APPLICABILITY OF CONTRARIAN INVESTMENT STRATEGIES IN SMALL CAPITALIZATION MARKETS: EVIDENCE FROM NASDAQ OMX VILNIUS

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Abstract. *This study reviews previous research on the contrarian investment strategy as first analyzed by De Bondt and Thaler (1985), and aims at deepening and complementing the existing research on the subject. The paper analyses the results of applying the strategy to NASDAQ OMX Vilnius stocks over the period 2003–2010, dividing the testing into two groups: prior to the economic crisis and the crisis periods, based on the movement of the OMXV index. The method uses holding period returns in evaluating the standard contrarian investment strategy. The paper explains the methodology in detail and presents the findings which show no considerable holding period returns from the strategy in NASDAQ OMX Vilnius during the decline period; however, contrarian strategy seems to be a better option than a standard market index based portfolio during the periods of rapid growth when stocks are overrated.*

Key words: *securities, stock market, NASDAQ OMX Vilnius, contrarian investment strategy*

Introduction

Previous research on contrarian investment

The contrarian investment strategy has been tested in multiple stock markets across the world. Studies conducted in large capitalization and well developed markets have proved that contrarian strategies produce superior returns. Mun, Vasconcellos and Kish (1999) have found that for both French and German stock markets, short-term contrarian portfolios work best. De Bondt and Thaler report contrarian profits in the US markets in 1985, which are up to 25%. The strategy seems to be profitable in other large stock exchanges, such as Japan (Rosita, Chang, McLeavey, Ghon Rhee, 1995); this is also the case for four European countries: France, Germany, the UK and the Netherlands (Brouwer, van der Put, Veld, 1997). A recent study carried out in Bombay Stock Exchange (Locke, Gupta, 2009) confirmed superior returns from the contrarian investment strategy as well.

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On the other hand, researches conducted in smaller capitalization and less developed markets, such as Istanbul (Bildik, Gulay, 2007), New Zealand (Chin, 2002), Tunisia (Trabelsi, 2010) and Canada (Assoea, Sy, 2003) do not provide positive results when testing the contrarian investment strategy.

Overview of NASDAQ OMX Vilnius

The Lithuanian economy reflected considerably high growth rates as a transition economy during the past decade until the sharp decline that started in the middle of 2007. The Lithuanian Stock exchange as a barometer of the country's economic performance has experienced a rapid economic growth since signing the cooperation agreement with the London Stock Exchange in July 2000 and becoming an associate member of the Federation of the European Securities Exchanges (FESE).

The history of NASDAQ OMX Vilnius dates back to 1993 when the National Stock Exchange of Lithuania (NSEL) was registered with the Securities Commission. With its acquisition by the NASDAQ OMX, the name of National Stock Exchange of Lithuania has been amended to the NASDAQ OMX Vilnius in August 2004. The change has brought valuable enhancements to the structure and facilities of the stock exchange, such as the SAXESS trading platform in 2005, the INET Nordic scalable trading platform in 2009, which brought in the European trading environment under Markets in Financial Instruments Directive (MiFID) as well as the establishment of the Emerging Nordic Research – the first independent equity research company in the Baltic region.

As is evident from the steady OMXV index upward movement in Fig. 1, supported by the macroeconomic reviews and studies, the past decade has evidenced a significant

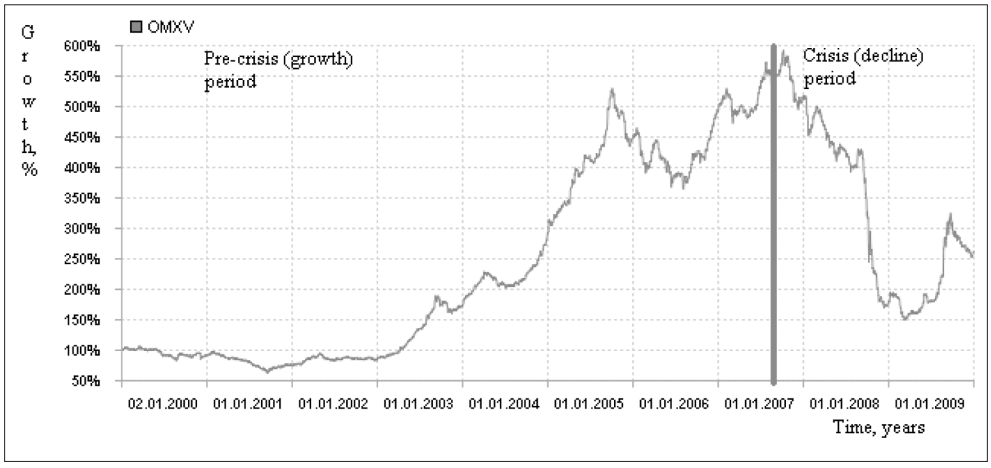

FIG. 1. **OMXV index development over the past decade**

Source: www.NASDAQomxbaltic.com

growth in the Lithuanian Stock market from the year 2003 until the middle of 2007 when the NASDAQ OMX Vilnius was hit by the US Stock Exchange crisis. The division into the pre-crisis (growth) and crisis (decline) periods is based on the steady upward movement of the OMXV index graph evident in Fig. 1 till the middle of 2007, whereas from the third quarter of 2007 the graph shows a visible negative slope. Regardless of some increase in the first quarter of 2009, for consistency and accuracy reasons it was avoided to start mentioning any significant recovery and growth of the Lithuanian Stock market. Furthermore, the sharp variations of the OMXV index in Fig. 1 lead to the conclusion that the Lithuanian capital market is characterized by high fluctuations in prices of the stocks, because it is a relatively small capitalization market.

Literature review

The contrarian investment strategy

The contrarian stock selection strategy consists of buying the stocks that have been performing badly over the past period and selling the short stocks that have been performing well (Chan, 1988). The main followers of the strategy include but not limit themselves to such investors as W. Buffet, investment researchers and book authors D. Dreman and M. Ripple, while others, such as J. Neff, refuse to acknowledge the existence of contrarian investment *per se* and consider it to be part of the value investment strategy.

The previous research

The first theories about the contrarian investment strategy date back to as far as 1934 with Graham and Dodd calling for buying stocks with low prices relative to value measures such as earnings, cash flows, book values or dividend yields. Keynes (1936) states that "a large proportion of our positive activities depend on spontaneous optimism rather than mathematical expectations". In other words, investors do not respond to information following Bay's rule, and "animal spirits" lead to irrational economic behavior related to excessive optimism or pessimism.

The Keynesian theory is further elaborated in the findings of cognitive psychology by Kahneman and Tvesky (1973, 1974) who discover that human beings tend to overreact to new information, attributing a greater weight to it. Such studies placed foundations for behavioral finance and the development of the overreaction hypothesis by De Bondt and Thaler (1985). The overreaction hypothesis claims that evident best-performers turn into worst-performers and that the worst-performers become best-performers during the consequent period, driven by the primary overreaction of the investors to the news that is subsequently corrected. If this is proven correct, then contrarian strategies, which are short in past best-performing stocks and long in past worst-performing stocks, should deliver excessive profits. In his review of the current debate on the market efficiency,

Merton (1985) considers the work of De Bondt and Thaler to be "particularly noteworthy" because it represents "a first attempt at a formal test of cognitive misperceptions theories as applied to the general stock market".

De Bondt and Thaler (1987) in the next article agree that the losing portfolio result was partly attributable to a small-firm effect, and the reason for overreaction lies in the market's inefficiency in incorporating information about earnings.

A bid-ask bias could be another contributing factor supporting the contrarian strategy. Kaul and Nimalendran (1990), Ball et al. (1995) and Loughran and Ritter (1996), among others, postulate that since earlier studies fail to consider transaction costs, it follows that it is not feasible to make abnormal profits. They conclude that best-performers keep on winning and worst-performers keep on losing, and price-reversals occur due to bid-ask spread and market liquidity. Keim (1989) notes that a systematic shift from trading at bid prices to trading at ask prices may partially account for various changes in stock returns. This argument is supported by Atkins and Dyl (1990) who examine stock price reactions to the announcement of best-performers and worst-performers in the *Wall Street Journal*, concluding that after including the bid–ask spread, the magnitude of the overreaction becomes small. Similarly, Kaul and Nimalendran (1990), Park (1995) and Akhigbe (1998) during investigations of bid–ask prices for NASDAQ and NYSE stocks find a negligible support of overreaction after the price of the stocks had been adjusted for bid–ask spread. Against this backdrop, Conrad and Kaul (1993) link overreaction to bid–ask spread and infrequent trading. This is consistent with Cox and Peterson's (1994) findings which suggest that bid–ask quotes bounce, and the degree of market liquidity is responsible for price reversals. Another explanation of this phenomenon is given by Mase (1999). After analyzing the UK stock market, the author concludes that a lower bid-ask spread or transaction costs lead to strong price reversals. As a result, chances of infrequent trading grow as the bid–ask spread increases.

Studies by Fama and French (1988), Zarowin (1990) and Chopra (1992) find that worst-performers under-perform the best-performers when the firm size and January seasonality are controlled. When worst-performers are compared with best-performers of equal size, there is little evidence of overreaction. An explanation of the size effect is proposed by Baytas and Cakici (1999) who assume that, since worst-performers tend to be low in price and low in market value – while the opposite holds true for best-performers – then the long-term price observed may be due to price and size effect. Conversely, Pettengill and Jordon (1990) claim that a forward price reversal occurs due to the January effect rather than the firm size anomaly. Ahmad and Hussain (2001), Alonso and Rubio (1990), and Chang (1995) find no evidence of size effects in explaining price reversals. A difference in risk is also raised as a possible reason for price reversals. Chan (1988), along with Ball and Kothari (1989), argue that the validity of long-term overreaction is based on the assumption that risk is constant. They suggest that the risk

of the best-performing and worst-performing portfolios changes over time. Ball (1995) suggests that if the market value is a good proxy for risk, as argued by the size effect literature, then the worst-performers will become more risky by the end of the formation period, and the best-performers will become less risky.

In some circumstances, methodological errors lead to different results using the same data. For example, according to Dissanaike (1994), estimates of portfolio performance are highly sensitive to the methods used to compute both the formation and the test period returns. This is consistent with Conrad and Kaul (1993) and Dahlquist and Broussard (2000). These authors use a "buy and hold" strategy instead of Cumulative Abnormal Returns approach, finding no evidence of overreaction. A range of new findings, including human biases, analysts' behavior, temporary fads, beliefs and other, partially help in explaining the overreaction hypothesis. Shiller (1984) notes a linkage between investors' decisions and temporary fads leading to a sudden change in stock prices. Surprisingly, Dreman and Lufkin (2000) argue that other than psychological influences, they do not find any other explanation for overreaction.

Methods

The objective of this study is to assess the possibility of receiving above the market returns from contrarian investment strategy in the NASDAQ OMX Vilnius, comparing them against the passive index tracking strategy. Thus, the return of hypothetically constructed contrarian portfolio will be mathematically and graphically compared against the movement of the OMXV index, representing the market portfolio, over the same time frame. The test for the profitability of contrarian trading strategies in this paper is based on the methodology used by De Bondt and Thaler (1985, 1987) and Jegadeesh and Titman (1993).

Research approach

The profitability of contrarian investment strategy was tested in the Lithuanian stock market during two periods: the pre-crisis (growth) period (from January 2003 till the middle of 2007) and the crisis (decline) period (from the third quarter of 2007 until the middle of 2010), as no considerable signs of stock market recovery were yet evident in the country. The current approach was opted for due to the fact that the stocks could have been possibly overrated at the end of 2005, and the consequences of such overrating were peaked stock prices and a sudden dropdown of the OMXV index.

Hypotheses and assumptions

Contrarian profits are expected at the peak of the OMXV index growth period around 2005–2006 when stock prices were assumed to have been overrated and not to provide

considerable gains during the crisis period in the NASDAQ OMX Vilnius, more precisely from the middle of 2007 till the end of 2009.

Data and sample construction

The prices of all 25 listed stocks in the Vilnius NASDAQ OMX on January 2, 2002 (as the first official working day of the year) were compared to the same set of stock prices on January 2, 2003, and the yearly percentage change in the price of the portfolio of stocks was calculated in order to identify the best and the worst performing stocks using the yearly percentage change formula explained below:

$$\text{Yearly \%age change} = (P_t - P_{t\text{-}1})/P_{t\text{-}1}, \quad (1)$$

where P_t is the price of the stock in year t, and $P_{t\text{-}1}$ is the price of the stock in year (t-1).

The best performing quincentiles of the stocks in 2003 were formed into the "best-performing" portfolio named P_B, while the worst performing quincentiles of the stocks in 2003 were grouped into the "worst-performing" portfolio named P_W. The number of stocks in each of the two portfolios was chosen to be five, being one fifth of twenty five total stocks available at the beginning of the study, and this number of stocks was kept the same throughout each year for the entire period of the study for consistency purposes. The stocks were repeatedly rated every year, based on their January prices, and the "best-performing" and "worst-performing" portfolios were created accordingly from five stocks each. The two portfolios of stocks were kept for three, six and twelve months; thus, the quarterly, half-yearly and yearly returns were computed according to the price change formula provided below:

$$R_m = (P_m - P_{m\text{-}1})/P_{m\text{-}1}, \quad (2)$$

where P_m is the price of the stock on the first day of the last month m until which the stock is held, and $P_{m\text{-}1}$ is the price of the stock on the first day of the initial month of the stock holding period.

The returns of the contrarian portfolio R_C were calculated by subtracting the returns of best performing portfolios from the worst performing portfolio returns, expecting that in case the contrarian investment strategy is profitable, the returns of the worst-performing portfolio would exceed the returns of the best-performing portfolios:

$$R_C = R_W - R_B, \quad (3)$$

where R_C is the return on the contrarian portfolio,
R_W is the return on the worst-performing portfolio,
and R_B is the return on the best-performing portfolio.

Excess return was computed on a quarterly, half-yearly and yearly basis comparing the returns of the two portfolios against the OMXV index representing the average return on the market portfolio.

Findings

Profitability of the contrarian investment strategy during the growth period

Table 1 below represents the returns of three portfolios – best-performing (P_B), worst-performing (P_W) and contrarian (P_C) – during the growth period in the Lithuanian Stock Market in 2003–2007 with the holding periods of three, six and twelve months.

TABLE 1. **Returns before crisis of best-performing (P_b), worst-performing (P_w) and contrarian portfolio (P_c)**

Portfolio	Return	2003	2004	2005	2006
P_b	Quarterly	32.00%	14.56%	29.89%	-21.55%
	Half-yearly	71.64%	16.07%	30.00%	-42.52%
	Yearly	129.31%	95.37%	547.03%	-35.37%
P_w	Quarterly	11.82%	21.46%	13.60%	-1.44%
	Half-yearly	60.45%	24.78%	14.39%	-8.25%
	Yearly	112.84%	48.91%	36.29%	17.61%
P_c	Quarterly	-20.18%	6.90%	-16.29%	20.11%
	Half-yearly	-11.19%	8.71%	-15.61%	34.27%
	Yearly	-16.47%	-46.45%	-510.74%	52.98%

Until 2005, returns from the contrarian portfolio seem to significantly underperform the returns of both best-performing and worst-performing portfolios. The best performing stocks provide greater returns than the worst performing stocks with the quarterly holding periods in 2003 and 2005, and considerably greater yearly holding period returns than worst-performing or contrarian portfolios in 2003, 2004 and 2005. The situation visibly changes in 2006 which could be already considered a starting point for the crisis in the stock market, when the contrarian portfolio notably outperforms both best-performing and worst-performing portfolios with any of the three previously mentioned stock holding periods.

Profitability of the contrarian investment strategy during the decline period

Table 2 presents the returns of three portfolios: best-performing (P_B), worst-performing (P_W) and the contrarian portfolio (P_C) return during the decline in the Lithuanian stock market in 2007–2009 with holding periods of three, six and twelve months.

The data below indicate greater returns from the contrarian investment strategies through the entire period 2007–2009 with all of the three holding periods: quarterly, half-yearly and yearly.

TABLE 2. **Returns of best-performing (P_b), worst-performing (P_w) and contrarian portfolio (P_c) during crisis**

Portfolio	Return	2007	2008	2009	2010
P_b	Quarterly	-4.86%	-7.28%	-15.40%	27.02%
	Half-yearly	2.95%	-1.52%	-15.05%	21.57%
	Yearly	-3.29%	-52.32%	-47.91%	X
P_w	Quarterly	14.25%	-25.37%	-9.36%	2.93%
	Half-yearly	22.95%	-39.43%	12.77%	-16.29%
	Yearly	99.19%	-81.33%	75.11%	X
P_c	Quarterly	19.12%	-18.10%	6.04%	-24.10%
	Half-yearly	20.01%	-37.91%	27.82%	-37.86%
	Yearly	102.48%	-29.02%	123.02%	X

In both cases, the statistical significance of the data was not tested, because the sample includes the entire population.

Portfolio performance comparison against market portfolio return

The returns on the contrarian portfolio before the crisis period and during the crisis were compared against the passive market portfolio returns, based on movements of the OMXV index as in Table 3 and Table 4 below.

TABLE 3. **Returns of market (P_m) and contrarian portfolio (P_c) before the crisis**

Portfolio	Return	2003	2004	2005	2006
P_m	Quarterly	12.08%	27.51%	16.47%	-3.28%
	Half-yearly	56.30%	17.98%	40.08%	-14.13%
	Yearly	102.48%	68.16%	53.58%	9.31%
P_c	Quarterly	-20.18%	6.90%	-16.29%	20.11%
	Half-yearly	-11.19%	8.71%	-15.61%	34.27%
	Yearly	-16.47%	-46.45%	-510.74%	52.98%

TABLE 4. **Returns of market (P_m) and contrarian portfolio (P_c) during the crisis**

Portfolio	Return	2007	2008	2009	2010
P_m	Quarterly	-0.30%	-9.70%	-12.13%	20.58%
	Half-yearly	7.28%	-17.86%	0.23%	16.36%
	Yearly	4.68%	-64.95%	45.08%	0.00%
P_c	Quarterly	19.12%	-18.10%	6.04%	-24.10%
	Half-yearly	20.01%	-37.91%	27.82%	-37.86%
	Yearly	-102.48%	-29.02%	123.02%	X

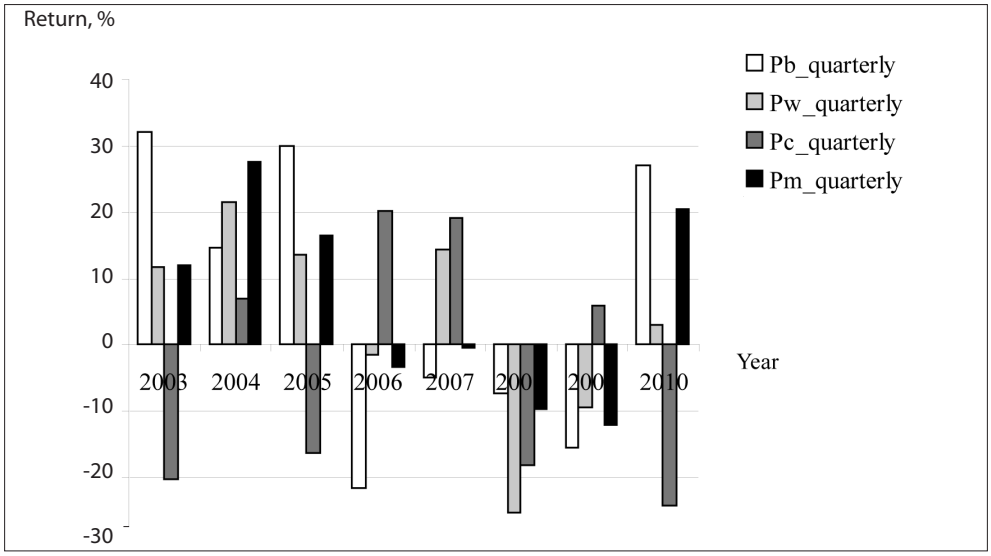

FIG. 2. **Comparison of quarterly returns from the four portfolios during growth and decline periods**

The computed returns of P_m portfolio during eight years of investment with the holding periods of three, six and twelve represent investors' gains from choosing a passive investment strategy and following the market index trends.

In order to visualize the profitability of the contrarian strategies represented by portfolio P_C against the passive market portfolio P_m strategy, as well as against best-performing and worst-performing portfolios, the returns on quarterly, half-yearly and yearly investments are compared in the three histograms below (Figs. 2–4).

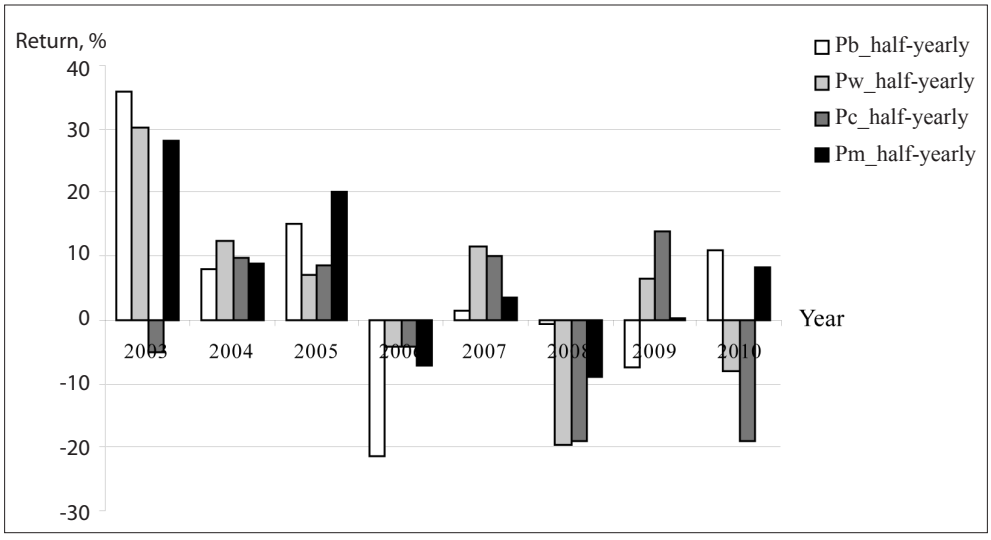

FIG. 3. **Comparison of half-yearly returns from the four portfolios during growth and decline periods**

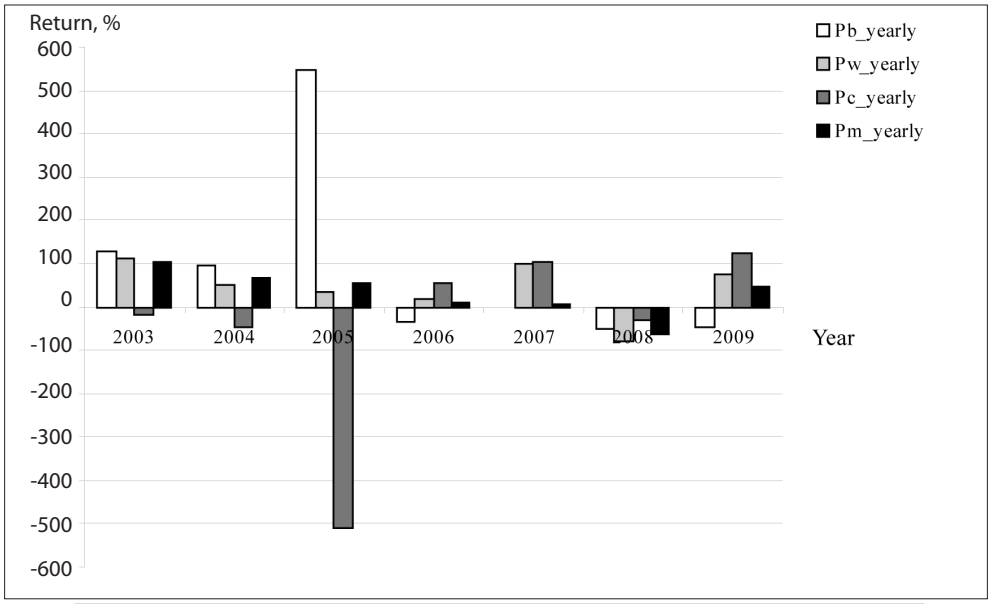

FIG. 4. **Comparison of yearly returns from the four portfolios during growth and decline periods**

As graphically presented in Fig. 2, the best-performing, worst-performing and market portfolio return are obviously greater than the contrarian portfolio return during the pre-crisis (growth) period, i. e till 2005. The situation changes during the market decline period, just as predicted, and the contrarian investment becomes more profitable, especially in 2006 and 2007, when holding the stocks for three months.

One can see that in the half-yearly investment, the market portfolio performs better than the contrarian portfolio just like in the quarterly holding period until 2005, but the situation changes in 2006–2008, with greater returns coming from the contrarian investment.

The last histogram in Fig. 4 shows that, again, the passive market portfolio provides greater returns till 2006 with investing into stocks for one year, while the contrarian strategy proves to be more profitable throughout the whole period 2006–2010.

To assess the statistical significance of the hypothesis that the contrarian strategy would yield higher returns during the market decline period, the contrarian portfolio returns were compared against the market portfolio return, using the p value with a 5% significance interval. In addition, it would be expected that the contrarian portfolio would have a strong negative correlation with the standard market portfolio; thus, a correlation between the two portfolios was computed over the eight periods of time.

Quarterly and half-yearly holding periods provide statistically significant p value results which prove the fact that the returns from the market and from the contrarian portfolios are different. In this case, during the growth period, investment into the passive

TABLE 4. **Comparison of contrarian (Rc) and standard market (Rm) portfolio returns during growth period**

Holding period	Correlation	Standard deviation (Rc)	Standard deviation (Rm)	p value
Quarterly	-0.43	0.29	0.13	0.04
Half-yearly	-0.80	0.41	0.30	0.01
Yearly	-0.04	2.57	0.39	0.12

market portfolio was a better option. With the yearly holding period, the calculated p-value being greater than 0.05 does not provide statistical significance enough to state that the two portfolios would provide different returns.

As expected, a negative correlation was established between the market-based and contrarian portfolios, with a strong evidence being present during the six-month holding period (Table 4).

TABLE 5. **Comparison of contrarian (Rc) and standard market (Rm) portfolio returns during decline period**

Holding period	Correlation	Standard deviation (Rc)	Standard deviation (Rm)	p value
Quarterly	-0.45	0.20	0.23	0.38
Half-yearly	0.16	0.36	0.11	0.34
Yearly	0.97	0.82	0.56	0.15

During the crisis period, none of the three holding periods provide a statistically significant difference between the results when opting for the market-based and the contrarian portfolios. Moreover, a strong positive correlation was found when holding the stocks for a year during the crisis period, indicating that both portfolios are moving in a very similar pattern and that there would be no major difference when opting for either of the two strategies.

Conclusions

The aim of this study was to assess whether contrarian strategies would provide excessive returns during the economic growth and decline periods in the NASDAQ OMX Vilnius. More specifically, contrarian profits were expected at the peak of the OMXV index growth period around 2005–2006 when stock prices were assumed to have been overrated due to excessive investors' optimism regarding the NASDAQ OMX Vilnius and not to provide considerable gains during the crisis period.

Despite the fact that contrarian profits were discovered in multiple large capitalization markets such as Japan, the US, the Netherlands, Germany, France and the UK, they

tend not to be present in smaller capitalization markets such as New Zealand, Istanbul, Tunisia or Mauritius.

When comparing the pure return percentages over the growth period, the contrarian strategy proves to provide smaller returns than the standard market, best-performing or worst-performing portfolio during 2003–2005. In 2006, the situation changes and the contrarian portfolio significantly outperforms both best-performing, worst-performing and market portfolios with all the three previously mentioned stock holding periods.

The graphical analysis and mathematical comparison of stock returns indicates greater returns from the contrarian investment strategies through the entire period 2007–2009 with all of the three holding periods – quarterly, half-yearly and yearly – relatively to the market portfolio.

Although a pure comparison of the returns shows the presence of the contrarian profits in 2006 when the stock prices were overrated, by conventional criteria the difference between the market and the contrarian portfolios' returns is considered to be not statistically significant.

Moreover, when analyzing a correlation between the contrarian and the market portfolios, a considerable strongly negative correlation is found only during the pre-crisis (growth) years with the holding periods of six months, and, curiously, a positive correlation is established between the market and the contrarian portfolios during the crisis period with yearly investments.

To summarize, due to the lack of a statistically significant proof, a more profound research is necessary in order to draw unanimous conclusions about the presence or absence of contrarian profits in the Vilnius NASDAQ OMX. Such factors as the book-to-market ratio, earnings-to-price ratio, size and price effects could be taken into consideration when engaging in further research.

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