

Investment Strategy Based on Bias Behavior and Investor Sentiment in Emerging Markets

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Abstract

This research's main objective is to select profitable investment strategies with the presence of sentiment investors in emerging markets, with behavior bias-based portfolio methods. The sample of 114 companies traded daily on IDX was conducted over three years with weekly data. This study uses pairwise comparison and OLS. The research results show that contrarian strategies are more profitable than momentum. Investors benefit when mild conditions are optimistic and more significant when the conditions are pessimistic. This research proves that investor sentiment in the market can distort investor investment decisions, even using the behavior-bias method. Therefore, forming a portfolio will be more appropriate based on biased behavior because it facilitates investment decision-making.

Keywords:

bias behavior; investment strategy; investor sentiment; emerging market

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INTRODUCTION

People have limitations in thinking (bounded rationality), so making decisions requires information that is considered an anchor (Tversky & Kahneman, 1974). This study will test investment decisions using methods based on behavior bias. The biased method of portfolio formation is 52 weeks high because the rating is based on the highest price ratio. 52 week high is better known as 52 weeks high momentum (Bornholt & Malin, 2011; Hao et al., 2016, 2018). Recent research has found that a 52-week high can be used as a target price (Clarkson et al., 2020).

The investor's decision to sell the stock does not have significant difficulties because the number of shares owned is limited. The difficulty of making investment decisions will be felt by investors when choosing stocks that are worth buying because the stocks that must be observed are very much. Investment decisions are difficult because investors have limited attention (J. Li & Yu, 2012; Ramos et al., 2020). The difficulty of investment decisions can be overcome by ranking based on behavior bias because the winner-loser rating does not have a different effect (Hartzmark, 2015). Rankings based on 52-week highs have salient numbers that can be used for investment decision-making (Blau et al., 2020; Bordalo et al., 2012, 2013).

The sentiment is a market condition that is difficult to measure because it is an unobservable variable (Mehrani et al., 2016). Sentiment proxies are numerous, including market surveys, indices based on trading volume, IPO volume, IPO first-day return, the market volatility index (VIX), Arms index, and many others. In this study, sentiment proxies were used by the Arms index. The Arms Index is a technical indicator and can show an optimistic and pessimistic market situation by using stock prices and trading volume indicators (Brown Cliff, 2005). Another reason for using the Arms index as a proxy for sentiment is that data is easily obtained from the market (Mehrani et al., 2016), and in general, investors use stock price indicators and trading volume as references for investment decisions (Sehgal & Vasisht, 2015).

A particular indicator in a sentiment index can indicate the sentiment in the market. The sentiment index shows market conditions and investor anxiety levels (Arik, 2011). Empirical evidence in Indonesia on sentiment based on news on the internet found that sentiment cannot be used to predict returns (Rizkiana et al., 2019). Another study in Indonesia stated that sentiment with proxy tendency business index significantly affects excess return (Widhiarti et al., 2018). Research in Indonesia on sentiment is conducted using proxies other than market information, so sentiment research with market data is necessary to enrich empirical evidence about sentiment

Empirical evidence of 52-week highs is more done in developed countries or countries with high liquidity financial markets, such as the United States, Taiwan, etc. (Chang et al., 2016; Hao et al., 2016, 2018; Montgomery et al., 2019). 52 week high in the developed market and countries with high liquidity always gives profit with momentum (George et al., 2018; Lee & Piqueira, 2019). Nevertheless, emerging markets or markets with low liquidity momentum cannot generate profit (Bornholt & Malin, 2011).

Momentum investment strategies are profitable in the medium term (Dhankar, 2019; Li et al., 2016, 2017), while contrarians in the long term (Dhankar, 2019; Shi et al., 2015). Recently, empirical research proves that momentum gains in the brief term (Antonacci, 2012; Chao et al., 2012), and contrarians can profit within the short term (Montgomery et al., 2019). In developed and emerging markets, contrarian strategy and momentum advantages are still debated. The common assumption argues that momentum strategies are more profitable than contrarian (Dhankar, 2019; Hao et al., 2018; Pan et al., 2013). However, other researchers can prove that contrarian strategies can outperform momentum (Montgomery et al., 2019; Shi et al., 2015). Some even prove that both investment strategies are profitable (Maheshwari & Dhankar, 2017).

Today's information technology advancements greatly facilitate market information search. Some investment managers advise investors to check their investment portfolios every week. The research will be very beneficial for investors by analyzing using weekly data. Investment strategy research rarely uses weekly data, even though market participants urgently need empirical evidence as a basis for investment decision-making.

The study will conduct tests with weekly data and 52 weeks high as preference price to make an investment decision as a novelty. Investors are usually believed to be speculative and short-sighted (Mei et al., 2009), and short-term sentiment has the power of predictive characteristic-sorted portfolio return (Raza et al., 2014). The contribution of this study is to provide evidence that the 52-week high is useful as a target or reference price to predict future returns, especially when the role of sentiment is taken into account.

METHODS

The statistic population consists of all IDX-listed companies in Indonesia, and samples are collected from the company's shares traded daily (N = 114) in various industries between January 5, 2015, and December 30, 2017.

First of all, the calculation of the excess return of each stock is done every week. Furthermore, the rating is descending based on proximity to the highest price ratio for 52 weeks with the formula:

$$\frac{\text{current price}}{52 \text{ week high price}}$$

Where: *current price*: closing price t week; *52 week high price*: highest closing price for 52 weeks (George et al, 2018).

The top 30% (38 companies) as the winner's portfolio, and the bottom 30% (38 companies) are loser portfolios. Portfolio formation to be formed in 1 and 12 weeks and evaluated after 1 and 12 weeks in a rolling form method will be repeated. We use the Arms index as a proxy for investor sentiment. We calculate the Arms index as follows:

$$AD_t = \frac{ADV_t}{DEC_t} \quad (1)$$

$$VOLU_t = \frac{ADVOL_t}{DECVOL_t} \quad (2)$$

$$ARMS_t = \frac{AD_t}{VOLU_t} \quad (3)$$

ADV_t is the number of companies that experienced an increase in the share price in the period t , and DEC_t is the number of companies that experienced a decrease in the share price in the daily period. Thus, AD_t is the ratio between ADV_t and DEC_t . In addition, $ADVOL_t$ is the trading volume of the company's shares that experienced an increase in the price in the daily period, and $DECVOL_t$ is the trading volume of the company's shares that decreased in price in the daily period. Arms investor sentiment index obtained by dividing AD_t by $VOLU_t$. To facilitate the classification of optimistic and pessimistic categories, ARMS adjusted index-obtaining 0 as the lower limit and 100 as the upper limit, with the formula presented in equation 4.

$$ARMS_t \text{ adj} = 100 - \frac{100}{1+ARMS_t} \quad (4)$$

We categorize investor sentiment into three categories, namely optimistic (over-bought), pessimistic (over-sold), and neutral. This research defines over-sale reactions as situations where the market adjusted investor sentiment index is higher than 79. Conversely, optimistic investor sentiment is a situation where asset prices rise higher than the actual value of a transaction. In general, the market reaction is low, and asset prices become very expensive. In our research, the market-adjusted sentiment of investor indexes is lower than 57 in reactions to buying and selling opportunities.

To test the advantages of investment strategies are done with pairwise comparison. As for testing the effect of investor sentiment on investment strategies using

$$RET_i = ai_0 + \beta_1 W_{GH} + \beta_2 L_{GH} + \beta_3 OP_i + \beta_4 PES_i + \epsilon_i \quad (5)$$

$$RET_i = ai_0 + \beta_1 W_{GH} + \beta_2 L_{GH} + \beta_4 NEUTRAL_i + \epsilon_i \quad (6)$$

Where RET_i is the return of shares evaluation period. W_{GH} is a dummy portfolio winner (1 = winner: 0 = loser) and L_{GH} is a dummy portfolio loser (1 = loser: 0 = winner). OP_i , PES_i , $NEUTRAL_i$ stand for optimistic, pessimistic, and neutral condition when forming a portfolio. The sum of optimism, pessimism, and normal states percentages during a week are 100%. In order to control for the co-linearity effects, we address the neutral state effects within a different model.

RESULT AND DISCUSSION

Descriptive Statistic

Illustration of arms adjustment index for 715 trading days is 16% optimistic, 20% pessimistic, and 64% neutral. Descriptive statistics for research variables are presented in Table 1. Mean, median and standard deviation are displayed. The average return is

-0.1427%, and the excess return is -0.00237%; it illustration if, during the research period, the return and excess return tend to be negative. Negative average return and excess return indicate that Indonesia's market condition tends to be depressed because it gives a negative average. The average Arms worth 0.79 means during the research period, the market conditions on average are well following the Arms criteria stating that the value of Arms is less than 1, then the market is in good condition. The Average Arms adjusted is 40.39, which indicates that sentiment investor conditions tend to be optimistic.

Strategy test Result

We measure the efficiency of investment strategies and evaluate them during the periods of 1 and 12 weeks. Table 2 will show the results of the calculation of pairwise comparison. The winner's portfolio delivers an average weekly loss of 0.812%. The medium portfolio earns an average weekly profit of 0.239%, and the loser portfolio delivers an average weekly loss of 1,030%. All three portfolio compositions (J/1) and (K/1) provide significant returns. Portfolio of GH methods with formation period (J) and testing (K) per 12 weeks (12/12). Testing the difference in average profits between winner-loser portfolios shows there are significant differences and a profitable strategy is a contrarian strategy. The winner's portfolio delivered an average loss per 12 weeks of 0.563%, a medium portfolio of 0.235%, and a loser portfolio resulting in a loss of 0.413%. The winner-loser portfolio pairwise comparison test results illustrate that a profitable strategy is a contrarian and effective strategy.

Tabel 1. Descriptive Statistic

Variable	Mean	Min.	Max.	Std. Dev
Arms	0.792	0.000	3.849	0.532
Arms adj.	40.387	2.519	79.377	14.318
Return	-0.001	-0.275	0.350	0.026
Excess Return	-2.37.10 ⁻⁰⁵	-0.357	0.270	0.025

The results of this study are different from research conducted in developed financial markets and high liquidity so far (Bornholt & Malin, 2011; Liu et al., 2011). Investors in emerging markets tend to choose stocks at prices far from the highest prices (Bornholt & Malin, 2011). Therefore, argument Antoniou et al. (2005) contrarian strategies are more profitable in emerging markets characterized by predictable markets, low trading, and dominated by small and less experienced investors so late in responding to information. Furthermore, Indonesia's financial markets are included in weak efficiency and low trade. Hence the contrarian is more profitable, according to the argument Antoniou et al. (2005).

Table 2. Test of Investment Strategy

	Portofolio (1/1)	Portofolio (12/12)
Winner	-0,812% (0,00)	-0,563% (0,00)
Medium	0,239% (0,00)	-0,235% (0,43)
Loser	1,030% (0,00)	0,413% (0,05)
W - L	- 1,843% (0,00)	-0,976% (0,00)

The results of this study support Lee and Piqueira (2019), who found that insider trading prefers to sell stocks that are close to the highest price level and buy stocks that are far from the highest price level. Other empirical evidence proves that the winner's portfolio is riskier, so investors prefer stocks far from the highest price ratio (Blau et al., 2020). Stocks that fall into the category far from the highest price ratio are undervalued stocks and have a high future return, so they are worth buying (Cosemans & Frehen, 2021).

Investment Strategy and Sentiment

Testing with pairwise comparison is considered still inaccurate, then conducted testing with OLS. An investment strategy in this study using bias behavior-based method, the profit testing of investment strategy is combined with the role of investor sentiment. The coefficient of the winner's portfolio with a period of formation (J/1) and evaluation (K/1) is -0.794% (0.00). Portfolio winner formation period (J/12) and evaluation (K/12) is -0.6139% (0.01). The analysis evidence shows that the winner's portfolio has a negative and significant effect on returns following pairwise comparison testing. The winner's portfolio coefficient is marked negative, meaning that the winner's portfolio does not provide profit to investors and is proven significantly. The regression coefficient of portfolio loser with formation period (J/1) and evaluation (K/1) is -0.3824% (0.15). The analysis evidence suggests that the loser portfolio has a negative and insignificant effect on returns. Portfolio losers in the period (1/1) made a profit, although not significant. The portfolio losers for the formation period (J/12) and evaluation (K/12) were 0.0988% (0.57). Portfolio loser periods (12/12) do not provide a profit sign of regression coefficient but are not significant.

Testing with formation period (J/1) and evaluation period (K/1), optimistic influence on return is positive and insignificant with $t_{statistics}$ 1.42 (0.15). Pessimists had a positive and significant effect on returns with a 3.94 (0.00). Regression results for formation periods (J/12) and evaluation period (K/12) yield no different results. Optimists had a positive and insignificant effect on returns, with a 0.34 (0.72). Pessimists had a positive and significant effect on returns, with a 1.68 percent rate (0.09).

Table 3. Result of Regression test

Optimistic (pessimist)				
	Dummy Winner (1/1)	Dummy Loser (1/1)	Dummy Winner (12/12)	Dummy Loser (12/12)
Coefisient	-0.008 [-2.826] (0.005)***	-0.004 [0.157] (-1.414)	- 0.006 [- 2.509] (0.012)**	0.001 [0.559] (0.576)
Optimistic Coefisient		0.009 [1.419] (0.156)		0.008 [0.479] (0.6319)
Pessimist Coefisient		0.021 [3.966] (0.000)***		0.025 [1.658] (0.098)*
Neutral				
Coefisient	-0.008 [-2.899] (0.004)***	-0.004 [-1.484] (0.138)	-0.006 [-2.486] (0.013)**	0.001 [0.579] (0.562)
Neutral Coefisient		-0.016 [-3.534] (0.000)***		-0.018 [-1.537] (0.125)

Note: *** 1%,** 5%, * 10%

The regression result indicates that neutral sentiment negatively affects the return, as evidenced by the regression coefficient values -0.016 (0.00) and -0.018 (0.12). Neutral sentiment negatively affects the return means that the more neutral sentiment increases, the return will decrease. The influence of neutral sentiment was evident during the formation period (J/1) and evaluation period (K/1). This empirical evidence provides an idea if neutral sentiment greatly affects market conditions in the short term. In other words, the longer the period of formation and evaluation will decrease the influence of neutral sentiment. This research can prove a distortion because the winner's portfolio is reversed and detrimental. For example, the portfolio of losers in the formation period (J/1) and evaluation (K/1) coefficient marked negatively, and there is a reversal but not significant. On the other hand, in the formation period (J/12) and evaluation (K/12), the coefficient of the portfolio of losers is marked positive, meaning that in the medium term, the portfolio loser is detrimental, and there is no reversal. The timing of 52-week high price is able to predict changes in cross-sectional returns (Davallou & Javadian, 2017). Zhou et al. (2022) conclude that strong 52-week high momentum in low economic policy uncertainty (EPU) period. The strategy yields significantly positive raw returns when concentrated on the more liquid stock in the market (Bettman et al., 2010).

CONCLUSION

This research can prove that an investment strategy based on behavior bias can explain investor sentiment in the market, although not all are significant. Previous research

cannot explain the failure of 52 weeks of high momentum in emerging markets. This study found that winner portfolios are riskier than loser ones, and reversals occur.

These findings have exciting implications. First, profitable investment strategies used in emerging markets, especially Indonesia, are contrarian. Contrarian gains are not only in the short term but also in the medium term. Second, optimistic and pessimistic about future returns are positive, although only pessimistic sentiment is significant. Sentiment will increase investor returns when market conditions are pessimistic and mildly optimistic. Both investor sentiments do not cause investors anxiety, so investment decisions are more rational. The evidence suggests that investors should consider the role of market sentiment in stock pricing, and regulators should consider market sentiment to prevent economic shock. An exciting direction for future research is to combine sentiment proxy with indirect measurement such as Twitter.

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