Concurrent Momentum and Contrarian Strategies: Evidence from Indonesia

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This study aims to test the relative performance of contrarian and momentum strategies for middle-term and long-term horizons in the Indonesian capital market. The test is performed for constituents of the Kompas 100 index for the period 2009–2014. The results reveal that the superior performance of the momentum strategy in the intermediate term is sensitive to formation horizons. In the long term (over 24 months), however, the contrarian strategy is more profitable than the momentum strategy. It is also found that, in concurrence with the findings of many studies of long-run return anomalies in developed countries, there is no relationship between the generated returns and value and size premiums.

Introduction

Among several strategies that can be used to maximize portfolio returns are the contrarian and momentum strategies. In the contrarian strategy, investors buy past losers and sell past winners. This strategy is built on the assumption that in the long term the stock price will reverse, so that the losers will turn out to be winners and the winners will turn out to be losers (Brailsford, 1992; Doan, Alexeev, & Brooks, 2016). Meanwhile, in the momentum strategy, investors buy past winners and sell past losers. Unlike the contrarian strategy, this strategy is built on the assumption that the pattern of price movements will tend to follow previous trends (Chan, Hameed, & Tong, 2000; Hu & Chen, 2011; Ji, 2016).

Various studies have been conducted to test the benefits of these two strategies. An early study conducted by De Bondt and Thaler (1985) showed that stocks in the US market that initially provided positive (winners) or negative (losers) returns reversed after three years, at which point the losers generated returns of up to 15%. These reversal patterns were found consistently in the majority of industries in the US market (Bornholt, Gharaibeh, & Malin, 2015). Subsequent studies also proved that the same patterns were found in the Indian market (Dhankar & Maheshwari, 2014; Kumar, 2016; Nnadi & Tanna, 2017), the Chinese market (Chen, Hua, & Jiang, 2015; Kang, Liu, & Ni, 2002; Nnadi & Tanna, 2017), the Greek market (O'Keeffe & Gallagher, 2017), the Australian market (Doan et al., 2016), the Egyptian market (Ismail, 2012), and various other international markets,

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in both developed and developing countries (Malin & Bornholt, 2013).

In contrast to these reversal patterns, Jegadeesh and Titman (1993) documented continuation of returns in the US market, whereby past winners continued to outperform past losers over a period of 3 to 12 months. These findings were confirmed by other researchers in a variety of markets (Chai, Limkriangkrai, & Ji, 2017; Grundy & Martin, 2001; Hu & Chen, 2011; Ji, 2016; Kim, Tse, & Wald, 2016; Lin, Ko, Feng, & Yang, 2016; Narayan & Phan, 2017; Patro & Wu, 2004). In general, these researchers also proved that the momentum strategy could be profitable in shorter horizons.

Although the performance of both these strategies has been widely acknowledged in the literature, there is no conclusive evidence regarding the best horizons over which each strategy will work effectively, including in Indonesia. Moreover, these strategies have been viewed with skepticism, partly because there is no unified model reconciling these two return anomalies (Kadiyala & Rau, 2004). Fama and French (1998) argued that this implies that, on average, investors are unbiased in their reactions to information.

This study aims to analyze the relative performance of the contrarian and momentum strategies in the context of the Indonesian capital market by concurrently testing both strategies in one observation. The test is carried out for the top 100 liquid stocks in the Indonesian market which form the Kompas 100 index in a variety of different time horizons, ranging from 2 to 36 months. A further test to control the variability of returns is conducted by including growth and the size premiums in the models. The remainder of the paper reviews and discusses the literature, presents the research methods used, together with the results obtained, discusses the findings, and finally presents conclusions about these findings and outlines possible directions for future research.

Literature Review

The momentum and contrarian strategies are investment strategies derived from the results of various studies relating to underreaction and overreaction anomalies. Overreaction is a phenomenon related to long-term return reversal in which markets overreact to information, while underreaction is a phenomenon of long-run sustained returns, in which investors delay in responding to new information (Kadiyala & Rau, 2004; Spyrou, Kassimatis, & Galariotis, 2007).

This overreaction tendency then causes prices to reverse during the period after markets correct their expectations. This reversal then triggers the contrarian strategy in which investors buy up losers and release winners. Conversely, underreaction causes price moves which follow past trends, leading investors to buy past winners and sell past losers. Behavioural study approaches assume that representativeness (for overreaction) and conservatism (for underreaction) biases became the main drivers of the emergence of these loser/winner anomalies (De Bondt & Thaler, 1985; Kadiyala & Rau, 2004).

The benefit of the contrarian strategy was first evidenced by De Bondt and Thaler (1985), who found that winners (or losers) experienced a return reversal over 3 to 5 years. Subsequently, the benefit of the momentum strategy was documented by Jegadeesh and Titman (1993), who found that over a span of 3 to 12 months, past winners or losers tended to continue being winners or losers. These findings have been extensively proved by many other researchers in different markets (Chai et al., 2017; Doan et al., 2016; Kim et al., 2016; Lin et al., 2016; Malin & Bornholt, 2013; Narayan & Phan, 2017; Nnadi & Tanna, 2017).

Although the workings of both of these strategies do not appear consistent across periods and countries, these researchers generally found that the strategies can generate profits for investors if implemented with appropriate time horizons (Chai et al., 2017; Doan et al., 2016; Malin & Bornholt, 2013). Galariotis, Holmes, and Ma (2007), for example, found that the contrarian strategy was beneficial for investors in the long term (3 to 5 years) on the London Stock Exchange. That the benefits of contrarian strategy are more visible in the long run conforms to the initial findings of De Bondt and Thaler (1985), as well as to the findings of other researchers

such as Bornholt, Gharaibeh, and Malin (2015) and Kumar (2016), in the US stock market. By carrying out a cross-country study, Malin and Bornholt (2013) also found that the contrarian strategy was profitable in the mid-term (3 to 12 months) for 18 markets in developed countries, but not significantly beneficial for 26 markets in developing countries, including Indonesia.

In the Australian market, Doan, Alexeev, and Brooks (2016) found evidence that gains from the contrarian strategy dominated gains from the momentum strategy in the short term (1 to 12 weeks), but underperformed in the medium and long-term periods. These findings also correspond with the earlier findings of Jegadeesh and Titman (1993) confirming the relative gain of the momentum strategy within shorter periods (3 to 12 months). Other findings that also correspond with this evidence are documented by Mengoli (2004), Galariotis et al. (2007), Hu and Chen (2011), Chai, Limkriangkrai, and Ji (2017), Jiang and Zu (2016), Nnadi and Tanna (2017), and Narayan and Phan (2017).

In Indonesia, the gains linked to each of these strategies are not easy to generalize because researchers have modeled their studies using different methodologies, especially with regard to the benchmark of formations. In general, however, some researchers, such as Wiagustini (2008), Wiksuana (2009), and Saputro and Badjra (2016), have confirmed the possible higher performance of the contrarian strategy compared to the momentum option. Nevertheless, in the short term, the benefits of the contrarian strategy were not found by Widiastuti and Jaryono (2011). Thus, the hypotheses of this study are formulated as follows:

H1: The contrarian strategy generates a higher return in the long term compared to the momentum strategy

H2: The momentum strategy generates a higher return in the mid-term compared to the contrarian strategy.

Research Methods

The unit of analysis of this study is composed of the companies in the Kompas 100 index, the 100 most liquid stocks on the In-

donesian Stock Exchange, from the launching of the index in 2009 to the end of 2014. Applying the issue of the relative benefits of the two strategies to the most liquid stocks in the market will be more convincing because of the more liquid the stocks, the better the probability of the stocks being efficient. In the context of an efficient market, issues resulting from market anomalies, including those applying to the momentum and contrarian strategies, will be removed. Thus, it is likely that more robust results will be produced regarding the issues under investigation if the analysis is applied to the most liquid stocks in the market.

Because of missing data over the whole five-year period, only 96 companies are included in the final analysis. The procedure for analyzing the data is carried out following three main stages (De Bondt & Thaler, 1985; Jegadeesh & Titman, 1993). The first stage is the determination of the winners and losers, followed by the formation of the winner/loser portfolios and finally by the testing of the portfolios.

In the first stage, the monthly stock returns $(R_{i,t})$ and the monthly market return $(R_{m,t})$ during the observation periods are calculated to obtain the market-adjusted abnormal return for each stock $(AR_{i,t})$. $AR_{i,t}$ at month t_1 to t_n is then summed to obtain the cumulative abnormal return of stock i $(CAR_{i,t1-tn})$. $CAR_{i,t1-tn}$ is then used to categorize the stocks as winners or losers. The length of the period for $CAR_{i,t1-tn}$ is determined following the scenario of the formation periods during the observation, i.e., 3, 6, and 9 months for the medium term, and 12, 24, and 36 months for the long term. For each formation period, $CAR_{i,t1-tn}$ is divided into quintiles and ranked lowest to highest. The stocks with $CAR_{i,t1-tn}$ in the top quintile are categorized as winners, and those with $CAR_{i,t1-tn}$ in the bottom quintile are classified as losers. This mechanism is carried out for all formation periods, and replicated by the number of N during the observed period: 3 months (24 replications), 6 months (12 replications), 9 months (8 replications), 12 months (6 replications), 24 months (3 replications), and 36 months (2 replications) .

In the second phase, $CAR_{i,t1-tn}$ for the winners and losers for each replication period n are av-

eraged to obtain the average cumulative abnormal return for the winner portfolio ($ACAR_{w,n,t}$) and the loser portfolio ($ACAR_{L,n,t}$) in each formation. As in the first phase, this mechanism is also repeated following the number of replications in each period. $ACAR_{w,n,t}$ and $ACAR_{L,n,t}$ for each replication in each period are then averaged to obtain $ACAR_{W,t}$ and $ACAR_{L,t}$ for each formation (Eq.1). By subtracting $ACAR_{L,t}$ from $ACAR_{W,t}$ in each formation, $ACAR_{A,t}$, denoted as ACAR for the arbitrage portfolio, is obtained, representing the loser premium for each formation period (Eq. 2).

$$ACAR_{w,t} = \frac{ACAR_{w,n,t}}{N} / ACAR_{L,t} = \frac{ACAR_{L,n,t}}{N} \quad (1)$$

$$ACAR_{w,t} = ACAR_{L,t} - ACAR_{W,t} \quad (2)$$

In the next step, the mechanism for calculating $ACAR_{A,t}$, $ACAR_{W,t}$, and $ACAR_{L,t}$ is repeated for the periods after t_n in the formation periods (denoted as the testing periods). The testing periods are computed from a month after the formation periods of the winner/loser portfolios to n (the length of the formation period). For the testing periods, the stocks within the winner and loser portfolios are similar to the portfolio composition in the formation periods. If for the formation period j the $ACAR_{W,t}$ is computed from month 1 (t_1) to month 24 (t_{24}) ($ACAR_{W,t1-t24}$), then $ACAR_{W,t}$ for the testing periods is $ACAR_{W,t25-t48}$ (computed from month 25 to month 48). This mechanism is then repeated for any formation period following the number of replications. Thus, $ACAR_{A,t}$, $ACAR_{W,t}$, and $ACAR_{L,t}$ are obtained for the testing periods in each formation.

The significance of $ACAR_{A,t}$, $ACAR_{W,t}$, and $ACAR_{L,t}$ of the testing periods is then tested using a t-test, in which the t-values for each portfolio are computed using Eq. 3, Eq. 5, and Eq. 7, respectively (De Bondt & Thaler, 1985). Arbitrage portfolio:

$$T_t = (ACAR_{L,t} - ACAR_{W,t}) / \sqrt{2S_t^2 / N} \quad (3)$$

whereby S_t^2 is the variance of CAR_t, which is computed using the following equation:

$$S_t^2 = \frac{\left[\sum_{n=1}^{N} \left(CAR_{W,n,t} - ACAR_{W,t} \right)^2 + \sum_{n=1}^{N} \left(CAR_{L,n,t} - ACAR_{L,t} \right)^2 \right]}{2(N+1)} \quad (4)$$

To prove that at any month t, the average abnormal return has a contribution to $ACAR_{W,t}$ or $ACAR_{L,t}$, it is tested for significant difference from zero using Eq. 5 for $ACAR_{W,t}$, and Eq. 7 for $ACAR_{L,t}$.

Winner portfolio:

$$T_{t,w} = AR_{W,t} / (S_{t,w} / \sqrt{N}) \quad (5)$$

$$S_{t,w} = \sqrt{\sum_{n=1}^{N} (AR_{W,n,t} - AR_{W,t})^2 / N - 1} \quad (6)$$

Loser portfolio:

$$T_{t,L} = AR_{L,t} / (S_{t,L} / \sqrt{N}) \quad (7)$$

$$S_{t,L} = \sqrt{\sum_{n=1}^{N} (AR_{L,n,t} - AR_{L,t})^2 / N - 1} \quad (8)$$

whereby $S_{t,w}$ ($S_{t,L}$) is the standard deviation of the winner (loser) portfolios in month t, calculated by Eq. 6 (8). The decision regarding which of the strategies is superior relative to the other is taken based on the following criteria: if the performance of the momentum strategy outperforms the contrarian strategy performance, $ACAR_{w,t}$ must be greater than zero and $ACAR_{L,t}$ must be less than zero, which also means that $ACAR_{A,t} < 0$. Conversely, the contrarian performance outperforms the momentum performance if $ACAR_{w,t}$ is less than zero and $ACAR_{L,t}$ is greater than zero, which implies that $ACAR_{A,t} > 0$.

Results and Discussion

Table 1 presents the descriptive statistics for $ACAR_{w,t}$, $ACAR_{L,t}$, and $ACAR_{A,t}$ in each t_n for each formation period, while Figure 1 presents the movement of each ACAR for the testing periods. From Figure 1, it can be seen that in the medium term (3, 6, and 9 months), $ACAR_{w,t}$ and $ACAR_{L,t}$ tend to follow their past trends: the winners continue to be winners, and the losers continue to be losers. It also appears that the movement of $ACAR_{A,t}$ (losers/winners) is also

Table 1. Descriptive Statistics for ACAR in each formation period (%)

	Mean	Median	Max	Min	SD	Kurtosis	Skewness
(3-month formation)							
$ACAR_W$	0.80	1.10	1.40	0.00	0.70	-	-145.10
$ACAR_L$	-0.70	-0.70	0.00	-1.60	0.80	-	-63.90
$ACAR_A$	-1.60	-2.10	0.00	-2.80	1.40	-	125.00
(6-month formation)							
$ACAR_W$	3.60	4.40	6.30	0.00	2.60	-181.20	-52.00
$ACAR_L$	-1.30	-0.40	0.10	-5.00	2.00	321.00	-182.70
$ACAR_A$	-4.90	-4.70	0.00	-10.50	4.00	-125.60	-23.20
(9-month formation)							
$ACAR_W$	4.20	4.60	0.70	0.00	2.60	-123.00	-55.30
$ACAR_L$	-1.40	-0.50	1.30	-5.00	2.40	-148.20	-52.30
$ACAR_A$	-5.60	-5.00	0.00	-12.00	4.50	-150.70	-31.20
(12-month formation)							
$ACAR_W$	5.60	6.30	8.50	0.00	2.60	69.10	-119.50
$ACAR_L$	0.00	0.20	1.90	-3.30	1.50	74.30	-98.20
$ACAR_A$	-5.60	-6.20	0.00	-11.00	3.10	68.10	51.80
(24-month formation)							
$ACAR_W$	8.40	8.00	15.20	0.00	4.10	-84.90	-14.10
$ACAR_L$	-6.60	-6.80	0.00	-12.70	3.30	-53.40	15.60
$ACAR_A$	-15.00	-15.60	0.00	-26.00	6.90	-47.90	27.90
(36-month formation)							
$ACAR_W$	-5.30	-3.30	12.20	-26.20	9.90	-64.80	-44.80
$ACAR_L$	-4.00	-4.80	16.70	-15.10	6.20	343.40	136.30
$ACAR_A$	1.30	0.01	42.90	-15.50	14.30	125.60	119.10

Table 2. Statistical test of ACAR for mid-term formation and testing

| Periods	Portfolio type	ACAR (Formation periods)	ACAR during the testing periods					
			Number of months in the testing periods					
			2	3	4	6	8	9
	Loser	-0.188***	-0.007	-0.017	NA	NA	NA	NA
	(T-statistic)	(-7.682)	(-0.297)	(-0.547)	−	−	−	−
3 months	Winner	0.245***	0.014	0.011	−	−	−	−
(24 replications)	(T-statistic)	(-3.400)	(-0.746)	(-0.189)	−	−	−	−
	Loser-winner	-0.433***	-0.021	-0.028	−	−	−	−
	(T-statistic)	(-5.371)	(-0.504)	(-0.486)	−	−	−	−
	Loser	-0.327***	-0.002	-0.006	0.001	-0.050***	NA	NA
	(T-statistic)	(-41.675)	(-0.090)	(-0.252)	-0.287	(-3.209)	−	−
6 months	Winner	0.450**	0.011	0.033	0.055	0.055	−	−
(11 replications)	(T-statistic)	(-2.320)	(-0.618)	(-1.157)	(-0.919)	(-0.517)	−	−
	Loser-winner	-0.777***	-0.013	-0.039	-0.054	-0.105	−	−
	(T-statistic)	(-4.727)	(-0.335)	(-0.657)	(-0.606)	(-0.895)	−	−
	Loser	-0.419***	0.006	-0.005	0.006	-0.018***	-0.045	-0.050
	(T-statistic)	(-4.541)	-0.213	(-0.744)	(-0.936)	(-4.444)	(-0.756)	(-0.436)
9 months	Winner	0.600	0.013	0.019	0.056	0.043	0.068	0.070
(8 replications)	(T-statistic)	(-0.968)	(-0.467)	(-0.319)	(-1.486)	(-0.150)	(-0.157)	(-0.025)
	Loser-winner	-1.019***	-0.007	-0.024	-0.050	-0.061	-0.113	-0.120
	(T-statistic)	(-6.317)	(-0.126)	(-0.331)	(-0.526)	(-0.477)	(-0.896)	(-0.931)

Note: ***, ** and * denote significance at alpha 1%, 5% and 10%, respectively

consistently below the losers (negative). The same patterns can also be seen in the long-term periods (12 and 24 months). This means that during a period of 3 to 24 months, the winners (losers) continue to follow their past trends.

However, the statistical test in Table 2, using the sorter formations (mid-term period—3, 6 and 9 months) finds no strong evidence that the return generated using the momentum strategy is significantly higher than that generated from the contrarian strategy. The test result is slightly different from the results shown in Table 3, in which the winners and losers are constructed using a longer horizon (24 and 36 months). The

Figure 1. ACAR movement during the testing periods
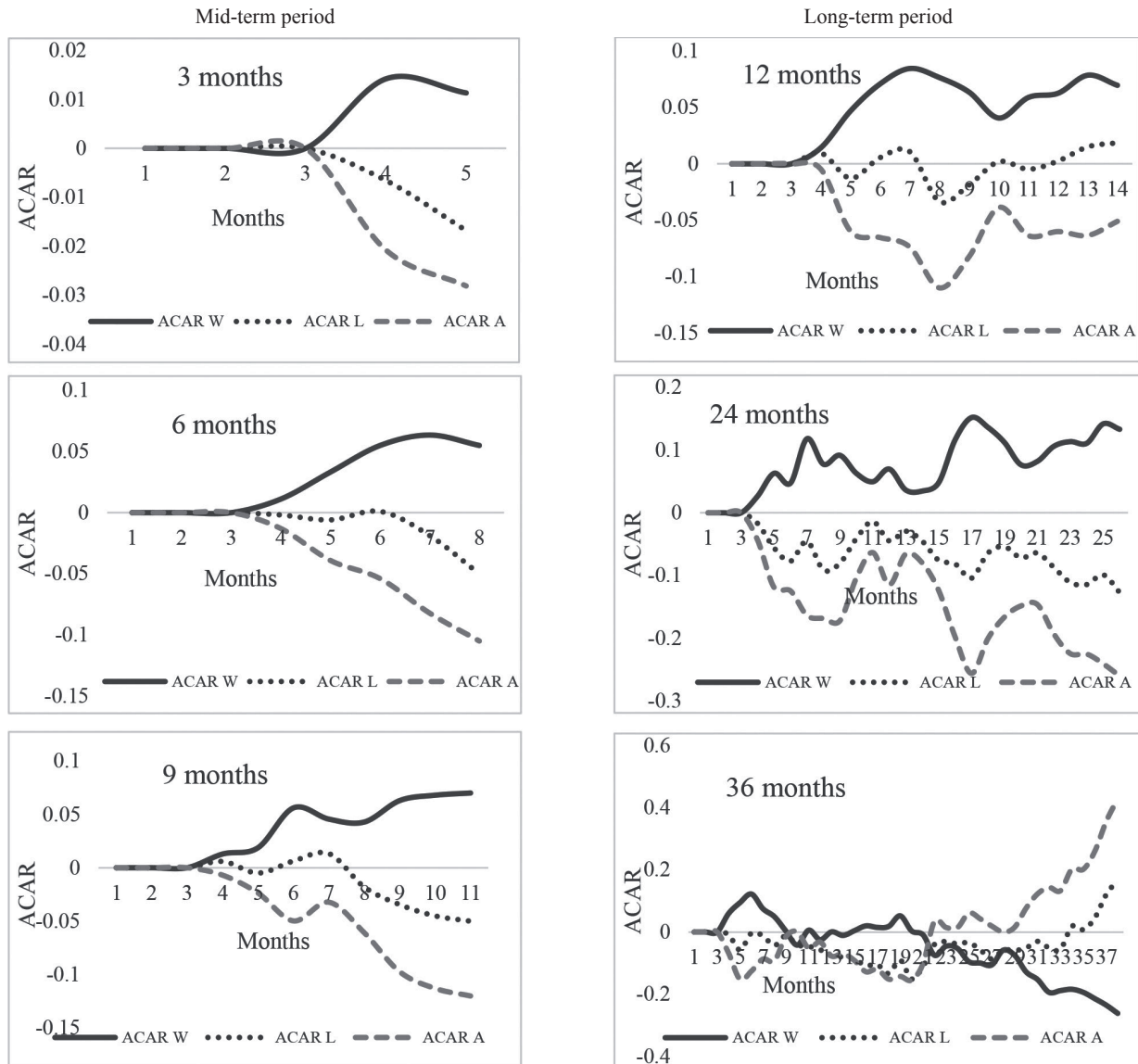
statistical test shows that $ACAR_{A,t}$ is significant from month 2 to month 6 (except for month 2 and 6 in the 36-month formation), which means that the momentum strategy can produce significant returns compared to the contrarian strategy.

Meanwhile, for the long-term test with the longer formation, it appears that at month 21 (36-month test period), $ACAR_{A,t}$ intersects both $ACAR_{W,t}$ and $ACAR_{W,t}$ and begins to be positive. This means that there is a return reversal in which the winners become losers and vice versa (Figure 1, 36 months).

The identified pattern in Figure 1 is corroborated by the results of the statistical test in Table 3. For the formations of 24 and 36 months, in month 24, $ACAR_{A,t}$ begins to be positive, indi-

cating a reversal. In months 30 to 36 (36-month formation), the $ACAR_{A,t}$ is positive and significant, meaning that the performance of the contrarian strategy outperforms the momentum strategy.

These findings correspond with the conclusions of various researchers such as De Bondt and Thaler (1985), Jegadeesh and Titman (1993), Mengoli (2004), and the more recent findings of researchers such as Galariotis et al. (2007), Dhankar and Maheshwari (2014), Siwar (2011), Malin and Bornholt (2013), Chai et al. (2017), Kumar (2016), Doan et al. (2016), and Narayan and Phan (2017). Their findings generally found significant potential returns for the momentum strategy in the medium term and for the contrarian strategy in the longer horizons.

Table 3. Statistical test of ACAR for long-term formation and testing

Periods	Portfolio type	ACAR (Formation periods)	ACAR during the testing period Number of months in the testing periods										
			Medium term							Long term			
			2	3	4	6	8	9	12	18	24	30	36
12 months (6 replications)	Loser	-0.520***	0.010	-0.010***	0.006	-0.030***	0.002	0.005	0.019	NA	NA	NA	NA
	(T-statistic)	(-4.271)	(0.750)	(-3.342)	(1.188)	(-4.702)	(0.959)	(-0.407)	(0.282)	–	–	–	–
	Winner	0.716*	0.020*	0.047*	0.071	0.076	0.041	0.059	0.070	–	–	–	–
	(T-statistic)	(1.923)	(1.834)	(1.781)	(0.730)	(-0.501)	(-1.101)	(0.897)	(-1.017)	–	–	–	–
	Loser-winner	-1.240***	-0.005	-0.060	-0.065	-0.110	-0.039	-0.064	-0.051	–	–	–	–
	(T-statistic)	(-8.195)	(-0.22)	(-1.376)	(-0.846)	(-1.576)	(-0.961)	(-1.308)	(-0.659)	–	–	–	–
24 months (3 replications)	Loser	-0.770***	-0.017	-0.056**	-0.080***	-0.090***	-0.041	-0.014	-0.045	-0.070***	-0.130***	NA	NA
	(T-statistic)	(-2.361)	(-1.63)	(-2.257)	(-7.480)	(-59.206)	(1.441)	(1.293)	(-1.222)	(-12.187)	(-7.769)	–	–
	Winner	1.075	0.000***	0.060***	0.050***	0.077	0.063	0.050	0.035	0.080***	0.133**	–	–
	(T-statistic)	(1.299)	(5.581)	(14.767)	(-3.719)	(-1.408)	(-0.884)	(-0.612)	(-0.107)	(-3.348)	(-2.005)	–	–
	Loser-winner	-1.850***	-0.100***	-0.120***	-0.120***	-0.170***	-0.104	-0.063	-0.080	-0.148	-0.260***	–	–
	(T-statistic)	(-8.232)	(-2.70)	(-8.373)	(-5.843)	(-4.215)	(-1.079)	(-0.826)	(-0.606)	(-1.219)	(-30.618)	–	–
36 months (1 replication)	Loser	-0.999**	-0.008	-0.060***	-0.000***	-0.043**	-0.041*	-0.046	-0.081	-0.150***	-0.058	-0.051	0.180***
	(T-statistic)	(-2.063)	(-0.55)	(-3.261)	(3.590)	(-2.083)	(-1.946)	(-0.332)	(-0.252)	(-4.025)	(-1.553)	(-1.396)	(3.082)
	Winner	1.490***	0.100***	0.090***	0.122*	0.050*	-0.04***	0.010***	-0.011	0.004***	-0.100	-0.190***	-0.260*
	(T-statistic)	(16.753)	(4.176)	(2.480)	(1.943)	(-1.790)	(-3.208)	(3.377)	(-0.808)	(-3.419)	(-0.310)	(-2.899)	(-1.850)
	Loser-winner	-2.490***	-0.068	-0.150***	-0.130*	-0.093	0.001	-0.052	-0.070	-0.155**	0.042	0.143*	0.430***
	(T-statistic)	(-9.438)	(-0.920)	(-3.071)	(-1.700)	(-1.260)	(0.013)	(-0.704)	(-0.944)	(-2.095)	(0.572)	(1.938)	(5.803)

Note: ***, ** and * denote significance at alpha 1%, 5% and 10%, respectively.

The findings of the benefits of the contrarian strategy for mid-horizons that are unproven in this study also correspond with those of previous researchers such as Widiastuti and Jaryono (2011) and Malin and Bornholt (2013).

However, this study's findings are slightly different from those of Hameed and Kusnadi (2002) and Rouwenhorst (1998). The results of Hameed and Kusnadi (2002) conclude that the benefits of the momentum strategy were not found in the Asian capital markets. In addition, Rouwenhorst (1998) stated that it was hard to achieve significant returns using the momentum strategy for individual stocks in an emerging capital market.

Although not consistently solid, this study does prove that the momentum strategy can benefit investors if the reference formations of winners and losers are longer (24 to 36 months). However, these benefits disappear when the reference formations are shortened (3, 6, and 9 months). These findings correspond with the results of Chai et al. (2017) which also indicate that momentum strategy benefit is sensitive to the time horizon of the formation periods.

Such results appear to be related to the extent to which the Indonesian capital market is efficient. It is widely known that the benefits of both momentum and contrarian strategies exist because the market incorrectly prices stocks, that in turn creating winner/loser anomalies. If the market is efficient, such price deviations will be corrected immediately, so the reversal will appear in the shorter horizon (instead of waiting until 24 months, as in the present findings). Because such efficiency is not the case, the benefits of the momentum strategy can be generated because the deviated patterns continue to exist in mid-term horizons.

The advantages of the momentum and the contrarian strategies only appearing strongly if longer formation periods (24 to 36 months) are used also probably corresponds to the efficiency issue. If the market is inefficient, price uncertainty will be high because of noise. Thus to robustly categorize stocks into a category such as winner or loser, longer time frames may be needed. This is probably why in the longer reference (formation) periods, the benefits of both strategies start to appear.

Robustness Check

It has been widely recognized in the literature that the variation of returns is influenced by the size and the value premium, in that small

Table 4. Regression results of CAR for PBV and market capitalization

Variables	3 months		6 months		9 months		12 months		24 months		36 months	
	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.
intercept	-0.150	0.89	0.283	0.345	0.342	0.434	2.430	0.00***	0.812	0.59	4.781	0.142
PBV	0.001	0.46	0.007	0.018**	0.008	0.0200**	0.034	0.00***	0.011	0.67	0.272	0.236
Log.MC	0.000	0.98	-0.040	0.255	-0.040	0.360	-0.26	0.00***	-0.100	0.53	-0.510	0.139
DP	0.195	0.26	0.347	0.442	0.714	0.337	-1.914	0.07*	3.626	0.16	0.772	0.906
DP.PBV	-0.000	0.49	-0.009	0.108	-0.020	0.140	-0.035	0.03**	-0.020	0.73	-0.300	0.278
DP.Log.MC	-0.020	0.35	-0.023	0.624	-0.056	0.469	0.213	0.05*	-0.334	0.22	-0.060	0.933
N	874		418		266		190		76		38	
Adj R²	0.004		0.040		0.045		0.068		0.046		0.039	

Note: ***, ** and * denote significance at alpha 1%, 5% and 10%, respectively.

and value stocks have higher returns than larger and growth stocks (De Bondt & Thaler, 1987; Fama & French, 1992; Lakonishok, Shleifer, & Vishny, 1994). Adjustment for this return performance has become a solid model that brings up the three-factor model of Fama and French (1993), as the extended concept of the capital asset pricing model.

In the three-factor model, it is assumed that stocks with low price-to-book value (PBV), that is value stocks, and stocks with low market capitalization (known as small stocks), will produce higher returns than those with higher PBV (growth stocks) and larger market capitalization (large stocks). In Indonesia, this possibility has been partially proven by Rafik and Lantara (2016). Therefore, if the premise is true, then the winner stocks should have a lower PBV and a lower market capitalization compared to the loser stocks. In other words, the return generated by both the contrarian and the momentum strategies could be triggered by size and value premium factors rather than by the strategies themselves.

To test the possibility, the return of each stock in the portfolio was regressed in terms of its relative value and size using Eq. 9.

$$CAR_{i,L/W} = \alpha + \beta_1 PBV_{i,L/W} + \beta_2 logMC_{i,L/W}$$
$$+ \beta_3 DP + \beta_4 DP.PBV_{i,L/W}$$
$$+ \beta_4 DP.logMC_{i,L/W} \qquad (9)$$

whereby $PBV_{i,L/W}$ and $LogMC_{i,L/W}$ are the price-to-book value and the log of the market capitalization for stocks in either the winner or the loser portfolios, and DP is a dummy variable for portfolios in which 1 indicates loser and zero otherwise. The CAR in Eq.9 is the CAR in month n (the last month) in each testing period, and $PBV_{i,L/W}$ and $LogMC_{i,L/W}$ are generated from month n (the last month) in each formation period.

From the six regression models (for each formation period) in Table 4, it can be seen that the coefficient of PBV and market capitalization tends to be consistently positive and negative, respectively, (except for the 3-month model for market capitalization) although only significant in the 12-month model. DP.PBV and DP.logMC are also not significant for the models (except for the 12-month model). These results suggest that the variation in the returns is not explained as a whole by size and value factors, as in the assumption of the three-factor model from Fama and French (1993).

The dummy portfolio also fails to show consistent significance in all models, which means that, in general, the returns for the winner and loser stocks are not significantly different (Table 4), although return reversal is confirmed for the long-term horizons (24 and 36 months) from the 24th to 36th months (Table 3). This means that size and value premiums cannot explain the variations in the portfolio returns. In other words, the test results in Tables 2 and 3 are confirmed as robust.

This finding is contrary to the consensus in current finance thinking regarding return anomalies which generally expects higher returns for value (low PBV) and small (low market capitalization) stocks (Arisoy, 2014; Basu, 1977; Fama & French, 1992, 1998; Lakonishok et al., 1994; Xie & Qu, 2016). Such findings are also unable to confirm the initial findings of Rafik and Lantara (2016) about the possible benefit of the value premium strategy in the Indonesian

capital market. Although not significant, the coefficients of PBV in Table 4 are consistently positive, meaning that the higher the PBV, the higher the returns. However, these results do correspond with the findings of other researchers, such as Brailsford (1992) and Doan et al. (2016), which have also failed to find support for anomalies regarding the size and the growth premiums. This implies that in the Indonesian context, the risk factors seem to go beyond the value and growth issues hypothesized in the three-factor model from Fama and French (1993).

Conclusions

In accordance with the findings of research in many developed and developing countries, this study has found partial evidence of the benefits of the momentum strategy as compared to the contrarian strategy in medium horizons (3 to 9 months). However, these benefits are sensitive to the time interval over which the determination of the winner and loser portfolios is generated. Although the return of the winners (losers) shows a consistent continuous pattern in the mid-term, the benefits disappear when the determination is based on a shorter formation (3 to 12 months). The return of the momentum strategy seems significant when the reference formation is much longer (24 to 36 months).

On the other hand, this study also finds evidence of return reversal for the winners (losers) from months 24 to 36. This reversal can generate a higher profit for the contrarian strategy. Therefore, the relative benefits of a long-term contrarian strategy are successfully confirmed.

This study does not include reference to market risk factors and includes only size and growth as the possible explanatory variables for the returns. Subsequent research can make improvements by further analyzing whether the variation in the returns is associated with not only market factors, but also other risk factors such as fluctuations in consumption and aggregate income (Lettau & Ludvigson, 2001; Lustig & van Nieuwerburgh, 2005; Petkova & Zhang, 2005; Yogo, 2006), cash flow risk (Campbell & Vuolteenaho, 2004), costly reversibility of physical capital (Zhang, 2005), or displacement risk (Gârleanu, Kogan, & Panageas, 2012).

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