
MOMENTUM STRATEGY ALTERNATIVES DURING COVID-19 PANDEMIC: AN EMPIRICAL STUDY IN INDONESIA

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Abstract. In some circumstances, especially in the crisis period, conventional or relative strength momentum strategy has led to momentum crash, giving rise to a negative return for investors. As a consequence, many researchers have developed new momentum strategies which had better performance than relative momentum strategy as they have been proven could withstand the extreme volatility in the crisis period, such as (1) residual momentum strategy, (2) absolute strength momentum strategy, and (3) removing stocks with extreme absolute strength. The purpose of this research is to examine the outcome of those new momentum strategy alternatives during Covid-19, one of the potential crisis periods that could lead to a momentum crash, which will be divided into 4 phases from the beginning until the recovery period. This research uses the Fama-French three factors asset pricing model in regression to calculate the abnormal return generated by those strategies in the Indonesia Stock Exchange, specifically LQ45 stocks (high liquidity and large market capitalization stocks). This study shows that at the beginning of Covid-19, no strategy could generate a positive abnormal return. However, the absolute strength momentum strategy could generate a positive abnormal return during the crash and recovery period. Meanwhile, the other strategies have proven worse to be implemented in the crash and recovery phases of Covid-19 than the absolute strength momentum strategy. This research contributes to the existing literature by analyzing new momentum strategy alternatives for investors to optimize their portfolio return, especially during a crisis.

Keywords: momentum strategy, stock returns, momentum crash, Covid-19, Indonesia

Introduction

Several conventional papers such as Levy (1967) and Jegadeesh & Titman (1993) documented the positive abnormal returns by buying winner stocks and selling loser stocks. They tend to continue their high return and low return for the short period ahead. That strategy was named relative momentum strategy, which sorts the winner and loser portfolios based on the return from the most recent period. Such momentum occurred because of underreaction or delayed overreaction by the investor to respond to the market information (Nagel, 2002). Their researches supported by other researchers in the late 1990 and early 2000 such as Rouwenhorst (1998), Rouwenhorst (1999), Hameed & Yuanto (2000), Kang et al. (2002), which documented how relative momentum strategy could generate positive abnormal returns on developed and developing countries for 1980-1997.

Recent papers questioned the relative momentum strategy's effectiveness, documented as a momentum crash (Daniel & Moskowitz, 2016). A momentum crash could occur when the market is in highly volatile condition—precisely when the market has dropped and then followed by a market rebound in the short term. The relative momentum strategy has documented negative returns when used as an investment strategy during such a period (Daniel & Moskowitz, 2016).

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As a result, researchers have continually developed momentum strategy alternatives that could perform effectively even during the crash period. Recent papers documented some of the new momentum strategies as follows: (1) residual momentum, which sorts the portfolio based on their idiosyncratic returns (Gutierrez & Prinsky, 2007; Blitz et al., 2011); (2) absolute strength momentum, which sorts the portfolio based on their historical returns across stocks and time (Gulen & Petkova, 2018); and also (3) removing stocks with extreme absolute strength which is an expansion of the absolute strength strategy, by excluding the stocks with extreme absolute strength using certain threshold as breakpoints (Yang & Zhang, 2019; Lin et al., 2020). However, those researches about the effectiveness of those strategies are still contradictory to one another. For example, Berggrun et al. (2020) questioned the effectiveness of residual momentum and confirmed the effectiveness of absolute strength momentum in Latin America. On the other hand, Lin et al. (2020) show that absolute strength momentum is not effective and removing stocks with extreme absolute strength is effective when implemented in Taiwan.

As there is not much research yet about momentum strategies in Indonesia, especially in the Covid-19 period, Indonesia could become an interesting country to be studied further. Indonesia is one of the emerging countries (Prima, 2019) with an 80.98% of stocks institutional ownership compared to total ownerships (Kustodian Sentral Efek Indonesia, 2019), which could enhance the possibility of momentum strategies' execution and success in Indonesia (Nnadi & Tanna, 2019; Yusgiantoro, 2018). The Covid-19 crisis caused the Jakarta Stocks Composite Index (JKSE) to become highly volatile as it dropped 37.49% to Rp3.937,63 on 24 March 2020 from Rp6,299.54 on 31 December 2019. Meanwhile, in the next few weeks, the JKSE rose again by 20.15% to Rp4,811.83 on 6 April 2020 (investing.com, 2021). Budiarmo et al. (2020) noted the change in investor perception about systematic risk during the Covid-19 period, which resulted in the negative correlation between systematic risk itself and the stock return in January-March 2020, and the correlation became positive again in April 2020. Those indicated the potential of a momentum crash in Indonesia.

Considering the potential of new momentum strategies and Indonesia's condition above, this research aims to test and compare the effectiveness of those new momentum strategies in Indonesia, especially on the Covid-19 crisis, divided into several phases. Furthermore, this research contributes to the current literature by showing absolute strength momentum as the most effective strategy than other strategies, which could provide insight for academic literature and investors to optimize their portfolio return on crisis period.

Literature Review

Residual Momentum Strategy

Gutierrez & Prinsky (2007) and Blitz et al. (2011) were some of the pioneers of residual momentum strategy. Instead of using recent return distribution to sort stocks into winner and loser portfolios, they used the firm-specific abnormal return, which also can be named residual return or idiosyncratic return. Sorting the stocks based on residual return could generate more profit in terms of abnormal return, compared to relative strength momentum even in the crisis period, because: (1) residual momentum is neutral to the company's size; (2) residual return by nature is a firm-specific abnormal return that is not affected by the current economic condition; (3) the abnormal return which resulted from specific events such as earnings surprises, dividend changes, share repurchases, stock splits, and seasoned equity offerings will be continued in the short-term period ahead.

Empirically, the consistency of this strategy to generate abnormal returns has been proven. Gutierrez & Prinsky (2007) already prove the effectiveness of that strategy in NYSE, Amex, and Nasdaq in 1960-2000. Moreover, Blitz et al. (2011) enhanced the evidence by

proving the effectiveness using an extended research period, from 1926-2000, in the same market. Blitz et al. (2020) also verified the robustness of residual momentum strategy in other countries such as Europe, Japan, Asia Pacific, and emerging markets. Thus, justifying Covid-19 as one of the potential crash periods, the current study hypothesizes as follow:

H₁: Residual momentum strategy could generate a significant positive abnormal return when implemented in the Covid-19 crisis period.

Absolute Momentum Strategy

In response to the failure of the relative momentum strategy, Gulen & Petkova (2018) propose a new momentum strategy named absolute momentum strategy. This strategy required sorting stocks into winner and loser portfolios based on their absolute strength, the stock's return without being normalized by a current benchmark. Therefore, the stocks are sorted based on their historical return across stocks and periods from the extended period, in contrast to the relative momentum strategy, which only used the recent distribution of return across stocks. The absolute strength is better for sorting stocks since it is not biased by the recent crisis period.

Gulen & Petkova (2018) already prove the profitability of absolute momentum strategy across sample periods, international markets, asset classes, and holding periods. In line with Berggrun et al. (2020), their research also proves the effectiveness of that strategy in Latin America on July 2001-June 2016, using the Fama-French Three Factors Model to calculate the abnormal return. Therefore, it can be hypothesized as follow:

H₂: Absolute momentum strategy could generate a significant positive abnormal return when implemented in the Covid-19 crisis period.

Removing Stocks with Extreme Absolute Strength

This strategy is the most recent momentum strategy that has been developed by Yang & Zhang (2019) and Lin et al. (2020). With this strategy, the portfolio formation could be done as described in the relative momentum strategy. However, in addition to portfolio formation, the stocks with extreme absolute strength will be removed from the portfolio using specific breakpoints. The absolute strength is calculated following the methods proposed by Gulen & Petkova (2018). Yang & Zhang (2019) and Lin et al. (2020) argued that the stocks with extreme absolute strength tend to have high volatility and therefore have a low probability of maintaining their momentum in the long term. As a result, removing such stocks could enhance the portfolio's performance, even in a recession period.

Yang & Zhang (2019) proved the effectiveness of this strategy in NYSE, Nasdaq, and Amex in 1965-2015. Removing stocks with extreme absolute strength could reduce the loss from the worst months from 26% to 20.13%, the average worst ten months from 17.69% to 15.05%, and also could enhance the average return in the other period. Lin et al. (2020) proved the same things in Taiwan Stock Market from 1971-2018. Thus, it could be hypothesized:

H₃: Removing stocks with extreme absolute strength could generate a significant positive abnormal return when implemented in the Covid-19 crisis period.

On the other hand, some researchers had questioned the effectiveness of those strategies. For example, Berggrun et al. (2020) did not successfully prove the effectiveness of relative momentum and residual momentum strategy in Latin America, using Fama-French Three Factors Model. Moreover, Lin et al. (2020) confirm the ineffectiveness of the absolute strength momentum strategy when implemented in Taiwan Stock Market. However, there is no research

yet that demonstrated the ineffectiveness of removing stocks with extreme absolute strength. Therefore, this study hypothesized as follows regarding the performance of those strategies:
H4: There are differences in the effectiveness of relative momentum strategy, residual momentum strategy, absolute momentum strategy, and removing stocks with extreme absolute strength in the Covid-19 crisis period.

Research Method

This research applied a quantitative empirical research method that includes an inductive approach, using mathematics or statistics to conclude (Cooper & Schindler, 2014). The sample used in the research were the stocks classified as LQ45 (45 stocks selected by Indonesia Stock Exchange as which have high on both liquidity and market capitalization) on August-January 2021. Incorporating the event study method (Binder, 1998) and using the daily data from 31 December 2019-28 February 2021, the research period was when the Covid-19 crisis occurred, which divided into 4 phases as follows: (1) 31 December 2019-1 March 2020 (started from when World Health Organization announces Covid-19 first positive case); (2) 2 March 2020-30 March 2020 (started from when Covid-19 first positive case confirmed in Indonesia); (3) 31 March 2020-4 December 2020 (started from when the Indonesia government issued a policy to minimize the Covid-19 impact - Perpu No. 1 Tahun 2020); (4) 5 December 2020-28 February 2021 (started from when the Covid-19 vaccine arrived in Indonesia).

Abnormal return, which used to measure the strategies' performance, was calculated using Fama-French Three Factors Model as described below (Fama & French, 1992, Berggrun et al., 2020):

$$R_{it} - R_{ft} = \alpha + \beta_i (R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it} \dots\dots\dots (1)$$

Where α is the abnormal return, $R_{mt} - R_{ft}$ is the market excess return, with R_{mt} is the market return which is a daily percentage change in the Indonesia stock market index (Jakarta Composite Index). At the same time, R_{ft} is the risk-free rate proxied using Indonesia 1 year government bond yield. SMB refers to the return differences between the portfolio of small-company stocks and the portfolio of big-company stocks. HML refers to the return differences from the portfolio of high equity value company stocks and low equity value company stocks. SMB and HML were calculated by forming a portfolio using 2x3 sort on size, which proxied by market capitalization (total outstanding shares multiplied by the price per share) and equity value, which proxied with book to market equity value (Fama & French, 1992) on LQ45 stocks.

$R_{it} - R_{ft}$ indicates portfolio excess return calculated using four steps. First, calculate the individual stock return (R_{it} individual stock), which is the daily percentage change in the price (Tilica, 2018). Second, form 5 portfolios (P1-P5) with P1 indicates winner portfolio (20% highest return) and P5 indicates loser portfolio (20% lowest return) compared to the respective benchmark (Berggrun et al., 2020), with the detail for each strategy listed in Table 1. Third, calculate the portfolio return (R_{it}), using the value-weighted concept based on market capitalization period t-1 to reduce bias (Berggrun et al., 2020). Fourth, calculate the excess portfolio return by subtracting portfolio return (R_{it}) with the risk-free rate (R_{ft}).

Table 1. Return calculation and benchmarks used for each momentum strategies

Strategy	Return calculation and benchmarks used
Relative momentum strategy (Jegadeesh & Titman, 1993; Berggrun et al., 2020)	Latest 1-year average return, compared with other LQ 45 stocks.
Residual momentum strategy (Gutierrez & Prinsky, 2007)	Latest 1-year average residual return, compared with other LQ 45 stocks. Residual return measured by standardized residuals returns obtained from 5-year latest return regression error term using Capital Asset Pricing Model. Additional data of the latest 5-year stock price and risk free-rate is required.
Absolute momentum strategy (Gulen & Petkova, 2018)	Absolute strength concept: latest 1-year average return with 1 month skip period, compared with all LQ 45 stocks with all the same period from 2010. Additional data of stock price until 2010 is required.
Removing stocks with extreme absolute strength (Lin et al., 2020)	Portfolio formation using a relative momentum strategy, excluding 5% highest absolute strength and 5% lowest absolute strength based on calculation from absolute momentum strategy.

The data was analyzed using OLS regression, which applied the t-test statistics concept for time-series data (Lind et al., 2018; Gujarati & Porter, 2009) to test the significance of abnormal return (α) generated from equation (1) above.

Result and Discussion

Using the descriptive statistics analysis and OLS regression of the Fama-French Three Factors model, this study calculated the mean for portfolio excess return (mean $R_{it} - R_{ft}$), abnormal return, and R^2 for each portfolio formed using four-momentum strategies on 4 phases of Covid-19. The results are shown in Table 2.

Table 2. Summary of OLS result for 4 momentum strategies in 4 phases of Covid-19 using Fama-French Three Factors Model

Description	Relative Strength Momentum			Residual Momentum			Absolute Strength Momentum			Removing Stocks with Extreme Absolute Strength		
	W	L	W-L	W	L	W-L	W	L	W-L	W	L	W-L
<i>Phase 1: 31 December 2019 – 1 March 2020</i>												
Mean $R_{it} - R_{ft}$	-0.34%	-0.44%	0.09%	-0.48%	-0.45%	-0.03%	-0.22%	-0.48%	0.26%	-0.34%	-0.38%	0.03%
α	0.00%	0.03%	-0.03%	-0.13%	0.04%	-0.17%	-0.05%	0.06%	-0.11%	0.00%	0.10%	-0.10%
Sig. α	0.9850	0.9032	0.9136	0.1128	0.8523	0.3996	0.7383	0.6494	0.5845	0.9850	0.4872	0.6320
R^2	52.70%	59.25%	3.82%	54.39%	60.62%	0.40%	21.71%	69.57%	32.79%	52.70%	62.07%	17.06%
<i>Phase 2: 2 March 2020 – 30 March 2020</i>												
Mean $R_{it} - R_{ft}$	-0.79%	-1.04%	0.25%	-1.72%	-0.99%	-0.73%	-1.62%	-1.06%	-0.57%	-0.79%	-1.21%	0.42%
α	0.33%	-0.97%	1.30%	0.71%	-0.91%	1.61%	0.61%	-0.54%	1.15%	0.33%	-0.58%	0.91%
Sig. α	0.4798	0.1147	0.1967	0.2784	0.1381	0.1421	0.0546**	0.0468	0.0122*	0.4798	0.2281	0.2863
R^2	91.31%	85.90%	6.23%	88.49%	85.69%	28.88%	95.41%	93.81%	64.96%	91.31%	90.42%	8.53%

Phase 3: 31 March 2020 – 4 December 2020

Mean $R_{it}-R_{ft}$	0.12%	0.26%	-0.14%	0.12%	0.26%	-0.14%	0.36%	0.23%	0.13%	0.12%	0.40%	-0.28%
α	-0.04%	-0.01%	-0.03%	-0.07%	-0.01%	-0.06%	0.19%	0.02%	0.17%	-0.04%	0.07%	-0.11%
Sig. α	0.5219	0.8854	0.8138	0.1543	0.9273	0.6118	0.1129	0.7059	0.1874	0.5219	0.5021	0.3711
R^2	69.16%	75.25%	19.20%	86.03%	73.21%	10.83%	47.05%	86.15%	18.46%	69.16%	81.22%	43.93%

Phase 4: 5 December 2020 – 28 February 2021

Mean $R_{it}-R_{ft}$	0.63%	-0.08%	0.70%	0.39%	0.10%	0.29%	0.81%	0.00%	0.81%	0.63%	-0.08%	0.71%
α	0.15%	-0.18%	0.33%	-0.06%	-0.07%	0.00%	0.29%	-0.12%	0.41%	0.15%	-0.19%	0.34%
Sig. α	0.6098	0.2799	0.3540	0.8241	0.5883	0.9952	0.4552	0.3541	0.3214	0.6098	0.2574	0.3435
R^2	59.42%	61.96%	22.25%	61.17%	60.71%	26.07%	55.00%	76.96%	19.63%	59.42%	60.24%	22.10%

*W is the winner portfolio; L is the loser portfolio. Only absolute strength momentum strategy could generate a positive abnormal return on phase 2 for winner and winner-loser portfolios in 10% (**) and 5% (*) significance level, respectively.*

Overall, in phase 1 and phase 2, both winner and loser portfolios have negative values for portfolio excess return mean. From phase 1 until the mid of phase 2 (24 March 2020), Covid-19 started to impact the market index. The market index experienced a 37,49% drop from Rp6.299,54 at the end of 2019 to Rp3.937,63 on 24 March 2020 (investing.com, 2021). The individual stock price was also decline following the decline in the market index. As the stock price had fallen, the stock return also dropped. Phase 3 and phase 4 indicated recovery phases since, in those phases, the return of both portfolios (especially for the winner portfolio) starts to show positive value. The performance of the portfolios became better because of the stocks' price increase, which in line with the market rebound on those periods (investing.com, 2021) as the government started to issue the policy for handling Covid-19 impact on 31 March 2020. For the excess return of portfolio winner versus loser (W-L), in phase 1 and phase 4, most of the mean from the winner portfolio is higher than the loser portfolio since W-L has a positive value. However, in phase 2 and phase 3, the results vary, as they may be the results from instability in Indonesia due to Covid-19.

Based on the results shown in Table 2, we can conclude that the null hypothesis is rejected only for absolute strength momentum strategy, as it could generate a significant positive abnormal return for winner and winner-loser portfolios on 10% and 5% significance level, respectively. For the others, we cannot reject the null hypothesis as the strategy was ineffective in generating an abnormal return on the 10% and 5% significance levels. Specifically, in phase 1, all strategies resulted in negative abnormal returns for the winner and the winner-loser portfolio. A positive abnormal return for the loser portfolio indicated a failure of the overall momentum strategy. However, started from phase 2-phase 4, the results vary. Still, we can conclude that the absolute strength momentum generated the consistent and highest positive abnormal return, especially for winner and winner-loser portfolios for all phases. Therefore, it indicates the absolute strength momentum strategy as the best momentum strategy to be implemented during Covid-19. The results assumed that R^2 is more than 50%, for all winner and loser portfolios, except for absolute strength momentum, phase 1, and phase 3 for winner portfolio. Therefore, the overall Fama-French Three Factors Model could explain more than 50% variance of winner and loser portfolio return.

The explanation of the strategies' failure could be described in the two reasons: (1) the overall failure due to economic condition and (2) the technical failure of a specific strategy. First, the overall failure could be noted in phase 1, as the economic condition started to decline consistently (Nasution et al., 2020). This research has shown that the winner portfolio generates a negative abnormal return in such situations while the loser portfolio generates a positive abnormal return. The findings indicate the big failure of a momentum strategy, and contrarian strategy (reversal of momentum strategy: buy loser stocks and sell winner stocks) may be better

implemented in such a period. Moreover, in the consistent decline of the market, the microstructure effect and disposition effect could happen. The microstructure effect refers to when the bid-ask price in the market could reflect the fundamental value of the stocks and unsynchronized data due to the large trading volume. Disposition effect refers to investor action that sold winner assets and bought loser assets, resulting in price decrease in winner assets and price increase in the loser assets. Both of those phenomena could happen due to investor overreaction and could lead to a higher abnormal return for loser portfolios (Rhee & Wang, 1997; Conrad et al., 1997; Chen et al., 2012).

From phase 2 until phase 4, we can conclude that each strategy generated varied results. Overall, absolute strength momentum has succeeded in generating a consistent positive abnormal return on all phases, especially significant on phase 2 when market decline followed by an immediate market rebound. It is in line with Gulen & Petkova's (2018) research. Gulen & Petkova (2018) found that sorting and forming portfolios based on their absolute strength for winner and loser portfolios could generate consistent profit and that strategy could withstand crash periods. Berggrun et al. (2020) also found that the absolute momentum strategy is effective, especially when using Fama-French Three Factors Model to calculate abnormal return on Latin America.

However, relative strength momentum, residual momentum, and removing stocks with extreme absolute strength are failed to generate a significant positive abnormal return. It may be due to the technical failure of the specific strategy. Relative strength momentum is already expected to show failure. Most of the new researchers such as Gaunt (2016), Bohl et al. (2016), Gulen & Petkova (2018), Berggrun et al. (2020) had proven the failure of relative strength momentum to generate consistent profit, especially in the crash period, which specifically called as momentum crash (Daniel & Moskowitz, 2016). The failure of residual momentum is not in line with Gutierrez & Prinsky (2007), Blitz et al. (2011), and Blitz et al. (2020), which documented the consistent profit for that strategy. Blitz et al. (2020) noted idiosyncratic momentum as a factor unrelated to the overall market return. This research resulted in a high enough R^2 , more than 50% for residual momentum portfolio winner and loser. Therefore, the idiosyncratic or residual return cannot be utilized optimally, as the portfolio formed follows the market portfolio. Removing stocks with absolute strength also failed to generate a positive abnormal return. There is not much research yet that documented this failure. However, by looking at this research sample and the sorting method from Lin et al. (2020), the failure may happen because the portfolio formed is not different from the relative momentum strategy. It occurs especially for the winner portfolio, as there are no highest absolute strength stocks to be removed from the portfolio, especially in the crisis period.

The research also compares the result with the risk-adjusted return: Sharpe ratio and Treynor ratio, which compares the portfolio's excess return with its risk (Bodie et al., 2018). Based on the assessment, the result is consistent in phase 1, phase 3, and phase 4, which indicates the period with less volatility. Meanwhile, in phase 2, the result is inconsistent as the market has shown extreme volatility, resulting in the negative Sharpe ratio and Treynor ratio even if the portfolio has a positive abnormal return. It was expected as the risk-adjusted return is an unconditional measure that does not consider or does not compare the portfolio's performance with the market condition (Marhfor, 2016).

Conclusion

This study focused on analyzing momentum strategy alternatives starting from the conventional one: relative strength momentum to the newer one: residual momentum, absolute strength momentum, and removing stocks with extreme absolute strength. The analysis was performed specifically on the Covid-19 crisis period to test their effectiveness for withstanding such period.

Based on the analysis performed, all momentum strategy alternatives were ineffective during the consistent market decline at the beginning of the crisis period (from the first announcement of the Covid-19 positive case by WHO and before the first Covid-19 positive case in Indonesia). However, when Indonesia started to enter the significant crisis phase indicated by its market index (after the first Covid-19 case in Indonesia), the absolute strength momentum strategy effectively generates a significant positive abnormal return. The effective performance of the absolute strength momentum strategy continues until the recovery phase, although the significance is lower than its performance in the significant crisis phase. Meanwhile, the other strategy could not consistently generate a positive abnormal return on all those periods. The assessment of strategies' effectiveness using abnormal return only consistent with the evaluation using risk-adjusted return in the period with less volatility.

As the results highlight the outstanding performance of absolute momentum strategy, this research implied that investors could utilize an absolute strength momentum strategy to form their stock investment portfolio in the crisis period, especially in the crash and recovery phases. Furthermore, this research has shown that utilizing market anomaly could give investors advantages even in the crisis period. Moreover, this study could give insight to the academicians for further research to improve the momentum strategy.

However, there are some notable limitations in this research. First, this study implied the formation period of 1 year and holding period throughout the Covid-19. Further research could perform analysis using various holding and formation periods, such as using the combination mentioned in Berggrun et al. (2020). Second, the samples used in this research are limited to LQ45 stocks in Covid-19. Using extended samples and observation periods in subsequent research could provide more robust results. Third, this research only uses Fama-French Three Factors Model to calculate abnormal returns. Further research could perform analysis using another market model such as the Carhart Four Factors Model or Fama-French Five Factors Model, which include more market factors. Fourth, the research focuses the momentum strategy on stocks. Therefore, future research could attempt to analyze the effectiveness of momentum strategies when implemented on other assets such as bonds or cryptocurrencies.

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