
RESEARCH OF THE STOCK PRICE OVERREACTION AND INVESTOR OVERCONFIDENCE ISSUES

Bayu Sindhu RAHARJA¹, Dahli SUHAELI², Muji MRANANI³

*The Faculty of Economic and Business, Universitas Muhammadiyah Magelang,
Jl. Tidar No. 21 Magelang, Indonesia 56126*

*E-mails: ¹raharja@ummgl.ac.id (corresponding author);
²dahlish@ummgl.ac.id; ³mujimranani@ummgl.ac.id*

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Abstract. This research examines the existing of investor overconfidence in the capital market and the phenomena of stock prices reversal in the future due to the existing of this behavior. It has a different approach to test the existing of investor overconfidence by introducing firm's growth as the information which has triggered many investors to behave overconfidently. By using multiple regression analysis, the results of this research confirmed our conducted hypothesis, investor tends to behave overconfident to firms which have higher growth. It proofed by the positive relation between firms' growth and trading volume. Afterward, this research also found that higher growth firms tend to have declining on its performance in the future. The negative relation between firms' growth and long-term performance means that the stock's price reversal caused by the existing of investor overconfidence.

Keywords: investment, firms' growth, investor behavior, stock behavior, price reversal.

JEL Classification: G11, G12, G14.

1. Introduction

The capital market in Indonesia has been growth rapidly. The average of the increasing trading volume was 267% during 2011–2016. Even in 2016 the trading frequency of Indonesian Stocks were 23,83 million times, it means that the average turnover of buying and selling was 8 days. In other said, people who buy shares today will sell it back 8 days later. It evidence showed great development of capital market in Indonesia but in other side it inflicted many worries about speculative trading behavior. The speculative trading is one of many factors which pushed many investors to trade irrationality, the overconfident and overreaction behavior are the example in which has attracted many scholars.

De Bondt and Thaler (1987) was the pioneer of research on overreaction hypothesis in capital market, especially on many financial events. In their research, they said that

investor tend to overreact to unexpected events rather than the whole of the base-data of the firms. The overreaction behavior would make the stock prices departed away from its fundamental values (De Bondt, Thaler 1987). Therefore, the stock prices were rising at the short-time whereas in the long-time due to an adjustment of the availability information it would be declined, it was called stock prices reversal. Previous research found the phenomena of stock price reversal in many financial events such as IPOs (Ritter 1991; Agarwal *et al.* 2008; Cai *et al.* 2008; Thomadakis *et al.* 2012) and SEOs (Wadhwa *et al.* 2016). Many scholars argued that the stock price reversal at financial events due to the existing of investor overreaction in capital market (Ritter 2003; Agarwal *et al.* 2008; Cai *et al.* 2008; Vokrman, Kristoufek 2015). This research also examine the overreaction hypothesis in capital market, but not only restricted on financial events like IPOs and SEOs. Daniel *et al.* (1998) said that overreaction behavior occurred due to investor overvalued on recent information in capital market. Thus, there is not only restricted on financial events, but rather the investment activity in the capital market. Many previous research also found the investor overconfidence and stocks' price overreaction on investment activity in capital market (Daniel *et al.* 1998; Ma *et al.* 2005; Boussaidi 2013; Ni *et al.* 2015). But the existing research not fully explained what and how the private information signals affected on the overconfidence behavior. For example Agarwal *et al.* (2008) and Boussaidi (2013), they used trading volume, price reversal, and trading volatility to capture the investor overconfidence and stocks' price overreaction. Higher trading volume of stocks has a mean of higher demand from investor to buy the stocks due to overconfidence of their private information. It implied that trading volume could be a proxy of investor overconfidence. The higher trading volume would make stocks' price overreacted and keep away from its fundamental values. And in the future, due to the correction of availability information in capital market, stocks' price will decline closed to its intrinsic values. Therefore, the issues in this area remain unresolved, need more explanation about the information which have triggered many investor to behave overconfident.

This research introduces firms' sales growth as an information which have caused investor overconfidence, it implied that investor overweight to firms' which have higher sales growth. In other that, this research also examines the long-term performance of firms' which have higher sales growth and identify what factors affected on its long-term performance. We begin by analyzing how investor reacted to the firms which experienced higher sales growth. Secondly, we analyze how the stocks' performance of higher growth firms in the future. Thirdly, we identify what factors affected on the stocks' long-term performance. Our empirical results show that investor is overconfidence to higher growth firms, it showed by higher trading volume of higher growth firms, and we also found the declining of its performance in the future. The empirical results of this research give knowledge to investor on how to invest wisely in capital market, minimizing self-attribution bias by looking and understanding the details of firms' information.

2. Literature review and hypothesis

2.1. Investor overconfidence and past information

Many evidences challenge the existing of efficient market hypothesis (EMH) on explaining many phenomena in the capital market. For example, Figure 1 shows the data of trading frequency in Indonesian Stock Exchange (IDX) during 2011–2016. As mentioned previously that trading volume and trading frequency of Indonesian stocks in IDX increase during 2011–2016. The increasing trading volume activity, in the other side, will effect on higher trading volatility and push capital market to have higher uncertainty due to the information could not distribute perfectly. Therefore, investor tend to have irrational on making decisions.

Efficient market hypothesis (EMH) is a classical theory in investment which explained that the price of stocks reflected to the all of existing information. The theory required at least two conditions, firstly, the all of information distributed smoothly. Secondly, investor have ability to interpret information precisely and taking decisions rationally. Therefore, in the context of EMH, stocks' return determined by risk bearing. But, many previous research gave evidences that have challenged to the existing of EMH. Many scholars who have concerned on the phenomenon of stock prices reaction to many events such as stocks split (Lamoureux, Poon 1987), dividend announcement (Bessler, Nohel 1996), stock repurchase (Isa, Lee 2014), political events (Raharja 2015) found the abnormal return during announcements. Raharja (2015) found that abnormal returns occurred during 40 days after announcement Indonesian Reshuffle Ministry. It researchers also found the anomaly of the excess return of risk free asset over market performance. The other phenomena also challenged to EMH such as positive short-term autocorrelation of stock returns (Rouwenhorst 1998), long-term reversal (Raharja *et al.* 2017). Therefore, those empirical results pushed many scholars to rethinking alternative approach in elaborating capital market phenomena. The behavioral approach is the alternative approach that can be used to get more detail explanations about it.

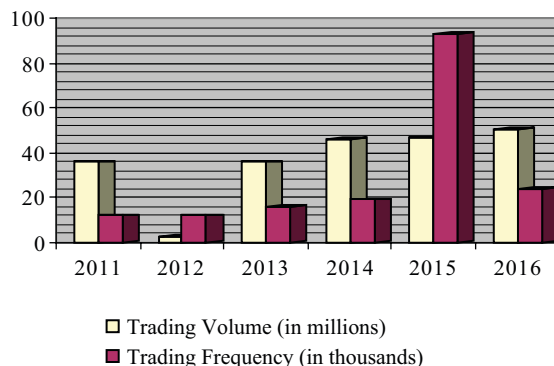


Fig. 1. Trading volume and trading frequency (source: Financial Services Authority (OJK))

De Bondt, Thaler (1985) argued based on the basic of psychological theory, in violation of Bayes' rule most people tend to overreact to dramatic news events. By using this concept he explained the increasing of stock prices over its intrinsic values at many news events, its empirical results called "stock market overreaction". Daniel *et al.* (1998) argued that stock market overreaction occurred due to investor overconfidence behavior. The investor overconfidence pushed the increasing demand of stocks, consequently the price of stocks will increase keep away from its intrinsic values. Previous researches prove this evidence, their research found that higher trading volume as a proxy of higher demand of stocks, has been the antecedents variable of stock market overreaction (Hirshleifer 2001; Agarwal *et al.* 2008; Hsu, Shiu 2010; Boussaidi 2013; Raharja *et al.* 2017). But as mentioned previously that its previous research did not consider many information which have triggered many investor to overconfident.

Weinstein (1980) explained the overconfidence behavior occurred due to most people tend to have self-attribution bias, it means people tend to overweight their ability in interpreting information. If the object have good or successfully past experience, the self-attribution bias as well as the overconfidence behavior get worse (Steen 2004). For example, Gilovich (1985) found that people tend to overweight past winning teams in betting basketball game. But when the game is running and past losing teams leading over past winning teams most people tend to change their betting which overweight to past losing teams, and so on, always changed depending on which team was superior. This empirical result give insight to understand the information which have triggered many investor became overconfident. In this research we use firms' growth, measured by firms' sales growth, as information which has triggered many investor. Therefore, investor become overconfidence in investing their funds on higher growth firms, it showed by higher trading volume of higher growth firms.

H₁: Sales growth positively related to trading volume

2.2. Stock's prices reversal

If investor become overconfidence, stock's prices tend to overreact and increase keep away from its intrinsic values. But after that as Daniel *et al.* (1998) explained, that the stock's price would be corrected, the confident level of many investor decline, therefore in the future stock's prices back to its intrinsic values. In other said, stocks which have overreacted in the past will have declining long-term performance in the future, it called stock's prices reversal. Stocks' price reversal occurred due to the overconfident behavior of investor which pushed stocks' price overreact. Many previous research also found the phenomena of stock's prices reversal of winning stocks (Ritter 1991; Daniel *et al.* 1998; Cai *et al.* 2008; Li, Yeh 2011; Hribar, McInnis 2012; Raharja *et al.* 2017).

In this research, we have different approach to proof the existing of investor overconfidence. We use firms' growth as the information which have triggered many investor to become overconfident, therefore it would caused on the declining of long-term

performance. In other said, higher growth, winning stocks, tend to have declining on long-term performance in the future. Ramezani *et al.* (2002) and Gombola, Marciukaityte (2007) in their research also found that higher growth firms tend to have declining on its long-term performance. Therefore, the second hypothesis is:

H₂: Firms growth negatively related to long-term performance.

2.3. Theoretical framework

The theoretical framework of this research show in Fig. 2.

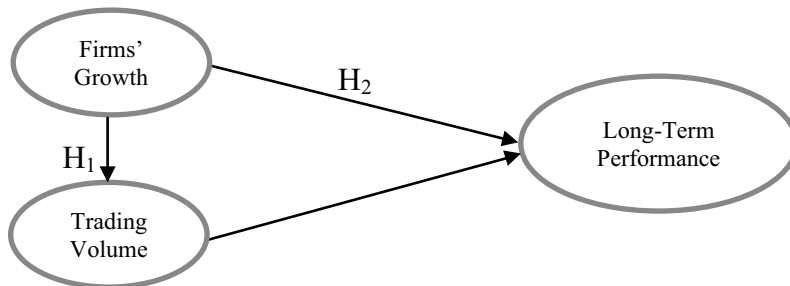


Fig. 2. Theoretical framework of this research

3. Research Method

3.1. Data

This research uses the data of 1.993 manufactural firms in Indonesia. Measuring firms' growth are began from 2000 to 2013, whereas long-term performance measured by 3 years' stocks performance after experienced higher growth. Totally, the range of the research's sample are range from 2000 to 2016. The design of this research breakdown into 3rd steps. Firstly, it firms classified into 4 (four) quartile based on its firm's growth from 2000 to 2012. Q1 is firm with highest sales growth, Q2 whose sales growth less than Q1, and so on. Secondly, to examine the effect of higher firms 'growth as a factor which have triggered many investor to behave overconfident, this research eliminates firms which classified in Q2, Q3, and Q4. Table 1 show the distribution of research's sample in this research.

As mentioned above, this research test whether firm's growth is the one of many information have triggered the sentiment of many investor to buy more shares in capital market. This research also examines whether firm's growth is the main factor which caused the declining performance in the future. Furthermore, we measure the monthly stock returns of 224 firms and market performance during three years after experienced highest sales growth. The purpose of this analysis is to examine the declining of firm's performance in the future. Therefore, to take the whole sample, this research use the secondary data of the firms from 2000 to 2015.

Table 1. Distribution of firm's growth (source: Indonesian Capital Market Directory)

Year	The Sum of Q1's Firms	Quartile Firms' Growth			
		Q1	Q2	Q3	Q4
2000	35	1.96	0.27	0.02	-0.26
2001	35	1.56	0.34	0.19	-0.07
2002	40	18.13	1.62	-0.37	-0.89
2003	37	0.27	0.07	-0.04	-0.18
2004	38	20.18	1.62	-0.43	-0.88
2005	39	0.78	0.27	0.13	-0.12
2006	37	0.90	0.20	0.09	-0.14
2007	38	0.42	0.11	0.01	-0.26
2008	37	0.57	0.22	0.12	-0.10
2009	38	2.78	0.28	0.18	-0.10
2010	37	17.70	0.04	-0.12	-0.40
2011	38	0.70	0.14	0.04	-0.24
2012	36	2.34	0.21	0.10	-0.09
2013	24	0.44	0.23	0.16	0.01
Σ	485	68.72	5.63	-0.07	-3.73
π	37	4.91	0.40	-0.00	-0.27
σ	1.44	7.70	0.54	0.20	0.28

Table 1 shows that the sum of firms which classified into Q_1 from 2000 to 2012 are 485 firms. Furthermore, it firms eliminate into 224 firms due to delisting from Indonesian Capital Market in the middle of research period. This research omitted delisting firms due to the availability of the data. Thirdly, as mentioned above, this research measure stocks' long-term performance of sample' firms, as proxied by three years' stock performance after experienced higher growth, then its performance compare to market performance (JKSE) from 2000 to 2015 as a benchmarking. The sources of the secondary data in this research are from Indonesian Capital Market Corner (Pojok BEI) and Center of Economics and Financial Development Universitas Muhammadiyah Magelang.

3.2. Data analysis

The data analysis of this research divided into three steps. Step 1, this research analyze the relation between firms' growth and stocks' trading volume to examine which information have triggered many investor to became overconfident. To deal with it, we use simple regression analysis.

$$\text{Trading Volume}_i = \alpha_0 + \beta_1 \cdot \text{Firms Growth}_i + \beta_2 \cdot \text{EAT}_i = \varepsilon_i \quad (1)$$

Trading Volume is the amount of stocks that was traded at a day after firms experienced highest firms' growth. In this research sales growth use as a proxy of *Firms Growth*. Earning after tax (EAT) in model 1 as a control variable of the relation between firms 'growth and trading volume.

$$\text{Sales Growth}_i = \frac{(\text{Sales}_{i,t} - \text{Sales}_{i,t-1})}{\text{Sales}_{i,t-1}}$$

Step 2, we analyze the relation between growth of the firms and its long-term performance. The aim of this analysis is to proof that the overconfident behavior caused the declining performance in the future. Equation 2 illustrate the model of simple regression which used on dealing in Step 2.

$$\text{Long - term Performance}_i = \mu_1 + \beta_2 \cdot \text{Firms Growth}_i + \beta_3 \cdot \text{EAT}_i + \varepsilon_i$$

Long-term performance is three-year performance of highest growth firms. In model 2, this research also use EAT as a control variable. To measure long-term performance, we use monthly stock return during three years after experienced highest sales growth. Therefore, the monthly stocks performance of highest growth firms benchmarked by monthly market performance to obtain abnormal return. We introduce market adjusted model for gaining abnormal return (AR).

$$\text{Abnormal Return}_i = \text{Return}_i - \text{Market Return}_i$$

$$\text{Cumulative Abnormal Return (CAR)}_i = \prod_{t=36}^n \text{Abnormal Return (AAR)}$$

Step 3, we use descriptive analysis and theoretical concept to describe how the highest growth firms tend to have declining performance in the future. In this step, we identify the variable which caused the declining of highest growth firms' performance in the future and describe theoretically.

4. Result and discussion

Research results show the aspects of the analysis of Step 1 and Step 2. The results of Equation (1) show that firms growth positively and significant related to trading volume, whereas in Equation (2) show that firms growth negatively and significant related to long-term performance. It proofs our both hypothesis that investor tend to have overconfident behavior to highest growth firms, it caused stock market overreact keeping away from its intrinsic values and outperform over market performance in the future.

As mentioned above that Table 2 show the statistical test of our hypothesis, in Equation (1), t-statistic value of the relation between firm's growth and trading volume is 2.01 (> 1.96), it means that the higher the sales growth, the higher the trading volume of its stocks. Whereas in Equation (2), the t-statistic value of firm's growth to long-term performance is -3.14 (<-1.96), it means that the higher the firms' growth, the

Table 2. The Results of Regression Analysis (source: worked by Eviews 6)

	Model (1)	Model (2)
	Trading Volume	Long-Term Performance
Constanta	14.23 (6.90)***	
Firms Growth	0.30 (2.01)***	
EAT	0.02 (1.10)	
Constanta		0.01 (5.20)***
Firms Growth		-0.005 (-3.14)***
EAT		-0.0002 (-0.62)

**significant at 10% level

***significant at 5% level

lower its long-term performance in the future. The important findings of this analysis showed that firms growth is one of many pieces information which has triggered many investors become overconfident. The existing of investor overconfidence proofed by high trading volume and declining performance in the future. Consider to Daniel *et al.* (1998) that explained the price of overreacted stock would be corrected in the future due to spreading information availability in the market, therefore, its price would be back into its intrinsic values. In other said, the price of overreacted stocks would decline in the future, in which usually called stock prices reversal. The empirical results of this research confirm the hypothesis (H1, and H2) of this research and much earlier research (Ritter 1991; Daniel *et al.* 1998; Cai *et al.* 2008; Li & Yeh 2011; Hribar & McInnis 2012; Raharja *et al.* 2017).

In Step 3 this research analyze descriptively about the factor of which identified caused the performance of highest growth firms declined in the future. This research argues that investor who has overconfident behavior did not consider many fundamental pieces of information of the firms. They tend to overweight firms which have good and successful past performance. Ramezani *et al.* (2002) found empirical results that firms which have the highest growth tend to have higher debt on its financing decisions. This research also found that firms which have higher growth tend to have to decline on long-term performance, or in other said, the stock prices of its firms reverse in the future. By

Table 3. Firm’s growth and debt to equity ratio (source: Indonesian Capital Market Directory)

Year	Quartile Firm’s Growth				Debt to Equity Ratio			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2000	1.96	0.27	0.02	-0.26	2.30	2.89	3.43	3.40
2001	1.56	0.34	0.19	-0.07	2.72	2.88	1.51	2.77
2002	18.13	1.62	-0.37	-0.89	1.26	2.04	3.12	0.94
2003	0.27	0.07	-0.04	-0.18	2.81	2.83	2.00	1.85
2004	20.18	1.62	-0.43	-0.88	9.85	2.16	2.10	2.01
2005	0.78	0.27	0.13	-0.12	1.90	1.11	2.40	2.08
2006	0.90	0.20	0.09	-0.14	1.96	0.94	0.51	1.51
2007	0.42	0.11	0.01	-0.26	2.41	1.06	0.44	2.49
2008	0.57	0.22	0.12	-0.10	2.53	2.66	2.44	1.56
2009	2.78	0.28	0.18	-0.10	2.29	2.12	1.79	1.69
2010	17.70	0.04	-0.12	-0.40	1.54	0.18	0.97	3.39
2011	0.70	0.14	0.04	-0.24	1.48	1.07	1.65	1.81
2012	2.34	0.21	0.10	-0.09	0.97	0.47	1.22	0.57
2013	0.44	0.23	0.16	0.01	2.76	1.95	0.98	0.29
Σ	68.72	5.63	-0.09	-3.73	37	24.35	24.58	26.36
Π	4.91	0.40	-0.01	-0.27	2.63	1.74	1.76	1.88
Σ	7.51	0.52	0.20	0.28	2.16	0.92	0.90	0.93

using it empirical results we describe and analyze debt to equity ratio of highest growth firms. Higher debt to equity ratio has meant higher on debt using in financing decisions. Table 3 describes the quartile of firm’s growth and its debt to equity ratio.

Research results show the evidence that firms which have higher growth, tend to have higher in debt to equity ratio. It means that firms which have higher growth tend to use more debt in its financing decisions. The sum and the average of debt to equity ratio of highest growth firms in 2000 to 2012 are higher than the other categorized firms in Q2, Q3, and Q4. Even in every year, the debt to equity ratio of highest growth firms is higher than the others. It evidences implicitly make sense due to higher growth firms need more funds to run its business as a consequence of increasing on its sales growth. For example, firms need more resources to handle the higher production, need more employee to handle business operation, more funds on marketing activity to expand its existing market and meet economic of scale, etc. But, the literature on capital structure,

trade-off theory, said that higher debt to equity ratio would increase the firms' risk, ultimately the risk of bankruptcy (Scott 1977).

Many previous research also found that higher debt to equity ratio tend to have negatively related to its stocks return (Ramezani *et al.* 2002; Gombola, Marciukaityte 2007; D'Mello, Gruskin 2014; Davydov *et al.* 2014). Research results show that rational investor tends to give negative sentiment on firms which have higher debt to equity ratio. By the finding of it empirical results, we can understand why higher growth firms tend to have to decline on its performance in the future. Instead of fully controlling and taking advantage of its growth, higher growth firms trapped on the risk of higher debt in financing decisions. Consider to classical theory in corporate finance that cost of debt is categorized on fixed charges of the firms. The higher fixed charges mean the longer firms to meet its break-even point. The longer firms achieving its break-even point, the higher firms' bankruptcy risk. Many investors who suspected overconfident behavior did not consider it evidences. They, due to their self-attribution bias, only trust on good and successfully experience of firm's performance on gaining higher sales growth.

5. Conclusions

This research conducted to examine the existing of overconfident behavior in capital market and stock prices reversal in the future. We hypothesize that investor overconfidence makes stock market overreact and keep away from its intrinsic values, it proxied by higher trading volume of stocks. Higher trading volume tends to make stock prices increasing, furthermore, its prices reverse to its intrinsic values in the future. In another word, there are stock prices declining in the future. This research also analyzes the factor which has triggered many investors to behave overconfidently. Furthermore, analyze whether it cause on the declining stock prices performance in the future. Afterward, we identify the fundamental factor of the firms which can push to the declining performance in the future.

The empirical results of this research showed that many investors in capital market behave overconfidently. It showed by the empirical result in the first hypothesize, which said firm's growth has a significant positive relation on higher trading volume of stocks. It means that higher firm's growth, higher in trading volume of stocks. Investor tends to behave overconfident on higher growth firms, as a result investor ask more on its stocks then the stock prices increase reactively and keep away from intrinsic values. Afterward, in the future, due to spreading of the availability information, stock prices will be corrected and it back to its intrinsic values. In other word, stocks prices decline in the future and outperform over market performance, or usually called stock prices reversal. It empirical results proofed by hypothesis 2, firm's growth negatively related to its long-term performance. The analysis of why stock prices of firm's growth underperform over market performance and investor overconfidence to choose it stocks proofed by Step. 3 analysis in this research. It descriptively explains that firms which have higher growth

also have higher debt to equity ratio. In another word, it used more debt on financing decisions to run and operate its business activity. From the classic literature of capital structure, that said firms which have too much debt means have higher business and financial risk. Instead of taking advantage of its sales growth, higher growth firms could not control its growth and trapped in the situation of higher debt financing, too much cost of debt and too slow to meet break-even point. Due to regardless of this evidence and overconfident on good and successfully past performance, higher firms' growth, in the future investor will suffer the loss on their investment in capital market.

Although in this research limited on firms' growth as the only one information which have affected on the overconfident behavior. The empirical results of this research give knowledge to many investors. Investment decisions are not only short-term planning but also long-term planning. They ought to consider and analyze much complete fundamental information of the firms carefully. For example, look at how the firms financing its business and then measuring its business risk. Do not overconfident on the only good and success of past performance, such as higher firm's growth, and etc. Understanding and analyzing carefully on the whole of fundamental pieces' information of the firm, investor freed on self-attribution bias on decision making. For future research, many scholars can introduce other information which have indicated on the overconfident behavior.

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Bayu Sindhu RAHARJA. Lecturer and researcher in the Department of Management, The Faculty of Economics and Business, Universitas Muhammadiyah Magelang. He has concerned his research on the topics of Behavioral Finance, Behavioral Economics in Decision Making, Personal Finance, and Banking.

Dahli SUHAELI. Lecturer and researcher in Department of Management, The Faculty of Economics and Business, Universitas Muhammadiyah Magelang. He has concerned his research on Strategic Financial Institution, Monetary Economics, and Strategic Human Development in Enterprises.

Muji MRANANI. Lecturer and researcher in Department of Accounting, The Faculty of Economics and Business, Universitas Muhammadiyah Magelang. She has concerned his research on Accounting Behavior, and Sector Public Accounting.