821		-0.0631774	
Market	0.1164539	0.2394026	1.8402517	-0.4868542	2.236246*	0.4621276		0.0965786	0.2405839

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

* When t-value < -2.0301 or > 2.0301, H0 is rejected; When t-value > -2.0301 or < 2.0301, H0 is not rejected

*Greyed box is for high B/M & E/P (top 30%) that does not have normal data distribution, hence the hypothesis testing is using Wilcoxon signed-rank test

Table 14. t-value and p-value for Treynor Ratio of high B/M & E/P (top 30%) versus the other portfolios during market positive period from Wilcoxon signed-rank test

High B/M & E/P (30%) versus:	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	Low BM & EP (30%)	DOD	Market
t-value	210	245	312	243	326	245	250	235	227
p-value	0.0533101	0.1668088	0.7414588	0.1573761	0.91243	0.1668088	0.1922412	0.123649	0.0958487
Significance	no	no	no	no	no	no	no	no	no

Source: author's data collection, calculation, and analysis

*When t-value < 208, H0 is rejected; When t-value > 208, H0 is not rejected

Table 15. t-test from Jensen's Alpha of value, growth, and DOD portfolio during market positive period

T-test of Jensen's Alpha	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.1133994								
High E/P	-2.238095*	-1.7045254							
Low E/P	0.7434436	1.1189756	2.324832*						
High BM & EP (50%)	-2.618805*	-1.5293749	-0.5439242	-2.173727*					
Low BM & EP (50%)	0.0163279	0.2905298	1.6709768	-1.2643545	1.6438764				
High BM & EP (30%)	-2.787603*	-1.6443516	-0.9774771	-2.40613*	-0.7991002	-1.8677634			
Low BM & EP (30%)	0.2442475	0.7284076	1.696546	-0.6097956	1.630648	0.5294842	1.8246381		
DOD	0.6686365	0.8480654	3.40868*	-0.0785774	2.891295*	0.6630338	2.755707*	0.2835204	
Market	-0.0130294	0.1466984	2.041710*	-0.9142152	2.046695*	-0.0374053	2.020771	-0.3331059	-0.7232429

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

*When t-value < -2.0301 or > 2.0301, H0 is rejected; When t-value > -2.0301 or < 2.0301, H0 is not rejected

3. Market negative period

There is no significant difference of average return of all portfolios during the market negative period, except for growth portfolios (low B/M, low E/P, and low B/M & E/P bottom 50%) that had the lowest average returns and showed significant difference with the market. This could indicate that growth portfolios cannot withstand the market downturn and heavily impacted more than value and DOD portfolios.

Table 16. t-test from average return of value, growth, and DOD portfolio during market negative period

T-test of Quarterly returns	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.122865								
High E/P	-1.611626	-0.881514							
Low E/P	0.2179351	0.5555799	0.9679591						
High BM & EP (50%)	-2.049059	-1.048506	-0.909658	-1.133858					
Low BM & EP (50%)	0.1449527	0.6640537	0.9120372	-0.099315	1.0649093				
High BM & EP (30%)	-1.529068	-0.825838	-0.589158	-0.913385	-0.232659	-0.852882			
Low BM & EP (30%)	-0.288584	-0.595762	0.4211382	-0.842576	0.6043782	-1.533117	0.5335807		
DOD	-0.959896	-0.812527	-0.011688	-1.117705	0.2670436	-0.94834	0.2866305	-0.403695	
Market	-1.198637	-2.31549*	-0.330544	-2.2024*	-0.000847	-2.26800*	0.0888692	-1.053051	-0.378462

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

* When t-value < -2.1098 or > 2.1098, H0 is rejected; When t-value > -2.1098 or < 2.1098, H0 is not rejected

In terms of the risk or volatility, there is statistically significant difference between all portfolios and the market. Value and growth also showed a difference but both had no significant difference with DOD.

Table 17. F-test from standard deviation of value, growth, and DOD portfolio during market negative period

F-test	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	2.610075*								
High E/P	1.3657755	1.9110573							
Low E/P	1.6440741	1.5875654	1.203766						
High BM & EP (50%)	1.1014815	2.3696042	1.2399441	1.4926025					
Low BM & EP (50%)	1.9962678	1.3074774	1.4616369	1.2142201	1.812348				
High BM & EP (30%)	1.4778993	3.857428*	2.0184786	2.429778*	1.6278788	2.950283*			
Low BM & EP (30%)	1.8457871	1.4140717	1.3514572	1.1226909	1.6757313	1.0815266	2.727887*		
DOD	1.9754559	1.3212521	1.4463987	1.2015614	1.7934535	1.0105353	2.919525*	1.0702512	
Market	4.263524*	1.6334871	3.121687*	2.593268*	3.870718*	2.1357475	6.301059*	2.309868*	2.1582482

Source: author's data collection, calculation, and analysis

*Statistically significant with 5% alpha

* When F-value > 2.2719, H0 is rejected; When F-value < 2.2719, H0 is not rejected

Regarding the risk adjusted return, all portfolios and the market did not show any statistically significant difference, which could indicate that all portfolios move the same direction as the market and none of the portfolios were able to withstand the downturn during this period.

Table 18. t-test from Sharpe ratio of value, growth, and DOD portfolio during market negative period

T-test of Sharpe Ratio	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	0.5495121								
High E/P	0.6091663	0.7763936							
Low E/P	0.1954861	0.4758152	0.3655692						
High BM & EP (50%)	-1.0182287	-0.8629037	-0.4641075	-0.4720168					
Low BM & EP (50%)	0.706337	0.6456937	0.8326091	0.946134	0.9310668				

High BM & EP (30%)	-0.4050614	-0.7152898	0.0780848	-0.3210632	0.428203	-0.796248			
Low BM & EP (30%)	-0.0160382	-1.3580099	0.1824973	-0.2828119	0.2738588	-1.8304587	0.1592503		
DOD	0.0643429	0.5261131	0.1944439	0.2565511	0.2952619	0.6806672	0.1366184	0.0262177	
Market	1.4773433	0.7509073	1.7190685	0.9269381	1.7220825	0.0187371	1.3755554	1.0642514	1.3748798

Source: author's data collection, calculation, and analysis

*When t-value < -2.1098 or > 2.1098, H0 is rejected; When t-value > -2.1098 or < 2.1098, H0 is not rejected

Table 19. t-test from Treynor ratio of value, growth, and DOD portfolio during market negative period

T-test of Treynor Ratio	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.1637982								
High E/P	-1.4259243	-1.04074							
Low E/P	0.4120166	0.630419	1.231054						
High BM & EP (50%)	-1.862843	-0.74870	0.268378	-1.181673					
Low BM & EP (50%)	0.5322918	1.27935	1.419628	0.368632	1.279667				
High BM & EP (30%)	0.1563196	0.23799	1.007548	-0.100448	1.042266	-0.25512			
Low BM & EP (30%)	-0.3653782	-0.56636	0.424109	-0.866530	0.294355	-1.99846	-0.422471		
DOD	0.2080362	0.40441	1.045699	-0.058703	0.845587	-0.22972	0.044733	0.510328	
Market	-0.0763838	0.24103	1.299362	-0.525372	0.920944	-0.85729	-0.165621	0.456319	-0.39477

Source: author's data collection, calculation, and analysis

*When t-value < -2.1098 or > 2.1098, H0 is rejected; When t-value > -2.1098 or < 2.1098, H0 is not rejected

Table 20. t-test from Jensen's alpha of value, growth, and DOD portfolio during market negative period

T-test of Jensen's Alpha	High B/M	Low B/M	High E/P	Low E/P	High BM & EP (50%)	Low BM & EP (50%)	High BM & EP (30%)	Low BM & EP (30%)	DOD
Low B/M	-0.104709								
High E/P	-1.386836	-1.098019							
Low E/P	0.1409231	0.3444887	1.0377506						
High BM & EP (50%)	-1.7909016	-0.7723325	0.129541	-0.9179315					
Low BM & EP (50%)	0.325741	1.012351	1.3229049	0.4534534	1.110773				
High BM & EP (30%)	-0.6039861	-0.2870936	0.5057965	-0.4366867	0.6440834	-0.6090758			
Low BM & EP (30%)	-0.3195615	-0.6648807	0.4945031	-0.7436231	0.371855	-1.9193637	0.0523751		
DOD	-0.345676	-0.339046	0.4724081	-0.519659	0.334847	-0.680730	0.0398786	-0.005081	
Market	-0.118113	0.0057176	1.2254269	-0.323989	0.8251924	-0.725859	0.2887472	0.3960531	0.4635232

Source: author's data collection, calculation, and analysis

*When t-value < -2.1098 or > 2.1098, H0 is rejected; When t-value > -2.1098 or < 2.1098, H0 is not rejected

LIMITATION

This study is done in one market only and not able to compare different market from under- developing countries, developing countries, to developed countries for international comparison of all three investment strategies: value, growth, and DOD investing. This study also uses only two financial ratios: book-to-market ratio and earning-to-price ratio so future studies can develop portfolios with different criteria such as cash flow to price ratio or past sales growth to strengthen the findings. A differentiation between small-cap and large-cap stocks can also be done in future studies to find out whether there is any difference of return, risk, and risk-adjusted return between the stocks with different size of market capitalization.

CONCLUSION AND RECOMMENDATION

This study aims to analyze the performance and discover whether there is a difference on the average return, risk, and risk-adjusted return of value, growth, and DOD portfolios during the overall period, market positive, and market negative period. This study discovers that value portfolios that are formed on high E/P stocks and combination of high B/M and E/P stocks generated the highest average return, the researcher would recommend investors to consider adding these stocks to their portfolios, especially in Indonesia market where this study is conducted. These portfolios also have relatively smaller beta compare to growth and DOD portfolio in this study. However, a thing to note is the volatility of the portfolios. There is also statistically significant difference between the value and growth stocks when comparing the average return, risk, and risk-adjusted return. The average return of growth stocks also has statistically significant difference with DoD stocks. However, there is no statistically significant difference between the average return of value and DoD stocks.

In terms of the risk-adjusted return, value portfolios showed the most differences with growth, DOD and the market during overall and market positive, particularly the high E/P and combination of high B/M & E/P portfolio. However, during the market negative, most of the portfolios did not show any significant difference between each other and the market, related to its risk-adjusted return. Thus, it is hard to suggest which portfolio would be able to withstand the market negative period. Nevertheless, this study can recommend high E/P and combination of high B/M and E/P to take the most out of the market positive period.

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