Růstová a hodnotová investiční strategie aplikovaná na vybraných akciích z New York Stock Exchange

Growth and Value Investment Strategy Applied on Chosen Stocks of the New York Stock Exchange

Radim Gottwald

Abstract:
Purpose of the article: Nowadays, investors use many investment strategies. They can realize different profits using different strategies because of different principles of strategies. Author assesses two investment strategies. Calculating different financial indicators leads to comparison of yield and risk of indexes related to these strategies. Presented results could be important for investors within their investment decision in order to create investment portfolio.
Methodology/methods: Growth and value investment strategies are theoretically described and applied in real data within 2008–2012. Using the CAPM model, author divides stocks of the NYSE included in the base of the DJIA into growth stocks and value stocks. Author compares index trends in charts, interpolates individual index charts by trend line and calculates financial indicators.
Scientific aim: The aim of the article is to assess growth and value investment strategies which are applied to chosen stocks traded on the NYSE within 2008–2012. Author compares yield and risk of growth index with yield and risk of value index and DJIA index.
Findings: Author applies growth and value investment strategies to chosen stocks. Sharpe ratio of indexes within whole period 2008–2012 is negative, whereas Jensen's alpha is positive. Information ratio is positive only within 2008. Value investment strategy has lead to higher yield than growth investment strategy since October 2010, whereas before this month values had not been so different, but rather similar. Risk of value index is higher than risk of growth index and smaller than risk of DJIA index within each year of whole period 2008–2012.
Conclusions: Similarly to results of empirical studies cited in this article, results of author indicate that value stock yields are higher than growth stock yields. Based on assessment of these investment strategies, investors could use results when they are making investment decision.

Keywords: Investment strategy, growth investment strategy, value investment strategy, Sharpe ratio, Jensen's alpha, Information ratio

JEL Classification: G11, G12

Introduction

In connection with stock trading on stock markets, investors, financial analysts and other subjects of the financial market use various investment strategies. Principles of different strategies are also different, so that investors can realize different profits using different strategies. It is possible to find out, whether investors will realize higher profit by means of the growth investment strategy or of the value investment strategy. Author brings original findings to the field of investment strategies.

1. Literary Survey

Gladiš (2004) describes investment strategy as a such investment style used by investor, which reflects his opinion of both the market and behavior of other investors on the market. The investment effectiveness could be assessed. The more is the investment effective, the higher is the yield to risk ratio related to the investment, as Sharpe and Alexandr (1994) present. Indicator Sharpe ratio is often used to measure stock yield respecting risk. Soustružník (2003) considers the Sharpe ratio to be measure of investor success and he recommends it to assess investment rate of return. This ratio could be used not only by investors owing large diversified stocks portfolio but also by other investors.

Kohout (2008) presents that stocks could be divided according to the fundamental analysis indicators into growth stocks and value stocks. Earnings per share of most of the growth stocks increase in time more quickly than earnings per share of other stocks. Dow (1998) mentions that investors consider growth stocks to be stocks of companies which retain part of their profits to reinvesting. Growth investment strategy means investing to growth stocks. The principle of this strategy consists, as Vocílka (2008) presents, in buying of stocks of attractive companies which report high growth of sales, profits and margins. Similarly, value investment strategy means investing to value stocks. The principle of the value investment strategy could be described as to buy cheap and sell expensive. Šimčák (2001) considers investors using value investment strategy to be cautious investors that do not accept high risk.

Growth stock yields can be compared with value stock yields. Fama and French (1998) claim that value stock yields are mostly higher than growth stock yields. Arshanapalli, Coggin and Doukas (1998) present that value stocks outperform growth stocks, on average, in most countries during the January 1975 – December 1995 period, both absolutely and after adjusting for risk. The annual difference between the average returns on portfolios of value and growth stocks is 12.94% in North America, 17.26% in Pacific-Rim, 10.42% in Europe, per year, and value stocks outperform growth stocks in 17 out of 18 national capital markets. According to Chahine and Choudhry (2004), value investment strategy with a high earnings growth rate over performance the growth strategies for the Eurozone. Lee and Song (2003) investigate a relation between performance of value stocks over growth stocks and investor sentiment. They find that value stocks tend to outperform growth stocks when the Chicago Board Options Exchange equity put-call ratio is relatively low or the market volatility index is relatively high. When growing economics of some country is getting to recession, some growth stocks are changing into value stocks.

2. Objective and Methodology

The aim of the article is to assess growth and value investment strategies which are applied to chosen stocks traded on the New York Stock Exchange (NYSE). These stocks are included in the base of the Dow Jones Industrial Average index (DJIA). The NYSE belongs, according to market capitalization, among the biggest world stock exchanges. DJIA index is important indicator of trading on the NYSE. Period 2008–2012 was chosen due to increasing trend and afterwards decreasing trend in DJIA index, which will be mentioned below. Author uses the Capital Asset Price Model (CAPM) to divide stocks into growth stocks and value stocks.

Indicator P/E (price-to-earnings ratio) related to these stocks is calculated in each year. Stocks are divided according to average P/E. P/E is the ratio of stock price and earnings of a company. Four growth and four value stocks are chosen.

Growth portfolio contains all growth stocks, whereas value portfolio contains all value stocks. The stock weight in a portfolio expresses the ratio of market capitalization of this stock and market capitalization of all stocks in portfolio. The base and the trend of both growth and value index are presented. Growth portfolio yield is compared with value portfolio yield.

Growth index is determined by growth stocks, whereas value index is determined by value stocks. Growth index value is derived from the market capitalization of the growth index base. This capitalization is the sum of market capitalizations of all stocks

in growth portfolio. Similarly, value index value relates to the value index base.

Several financial indicators are calculated for stocks. Index value in time t+1 is calculated as follows:

$$I_{t+1} = I_t \cdot \frac{MC_{t+1}}{MC_t}, \quad (1)$$

whereas:

I_{t+1} is index value in time t+1,
I_t is index value in time t+1,
MC_{t+1} is market capitalization of the index base in time t+1,
MC_t is market capitalization of the index base in time t.

Then stock yield is calculated as follows:

$$r_t = \frac{P_t - P_{t-k}}{P_{t-k}}, \quad (2)$$

whereas:

r_t is stock yield,
P_t is stock price at the beginning of following period,
P_{t-k} is stock price at the beginning of current period.

Expected stock yield is calculated as follows:

$$r_{\exp} = \frac{1}{T} \cdot \sum_{t=1}^{T} r_t, \quad (3)$$

whereas:

r_{exp} is expected stock yield,
r_t is stock yield,
T is number of chosen periods.

Stock risk is calculated as follows:

$$\sigma = \sqrt{\frac{1}{T} \cdot \sum_{t=1}^{T} \left(r_t - r_{\exp}\right)^2}, \quad (4)$$

whereas:

σ is stock risk,
T is number of chosen periods,
r_t is stock yield,
r_{exp} is expected stock yield.

This indicator measures stock price volatility.

Sharpe ratio is calculated as follows:

$$SR = \frac{r_t - r_f}{SD}, \quad (5)$$

whereas:

SR is Sharpe ratio,
r_t is stock yield,
r_f is risk-free yield,
SD is annualized standard deviation of yield.

Jensen's alpha is calculated as follows:

$$JA = r_t - \left[r_f + \beta \cdot \left(r_m - r_f\right)\right], \quad (6)$$

whereas:

JA is Jensen's alpha,
r_t is stock yield,
r_f is risk-free yield,
β is beta coefficient,
r_m is market performance.

Information ratio is calculated as follows:

$$IR = \frac{r_t - r_m}{SD}, \quad (7)$$

whereas:

IR is Information ratio,
r_t is stock yield,
r_m is market performance,
SD is annualized standard deviation of yield.

DJIA yield is considered to be market performance.

Beta coefficient is calculated as follows:

$$\beta_t = \frac{\operatorname{cov}\left(r_t, r_m\right)}{\sigma_m^2}, \quad (8)$$

whereas:

β_t is beta coefficient,
$\operatorname{cov}(r_t, r_m)$ is covariance between stock yield and market performance,
σ_m^2 is dispersion of stock yield.

Beta coefficient measures systematic risk used in the CAPM model. If this coefficient is higher than 1, stock yield increases more quickly than portfolio yield. Similarly, if it is smaller than 1, stock yield increases more slowly.

Yield and risk of growth index is compared with yield and risk of value index as well as yield and risk of DJIA index by means of the comparison of index trends in charts, the interpolating of individual index charts by trend line and the calculating of indicators Sharpe ratio, Jensen's alpha and Information ratio.

Input data needed to realization of the empirical analysis are comprised of daily closing stock prices available from Finance Yahoo (2013), daily closing DJIA index values available from Measuring Worth (2013), P/E values of stocks, numbers of issued stocks and market capitalizations available from

Ycharts (2013) and 1-year annual US treasury bills yields available from The Federal Reserve System (2013).

3. Results

At the first, four growth and four value stocks are chosen of stocks traded within 2008–2012 on the NYSE, which are included in the DJIA index base. Stocks are divided according to average P/E. P/E is often used within the fundamental analysis.

High average P/E is typical, as Graham and Zweig (2007) present, for the growth stock. In detail, stocks with average P/E over 20 are often considered to be growth stocks. Based on the order of stocks of the DJIA index base according to average P/E within 2008–2012, stocks with high average P/E are integrated into growth stocks, whereas stocks with low average P/E are integrated into value stocks. Table 1 reports average P/E of chosen stocks within 2008–2012.

Table 1. Average P/E of chosen stocks within 2008–2012.

Stock	Stock type	Average P/E
Alcoa	growth	24.15
Merck&Co Ord	growth	21.19
Verizon Communications	growth	19.21
Bank of America	growth	18.33
Exxon Mobil	value	11.58
UnitedHealth Group	value	9.86
Chevron	value	9.41
Travelers Companies	value	9.15

Source: Ycharts, 2013.

Average P/E expresses how many monetary units are investors willing to pay for one monetary unit of annual profit falling upon one stock. The growth index base to 31. 12. 2012 is reported in the Table 2.

Weights of individual stocks in the growth index are determined by their market capitalizations. These capitalizations are products of stock prices and numbers of issued stocks. It is clear that Alcoa has smaller influence on the growth index base than other stocks because of low weight. Other three stocks have almost the same weights. Table 3 reports the value index base to 31. 12. 2012.

Similarly, market capitalizations determine weights of individual stocks in the value index. Exxon Mobil has the highest influence on the value index base because of the highest weight.

Growth index, value index and DJIA index are assessed by means of the comparison of index trends in charts, the interpolating of individual index charts by trend line and the calculating of indicators Sharpe ratio, Jensen's alpha and Information ratio. Several ways of assessment lead to more clear presentation of differences among indexes. Trend of both growth and value index within 2008–2012 is presented in the Figure 1.

Trend of DJIA index within 2008–2012 is illustrated in Figure 2.

DJIA index value to 1. 1. 2008 is 13 264.82. In order to make clear comparison, this value is set as initial also for growth and value index. Trends of all three indexes within 2008–2012 are analysed. Even

Table 2. The growth index base to 31.12.2012.

Stock	Stock price (USD)	Number of issued stocks (bil. pcs)	Market capitalization (bil. USD)	Weight (%)
Alcoa	8.62	1.07	9.26	2.42
Merck&Co Ord	40.55	3.03	123.91	32.44
Verizon Communications	42.33	2.86	123.69	32.38
Bank of America	11.59	10.78	125.14	32.76
TOTAL	–	–	382.00	100.00

Source: Finance Yahoo, 2013, Ycharts, 2013.

Table 3. The value index base to 31.12.2012.

Stock	Stock price (USD)	Number of issued stocks (bil. pcs)	Market capitalization (bil. USD)	Weight (%)
Exxon Mobil	85.41	4.50	389.65	57.09
UnitedHealth Group	54.03	1.02	55.27	8.10
Chevron	106.45	1.95	210.52	30.84
Travelers Companies	71.41	0.38	27.10	3.97
TOTAL	–	–	682.54	100.00

Source: Finance Yahoo, 2013, Ycharts, 2013.

Figure 1. Trend of both growth and value index within 2008–2012. Source: Finance Yahoo, 2013.

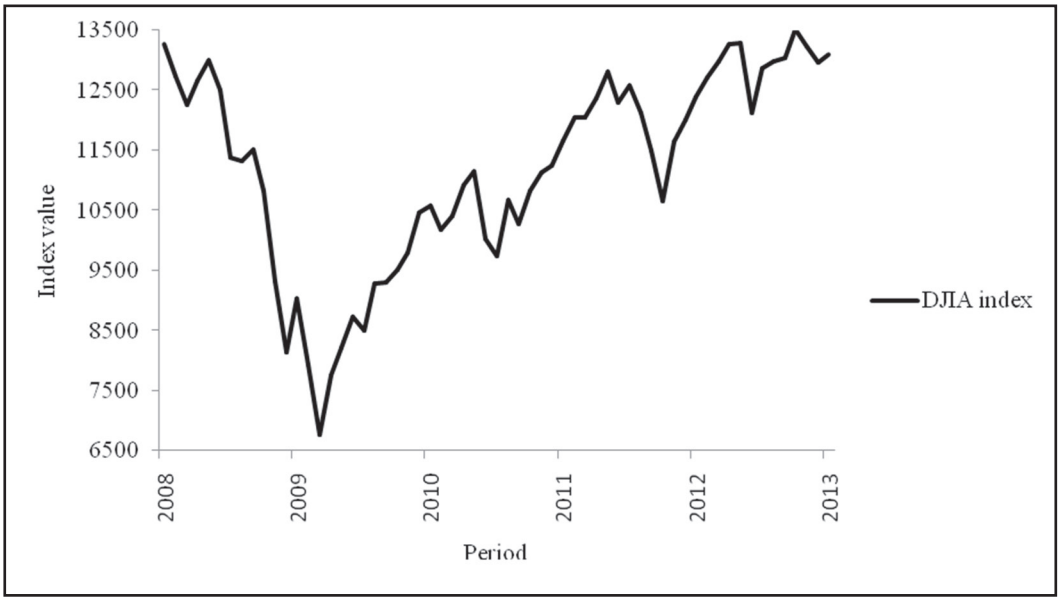

Figure 2. Trend of DJIA index within 2008–2012. Source: Measuring Worth, 2013.

when some differences in index values in time are clear, the trend of each trend since January 2008 till February 2009 is mostly decreasing. However, increasing trend predominates since March 2009 till December 2012. Change in trend is detected in the same month and year for all three indexes, so that growth stocks reflect current market situation similarly like value stocks. While the minimum of all three indexes is detected on March 2009, the maximum is detected on October 2012. Furthermore, value index has been higher than growth index since October 2010. While growth stock yields had been similar like value stock yields till October 2010, value stocks have been more profitable than growth stock since this month.

Table 4. Slope-intercept forms within the first and the second period.

Partial period	Index	Slope-intercept form
1	growth	y = –0.07x + 13263.67
1	value	y = –0.06x + 13263.23
1	DJIA	y = –20.17x + 13749.89
2	growth	y = +0.01x + 13246.85
2	value	y = +0.04x + 13239.94
2	DJIA	y = +5.14x + 8810.58

Source: Finance Yahoo, 2013.

Table 5. Sharpe ratio of DJIA index.

Year	Sharpe ratio	Yield (% p.a.)	Risk (% p.a.)	Risk-free yield (% p.a.)
2012	–0.0004	0.05	319.81	0.17
2011	–0.0003	0.05	487.54	0.17
2010	–0.0004	0.09	458.72	0.30
2009	–0.0003	0.15	1012.14	0.45
2008	–0.0013	–0.33	1543.01	1.63

Source: Finance Yahoo, 2013, The Federal Reserve System, 2013.

Table 6. Sharpe ratio of growth index.

Year	Sharpe ratio	Yield (% p.a.)	Risk (% p.a.)	Risk-free yield (% p.a.)
2012	–0.08	0.0004	2.22	0.17
2011	–0.14	0.0000	1.19	0.17
2010	–0.32	0.0001	0.93	0.30
2009	–0.16	0.0003	2.73	0.45
2008	–0.33	–0.0012	4.99	1.63

Source: Finance Yahoo, 2013, The Federal Reserve System, 2013.

In order to interpolate individual index charts by trend line author uses linear interpolation. Based on detected minimum of all three indexes on March 2009, period 2008–2012 is divided into two partial periods. The first period, mostly decreasing, lasted since 1.1.2008 till 9.3.2009. The minimum of DJIA index, 6,547.05, was detected just at the end of the first period. The second period, mostly increasing, lasted since 10. 3. 2009 till 31. 12. 2012. Line inclinations are compared separately for decreasing trend and for following increasing trend. Trend lines are expressed and compared through regression equation, concretely through slope-intercept form. Slope-intercept forms within the first and the second period are reported in Table 4.

Focusing on the first period, decreasing trend predominates, so that line directions of all three indexes are negative. On the contrary, increasing trend predominates within the second period and line directions of all three indexes are positive. Values in Table 4 confirm conclusions based on comparison of index trends in Figure 1 and Figure 2. Sharpe ratio of DJIA index including indicators used within its calculation are reported in Table 5.

1-year annual US treasury bills yield is considered to be risk-free yield. Jensen's alpha and Information ratio cannot be calculated for DJIA index because yield and risk contain values of this index. Sharpe ratio of growth index including indicators used within its calculation are reported in Table 6.

Jensen's alpha and Information ratio of growth index including indicators used within its calculation are reported in Table 7.

Sharpe ratio of value index including indicators used within its calculation are reported in Table 8.

Jensen's alpha and Information ratio of value index including indicators used within its calculation are reported in Table 9.

Sharpe ratio, Jensen's alpha and Information ratio of DJIA index, growth index and value index are compared.

Negative Sharpe ratio indicates that yield of certain index is smaller than risk-free yield. Sharpe ratio of all three indexes within whole period 2008–2012 is negative. Sharpe ratio of value index is within each year of whole period 2008–2012 higher

Table 7. Jensen's alpha and Information ratio of growth index.

Year	Jensen's alpha (% p.a.)	Information ratio	Yield (% p.a.)	Beta coefficient
2012	9.57	–0.02	0.0004	83.21
2011	38.75	–0.04	0.0000	316.08
2010	62.98	–0.10	0.0001	307.01
2009	105.50	–0.06	0.0003	358.22
2008	553.47	0.07	–0.0012	283.63

Source: Finance Yahoo, 2013, The Federal Reserve System, 2013.

Table . 8 Sharpe ratio of value index.

Year	Sharpe ratio	Yield (% p.a.)	Risk (% p.a.)	Risk-free yield (% p.a.)
2012	–0.05	0.0002	3.52	0.17
2011	–0.04	0.0011	3.81	0.17
2010	–0.08	0.0007	3.94	0.30
2009	–0.14	–0.0003	3.24	0.45
2008	–0.27	–0.0009	5.97	1.63

Source: Finance Yahoo, 2013, The Federal Reserve System, 2013.

Table 9. Jensen's alpha and Information ratio of value index.

Year	Jensen's alpha (% p.a.)	Information ratio	Yield (% p.a.)	Beta coefficient
2012	8.68	–0.02	0.0002	75.63
2011	11.76	–0.01	0.0011	96.89
2010	21.83	–0.02	0.0007	107.37
2009	64.19	–0.05	–0.0003	218.55
2008	421.06	0.05	–0.0009	215.97

Source: Finance Yahoo, 2013, The Federal Reserve System, 2013.

Table 10. Growth portfolio yield.

Stock	Weight (%)	Yield (% p.a.)	Portfolio yield (% p.a.)
Alcoa	2.42	–23.46	–0.01
Merck&Co Ord	32.44	–2.20	
Verizon Communications	32.38	5.74	
Bank of America	32.76	–20.63	

Source: Finance Yahoo, 2013, Ycharts, 2013.

Table 11. Value portfolio yield.

Stock	Weight (%)	Yield (% p.a.)	Portfolio yield (% p.a.)
Exxon Mobil	57.09	0.81	0.02
UnitedHealth Group	8.10	–0.04	
Chevron	30.84	6.49	
Travelers Companies	3.97	9.52	

Source: Finance Yahoo, 2013, Ycharts, 2013.

than Sharpe ratio of growth index and smaller than Sharpe ratio of DJIA index.

Positive Jensen's alpha indicates that yield of certain index is higher than market performance. Stuchlík (2006) presents that the higher is Jensen's alpha, the better should portfolio manager eliminate systematic risk of certain stock market. Jensen's alpha of growth index and value index within whole period 2008–2012 is positive. Values of Jensen's alpha decrease in time. Jensen's alpha of growth index is within each year of whole period 2008–2012 higher than Jensen's alpha of value index.

Positive Information ratio indicates that yield of certain index is higher than market performance. Risk-free yield is not calculated in this case, in contrast to Jensen's alpha. Information ratio is

considered to be benchmark when investor finds whether yield of certain stock exceeds market performance. Information ratio of growth index and value index is within 2008 positive, whereas it is negative within other years.

Further interesting finding is that minimum Sharpe ratio and yield together with maximum risk, Jensen's alpha and Information ratio is detected within 2008. Risk of value index is higher than risk of growth index and smaller than risk of DJIA index within each year of whole period 2008–2012.

Growth portfolio yield could be compared with value portfolio yield. Table 10 reports growth portfolio yield.

Table 11 reports value portfolio yield.

It is clear that growth portfolio yield is smaller than value portfolio yield. This fact corresponds with Figure 1.

4. Discussion

Volatile course of growth index and value index is illustrated in Figure 1. It is clear that value investment strategy has lead to higher yield than growth investment strategy since October 2010, whereas before this month values had not been so different, but rather similar. Similarly to results of empirical studies cited in this article, results of author indicate that value stock yields are higher than growth stock yields. However, several factors which could be discussed, influence achieved results. These factors are stock market, time period, number of chosen stocks and number and character of financial indicators.

The motivation and contribution of this article are clear. Investors need to know what are real yields of theoretically described investment strategies in the practice. Author finds what investment strategy leads to higher yield achievement. He uses present data of the US stock market. Investors could use results of this article within their investment decision in order to create investment portfolio. Many empirical studies focused on assessment of investment strategies, among which this article also belongs, show that field of investment strategies is considered to be still current by investors and financial analysts. It is current despite change of yields of growth stocks and value stocks caused by whole stock market development. Relatively high yields of growth stocks during 1990–2000 are in contrast with relatively high yields of value stocks during 2000–2010. So that growth stocks are not so attractive for investors as earlier. Also many portfolio managers added value stocks to portfolios whereas took away growth stocks from portfolios. Financial policy of joint-stock company determines whether the stock belongs between growth stocks or value stocks. Stable dividend policy of a company can change into irregular dividend payouts because of different reasons like change of financial policy or investment planning, decreasing profit or realization of loss in accounting within accounting period. Stocks are often divided on financial markets into growth stocks and value stocks. Many funds are focused on only growth investment strategy or value investment strategy. Growth stock indexes and value stocks indexes are used as well. The difference between growth stocks and value stocks need not be considerable. Vocílka (2008) describes situation when growth stocks transform into value stocks. This change can be caused by economic recession. The decision approved at general meeting of shareholders about change of financial policy and investment planning can indirectly later cause change of character of stocks of a company from growth stocks to value stocks or vice versa.

Further research in this field can go in several directions. Different investment strategies could be applied using different financial indicators. Also different time periods, different stock markets and different number of chosen stocks could be applied. The differences between trends of growth stock yields and value stock yields when the whole stock market rises or falls could be analysed.

Conclusion

The article is focused on assessment of growth and value investment strategies. At the first, empirical studies focused on these strategies are cited within literary survey. Then author applies these strategies into four chosen growth stocks and four chosen value stocks of the NYSE within 2008–2012. The growth index base and the value index base to 31. 12. 2012 are determined. Financial indicators Sharpe ratio, Jensen's alpha, Information ratio and beta coefficient are calculated to DJIA index, growth index and value index. These indicators and yields of all three indexes are compared by means of the comparison of index trends in charts, the interpolating of individual index charts by trend line and the calculating of mentioned financial indicators.

Based on founded results, it is clear that when yields related to growth and value investment strategies had not been since January 2008 till October 2010 too different, value investment strategy has lead to higher yield than growth investment strategy

since October 2010 As for risk, risk of value index is higher than risk of growth index and smaller than risk of DJIA index within each year of whole period 2008–2012. Author concludes that these results are similar to results of empirical studies cited in this article. Investors could take these facts into consideration when they hesitate whether add growth or value stock to their investment portfolio.

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Ing. Mgr. Radim Gottwald
Mendelova univerzita v Brně
Provozně ekonomická fakulta
Ústav financí
Zemědělská 1, 613 00 Brno
Česká republika
tel.: 545 132 436
e-mail: radim.gottwald@mendelu.cz