

CAN TECHNICAL ANALYSIS SIGNALS DETECT PRICE REACTIONS AROUND EARNINGS ANNOUNCEMENT?: EVIDENCE FROM INDONESIA

Dedhy Sulistiawan, University of Surabaya
Jogiyanto Hartono, Universitas Gadjah Mada

ABSTRACT

This study examines whether technical analysis signals can detect price reactions before and after earnings announcement dates in Indonesian stock market. Earnings announcements produce reactions, both before and after the announcements. Informed investors may use private information before earnings announcements (Christophe, Ferri and Angel, 2004; Porter, 1992). Using technical analysis signals, this study expects that retail investors (uninformed investors) can detect preannouncements reaction. Technical analysis is selected because it is a powerful strategy, especially in developing stock market (Fifield, Power, and Sinclair.2005; Ahmed, Beck, and Goldreyer, 2000), including Indonesia (McKenzie, 2007). This study also examines technical analysis signals after earnings announcements. Using the idea that preannouncements reaction absorb post announcements reactions, this study expect that technical analysis signals difficult to detect price reaction after earnings announcements. Using Indonesian data over 2007-2011, the results show that technical analysis signal before earnings announcements can produce profit, but signals after earnings announcements do not produce same results. Using several different measures of return, the results are statistically robust. Based on those results, this study concludes that technical analysis signal can detect reaction before announcements, but the signals don't work after earnings announcements. These findings contribute to accounting and technical analysis literatures.

JEL: M41, G14

KEY WORDS: Technical Analysis, Earnings Announcements

INTRODUCTION

This research examines whether technical analysis signals able to detect price reactions around earnings announcement dates in Indonesian stock market. Supporting that idea, Fan and Wong (2002) results show that companies in Indonesia have high concentrated ownership and low earnings informativeness. Those companies also have low information content (Landsman, Maydew, and Thornock, 2012). Controlling owners are perceived to report accounting information for self-interested purposes, causing the reported earnings to lose credibility to outside investors (Fan and Wong, 2002). It means that in the higher level of concentrated ownership, outside investors demand more alternative information. This research uses technical analysis signal as alternative information because it is useful in Asian countries, especially developing countries (Fifield, Power, and Sinclair.2005; Ahmed, Beck, and Goldreyer, 2000), including Indonesia (McKenzie, 2007).

Stock prices react before and after earnings announcements (Landsman, Maydew, and Thornock, 2012; Beaver 1968, Ball and Brown, 1968; Christophe, Ferri and Angel, 2004). Reactions before publication could occur due to information leakage or caused by speculative actions in response to new information that will be published. Christophe, Ferri and Angel (2004) study finds that short-selling before earnings announcements used to anticipate bad news. This study believes that retail investors, as uninformed investors, can detect the reactions of informed investors by charts.

This study expects that technical analysis signal before earnings announcements can detect informed investors reaction. Those ideas will refer to technical analysis performance. The capacity of signal to price reactions before earnings announcements can be represented by technical analysis signals profitability.

Conversely, technical signal after earnings announcements are expected produces bad signal because price movement is not supported by information. This study believes that fundamental information will drive technical analysis performance. This idea also stated in Murphy (1999) that fundamental analysis causes price reactions and technical analysis exploits those reactions. This result is important because it builds a theoretical relationship between earnings announcements and technical analysis studies.

Using one-year period, Sulistiawan (2009) show that the combination of relative strength index (RSI) and simple moving average (SMA) before earnings announcements produce profitable signal. This study also expects to enhance the generality of that earlier work by extending the idea. The first extension is that this study not only use closing price to determine return, but also daily average price. The use of daily average price is important to minimize the bias of end-of-day effect. The second extension, this study uses signal after announcements. The use of signal after announcements is important to explain that performance of technical analysis signals caused by fundamental information. The third extension, this study determines earnings announcement dates by using the official receipt letter of Indonesia Stock Exchange (IDX), other than the date of financial reporting completion by management. The fourth extension, this study uses transaction fee, adjusted market return, and abnormal return to calculate return from technical analysis. This is important because Fama and Blume (1966) explain that some strategies produce profit before transaction fee but generate loss after fee. This will make technical analysis strategies do not work in practice. The fifth extension, this study uses 5-days and 10 days. Wong, Manzur and Chew (2003) show that single MA is better than dual MA, triple MA, and RSI. The last, previous study uses only one-year test. This study uses multi-years examination to capture the consistency of technical analysis performance.

Empirical evidences show that technical analysis signal before earnings announcements can produce profit, but technical analysis signals after earnings announcements do not produce same results. It means there are difference performances of technical analysis signal around earnings announcements. Empirically, earnings announcements event cause different performance of technical analysis signals. These results produce three contributions. First, this study contributes to technical analysis studies. Previous researches use time series analysis to give evidence about technical analysis performance, for example Fama and Blume (1966), Sweeney (1988), Brock, Lakonishok, and LeBaron (1992), Bessembinder and Chan (1995), Ahmed, Beck and Goldreyer (2000), Fifield, Power and Sinclair (2005). This study examines profitability of technical analysis by using event-studies setting. The second, this study also contributes to earnings announcements studies. This study try to explain that earnings announcements event give impact to technical analysis performance. The third, this study gives guidance for investor to trade around earnings announcements. Flanegin and Rudd (2005) show that investment professional consider that technical analysis skill is important. These results will give benefit to investors to differentiate between technical signals that emerge before and after earnings announcements. The rest of the paper is organized as follows. Section 2 develops hypotheses. Section 3 presents the research design. Section 4 reports the empirical results and discussion. Section 5 summarizes research findings.

LITERATURE REVIEW

The theory used in this research relate to two major subjects in (1) accounting and (2) stock investment. Earnings announcements is a part of mainstream accounting research topic. Separately, technical analysis topic is a part of stock investment topic, but that is not popular in academic communities (Flanegin and Rudd, 2005; Eitman and Smith, 1974).

Price Reaction around Earnings Announcements

Earnings announcements cause price reaction. For example, Beaver (1968) examine earnings information content. These reactions are reflected by changes in volume and stock prices in the week on earnings announcement dates. Beaver (1968) article reports that earnings announcements bring new information to the market. In the same year, The results of Ball and Brown (1968) show consistent direction between changes in earnings and abnormal return. In a recent study, Landsman, Maydew, and Thornock (2012), using Beaver (1968) method, compare the information content of earnings announcement dates between companies in the countries that adopting IFRS and nonIFRS. The results show that firms in countries that adopt IFRS produce higher information content than those that do not adopt IFRS. In that study, Indonesian sample generate low information content compare with IFRS sample. It is also triggered by the law enforcement. This low information content may be caused by preannouncements reactions of informed investors (Christophe, Ferri and Angel, 2004) or reported earnings to lose credibility to outside investors (Fan and Wong, 2002). Christophe, Ferri and Angel (2004) conducted a study of investors' activities before earnings announcements. Investors with private information can have a short position on stocks they expect to report negative earnings surprises. The results show that informed traders make a short position prior to earnings announcements. Porter (1992) also supported this idea that institutional informed investor's reaction before earnings announcements will decrease price reaction after earnings announcements. To analyze those reactions, this study uses technical analysis signals around earnings announcements.

Profitability of Technical Analysis

Technical analysis is the oldest investment strategy. It has been around since 1600s (Wong, Manzur, and Chew, 2003). Eitman and Smith (1974) also showed that this analysis is also the dominant teaching materials in investment before 1930. Technical analysis is not popular in academic communities but it is popular among stock market professionals. Flanegin and Rudd (2005) article gives evidence that technical analysis is more attractive to practitioners than academics. In trading strategy studies, Fama and Blume (1966) test filter rule strategy as one of the technical analysis strategies. The result showed that most of the long strategies produce profit. However, buy and hold strategy produce greater returns than the rule-based filter after transaction costs. Twenty years later, the study of Sweeney (1988) reexamines the Fama and Blume (1966) method with adjustments. He removes short strategy and use filter rule 0.005 as a main strategy. Using same companies in Fama and Blume (1966), Sweeney provides different results. The results support the use of technical analysis in the US stock market.

After Sweney (1998), Brock, Lakonishok, and LeBaron (1992) introduce variable-length moving average (VMA) and fixed-length moving average (FMA) to test the ability of technical analysis signal produces profit. The results shows that buy and sell signals produce a profitable return. Both of Sweeney (1988) and Brock, Lakonishok, and LeBaron (1992) are important technical analysis articles because their results encourage next cross-countries researches using US as benchmark. Bessembinder and Chan (1995), apply trading strategy same with Brock, Lakonishok, and LeBaron (1992) in Asian market. The results show that technical analysis is powerful in those markets, except US market. Ahmed, Beck, and Goldreyer (2000) extend the idea of Bessembinder and Chan (1995). They show that performance of technical analysis work well in developing stock market that have high volatility and declining trend. Technical analysis return is better than buy and hold strategy. McKenzie (2007) also gives supporting evidences about technical analysis performance during 1988 financial crisis in Asia and Latin America. Fifield, Power, and Sinclair (2005), and Ahmed, Beck, and Goldreyer (2000), and McKenzie (2007) report that these strategies are not suitable for developed markets such as in UK and US markets, but these can produce profit in developing market such as Indonesian market. Based on those findings, this study uses technical analysis signals to detect stock price reaction around earnings announcements using Indonesian data.

Technical Analysis Signal before Earnings Announcements

Fundamental analysis information focus on the causes of market movements, but technical analysis signals carefully follows the effect of price changes (Murphy, 1999:5). Earnings announcements, as fundamental information, drive investor belief revision. This belief revision will cause price movements, and then technical analysis uses those movements to produce profit. Technical analysis signals will appear both before and after earnings announcements. Reactions before earnings announcements are caused by information leakage speculative actions in response to new information. Christophe, Ferri and Angel (2004) show reactions before earnings announcements anticipate next earnings numbers. Investors with private information can take short positions in stocks when they expect bad news. If they use short-sellers data, this study use technical analysis signal prior to earnings announcements. Beaver (1968) and Landsman, Maydew, and Thornock (2012) also show price reaction before earnings announcements. If market participants react before earnings announcement dates, then technical analysis signals are able to detect those reactions. This study expects that technical signals before earnings announcements will produce reliable signals. Reliable signals are profitable signals. It means that after buying (selling) signals before earnings announcements, stock price will go up (down). This study believes that technical analysis signals can detect price reactions before earnings announcements.

H1: Technical analysis signals before earnings announcements generate profitable returns.

Technical Analysis Signal After Earnings Announcements

The probabilities of success of technical analysis signals are 50-70% (Balsara, Chen and Zheng, 2007) or 40-60% (Brock, Lakonishok, and LeBaron, 1992). In other words, every two technical analysis signals, there is one successful (profitable) signal and one failed (not profitable) signal. At successful signals, price movement shape clear direction and pattern that is easily detected by technical analysis. However, at failed signals, the price movements do not form a clear trend or pattern that makes the signals are difficult to detect. In average, price reactions after earnings announcements will not create clear patterns because those are not supported by fundamental information. If informed (retail) investors react before (on) earnings announcements then reaction after earnings announcements will be weaker. Price movement after earnings announcements will not be supported by information. In this situation, price movement will difficult to be detected by technical analysis signal. These unclear stock patterns will produce unprofitable signals. This idea will confirm Balsara, Chen, dan Zheng (2007) and Brock, Lakonishok, dan LeBaron (1992) results, that there are good and bad signals. Signal after earnings announcements is bad signal. Based on that earnings announcement event is expected to explain technical analysis return.

H2: Technical analysis signals after earnings announcements do not generate profitable returns.

DATA AND METHODOLOGY

This study uses data from Indonesian Stock Exchange (IDX). Many researches show that developing markets present low-quality financial information (Fan and Wong, 2002; Landsman, Maydew, and Thornock, 2012), but in those countries technical analysis can produce profit (McKenzie, 2007). It means that technical analysis signal is reliable competing information. We use purposive sampling with the following criteria (1) companies listed on the IDX, (2) earnings announcement dates data are available in IDX website (3) around the date of announcements, companies with zero trading volume are eliminated, because daily stock price information becomes unreliable from technical analysis perspective (Murphy, 1999). We use the idea that reliable signal is profitable signal. To examine the hypothesis, this study use procedures explained below. First, determining earnings announcement dates based on the official receipt letter of IDX. In this date, market administrator publishes the announcements. Second, creating charts using technical analysis signal. The signal is simple moving average (SMA). This signal is used because

of two reasons. The first reason is the popularity of SMA in technical analysis communities. Many providers of technical analysis data such as Yahoo Finance, Bloomberg, Meta Stock and Chart Nexus as well as online trading offered by many of securities in Indonesia use this indicator as a default signal. The second reason is that this signal is already tested in previous studies as shown in Table 1. The value of SMA(n) for each stock is determined by equation 1.

$$SMA_n = \left[\frac{P_n + P_{n-1} + \dots + P_1}{n} \right] \tag{1}$$

P_n is the stock price n days ago, P_1 is the stock price 1 day ago, and n is the period in indicator (in days). The formula above uses 5 and 10 to form a signal because those are default period for most technical analysis software. Milionis and Papanagiotou (2008) show that short SMA work better than long SMA. Third, determining a buy or sell signal before and after announcements. This step is composed by a team of research assistants. To improve data reliability, this study uses audit process to determine buy and sell signals data. In this case, researchers randomly check the correctness of the signal in the data. A buy signal is determined by $P_0 > SMA_n$ after $P_{-1} < SMA_{n-1}$. P_0 is determined by the intersection of stock price and SMA lines. P_0 is price on earnings announcement date. P_{-1} is price on one-day before earnings announcement date. SMA_{n-1} is the value of SMA n one-day before earnings announcement date. A sell signal is determined by $P_0 < SMA_n$ after $P_{-1} > SMA_{n-1}$. Forth, determining return based on buying or selling signals starting before earnings announcement dates. The rules are presented in equation 2 and 3.

$$R_{ttabi, b} = \frac{P_{ai} - P_{bi}}{P_{bi}} \tag{2}$$

$$R_{ttabi, s} = - \left[\frac{P_{ai} - P_{bi}}{P_{bi}} \right] \tag{3}$$

P_{ai} is stock price of company i on the day of signal after earnings announcements. P_{bi} is the stock price of company i on the day of signal before earnings announcements. $R_{ttabi}(s)$ is the return of technical analysis of company i based on buy (sell) signal before earnings announcements. Formula in equation (3) is multiply by -1 because profitable selling signal is followed by falling prices. Conversely, profitable buying signal is followed by raising prices. Determining return based on buying or selling signals starting after earnings announcement dates. The rules are as follows.

$$R_{ttaai, b} = \frac{P_{a2i} - P_{ai}}{P_{ai}} \tag{4}$$

$$R_{ttaai, s} = - \left[\frac{P_{a2i} - P_{ai}}{P_{ai}} \right] \tag{5}$$

P_{ai} is stock price of company i on the day of signal after earnings announcements i . P_{a2i} is the stock price of company i on the day of second signal after earnings announcements. $R_{ttaai}(s)$ is the return of technical analysis of company i based on buy (sell) signal before earnings announcements. Fifth, this study uses several measurements of stock return to complement raw return examination. There is return after transaction costs. Transaction fee is a real crucial factor to measure gain from transaction. Most of technical analysis studies in Table 1 use transaction cost to deduct gain. This study uses 0.7% for each pair of buy and sell. In Indonesia, mostly, broker companies determine 0.3% to 0.4% fee for buying and selling fee. The value is a conservative value, because some securities offer a lower fee. Another measurement of stock return are (1) excess return after market adjusted return, and (2) abnormal return after expected return based on market model. This study not only uses closing price to represent stock price but also return based on average daily price. Average daily price is calculated based on four reference daily price; those are opening, highest, lowest and closing price in a day. This calculation is expected to anticipate bias from closing price.

Sixth, testing H1 and H2 using one sample t-test. Using equation (2) and (3), this study determines that $R_{ttabi} = R_{ttabi,b} + R_{ttabi,s}$. The expectation of H1 is $R_{ttabi} > 0$. Using equation (4) and (5), this study determines that $R_{ttaai} = R_{ttaai,b} + R_{ttaai,s}$. The expectation of H2 is $R_{ttaai} \leq 0$.

RESULTS AND DISCUSSION

This section is divided into three parts, namely (1) results and (2) discussion. The first part of the discussion focus on hypothesis testing and examining others findings related to the topic, and the second part discusses the results.

Results

Our sample period covers 2007 through 2012, with earnings announcement dates and stock prices obtained from Indonesian Stock Exchange (IDX). The return of technical analysis signal around earnings announcement dates are presented in Table 1.

Table 1: Summary Statistics of Technical Analysis Return around Earnings Announcements

Return of technical signal around earnings announcements	Before		After	
	SMA5-C	SMA5-A	SMA5-C	SMA5-A
n	414	414	414	414
mean	.0500	.0749	-.0020	-.0236
min	-.60	-.57	-.91	-.97
max	1.15	1.15	.22	.23
% of success	55.79	75.84	65.45	47.01
st. deviation	.14211	.14374	.07556	.07758

This table shows summary statistics of the data.

Table 1 shows that mean of technical analysis return before earnings announcements are bigger than that of after earnings announcements. C is a the return that is calculated based on closing prices. A is the return that is calculated based on 1-day average prices. It is calculated based on four references, those are opening, closing, high, and low price. SMA5 (SMA10) sample shows that signal are determined based on SMA5 (SMA 10). That table also shows the probability of success. It is calculated from the proportion of sample that produces profit. Do technical analysis signals before earnings announcements produce profit? The results are presented in Table 2. Technical signal produce 5% return (or 4.3% after transaction costs). Using one-day average return, the returns increase to 7.49% returns (or 6.79% after transaction costs). Return based on 1-day average price show the ability of different signals. Both of SMA5 and SMA10 strategy produce significant positive return. The results are statistically significant at 1% level.

After controlling market return, the results show that technical signals before earnings announcements better than market return. For example, using SMA10-A (SMA10-C), the signals produce 7,96% (5,98%) above the market. The signals also generate profitable abnormal return. It means that technical analysis signals produce profitable returns. Based on normality test, returns data are not normal. This is a problem in the study Several technical analysis studies, for example, Brock, Lakonishok, and LeBaron (1992), Wong, Manzur and Chew (2003) and McKenzie (2007) show the same problem. Brock, Lakonishok, and LeBaron (1992) try to overcome this normality problem. They calculated return that is the difference of the log Pt minus log Pt-x.. Pt is the price at t and Pt-x is price x days before t. The results are also still shows the normal distribution problems. Wong, Manzur and Chew (2003) using the central limit theorem assumption. McKenzie (2007) article uses repeated sampling. This study uses parametric tests performed with various alternatives to see the consistency of the results. It also equipped with nonparametric

testing. Brown and Warner (1985) also completed the test with nonparametric tests for sensitivity analysis. The results show that nonparametric test also still support H1. This study also use trimming and windzoring techniques to get better distribution, and the conclusions are unchanged.

Table 2: Return Based on Signal Before Earnings Announcements

Samples	Return		t statistic (Sig.)	Number of observations
SMA5 – C	Rttab	0.0500 #	7.161 (***)	414
SMA5 – A		0.0749 #	10.597 (***)	414
SMA10 – C		0.0878 #	6.204 (***)	393
SMA10 – A		0.1145 #	7.680 (***)	393
SMA5 – C	Rttab after transaction costs	0.0430 #	6.158 (***)	414
SMA5 – A		0.0679 #	9.606 (***)	414
SMA10 – C		0.0808 #	5.709 (***)	393
SMA10 – A		0.1075 #	7.211 (***)	393
SMA5 – C	Excess Rttab (adjusted market return)	0.0311 #	4.920 (***)	414
SMA5 – A		0.0501 #	7.854 (***)	414
SMA10 – C		0.0598 #	4.740 (***)	393
SMA10 – A		0.0796 #	5.964 (***)	393
SMA5 – C	Abnormal Rttab based on market model	0.0326 #	4.860 (***)	371
SMA5 – A		0.0511 #	7.592 (***)	371
SMA10 – C		0.0623 #	4.465 (***)	351
SMA10 – A		0.082 #	5.531 (***)	351

This table shows the profitability of technical analysis signals before earnings announcements.

Table 2 shows the profitability of technical analysis signal before earnings announcements. The first column describes the indicators used. ***, **, * significant at 1%, 5%, and 10%, respectively. C is a the return that is calculated based on closing prices. A is the return that is calculated based on 1-day average prices. It is calculated based on four references, those are opening, closing, high, and low price. SMA5 sample (SMA10) shows the return signal in the sample are determined based on SMA5 (SMA 10). Rttab is the return of technical analysis based on the signal before earnings announcements. # indicates that H1 is supported using nonparametric test (Wilcoxon signed rank test). Do the signals work every year? Table 3 indicates that the results show consistent return in all years and all strategies. H1 is still supported every year in each strategy. In essence, technical analysis signals before announcements generate profitable returns for investors. Those are reliable signals. After controlling market return (and systematic risk), results in Table 3 also shows that signals before announcements are still generate profit.

The results are similar to the conclusion in Table 2. This finding confirms the study of Sulistiawan (2009). Table 3 shows that technical analysis signals before earnings announcements work every year. ***, **, * Significant at 1%, 5%, and 10%, respectively. C is a the return that is calculated based on closing prices. A is the return that is calculated based on 1-day average prices. It is calculated based on four references, those are opening, closing, high, and low price. SMA5 sample (SMA10) shows the return are determined based on SMA5 (SMA 10). Rttab is the return of technical analysis based on the signal before earnings announcements. n is number of observations. Conversely, technical analysis signals after earnings announcements do not produce profit. The results of H2 are presented in Table 4. From 16 sub samples, only 4 samples produce significant positive return, but return is still lower compares to signals before earnings announcements. For example, SMA10-C before earnings announcements produce 6,23% abnormal return, but SMA10-C after earnings announcements only produce 0,8683%. Table 4 shows that H2 is also supported. ***, **, * Significant at 1%, 5%, and 10%, respectively. C is a the return that is calculated based on closing prices and A is the return that is calculated based on 1-day average prices. It is calculated based on four references (opening, closing, high, and low price in A day). SMA5 sample (SMA10) shows the return are determined based on SMA5 (SMA 10). Rttaa is the return of technical analysis based on the signal after earnings announcements, and n is number of observations.

Table 3: The Results of Hypothesis 1 by Year

Years (Strategy)	Rttab (n)	t statistics (Sig.)	Rttab after transaction costs (n)	t statistics (Sig.)	Rttab after adjusted market return (n)	t statistics (Sig.)	Abnormal Rttab based on market model (n)	t statistics (Sig.)
2007 (SMA5-C)	0.0461 (108)	2.838 (***)	0.0391 (108)	2.407 (***)	0.0366 (108)	2.363 (***)	0.0425 (99)	2.519 (***)
2008 (SMA5-C)	0.0536 (114)	4.383 (***)	0.0466 (114)	3.811 (***)	0.0287 (114)	2.460 (***)	0.0337 (98)	2.467 (***)
2009 (SMA5-C)	0.0827 (69)	3.934 (***)	0.0757 (69)	3.601 (***)	0.0461 (69)	2.731 (***)	0.0363 (63)	2.914 (***)
2010 (SMA5-C)	0.0472 (29)	1.752 (**)	0.0402 (29)	1.492 (*)	0.0339 (29)	1.366 (**)	0.0368 (28)	1.339 (*)
2011 (SMA5-C)	0.0270 (94)	3.328 (***)	0.0200 (94)	2.465 (***)	0.0157 (94)	2.280 (***)	0.0152 (83)	1.930 (**)
2007 (SMA5-A)	0.0652 (108)	4.047 (***)	0.0582 (108)	3.613 (**)	0.0530 (108)	3.421 (***)	0.0604 (99)	3.580 (***)
2008 (SMA5-A)	0.0808 (114)	6.427 (***)	0.0738 (114)	5.871 (***)	0.0474 (114)	3.986 (***)	0.0511 (98)	3.709 (***)
2009 (SMA5-A)	0.1186 (69)	5.481 (***)	0.1116 (69)	5.158 (***)	0.0699 (69)	4.012 (***)	0.0594 (63)	4.479 (***)
2010 (SMA5-A)	0.0773 (29)	3.086 (***)	0.0703 (29)	2.807 (***)	0.0613 (29)	2.595 (***)	0.0608 (28)	2.330 (**)
2011 (SMA5-A)	0.0458 (94)	5.721 (***)	0.0388 (94)	4.847 (***)	0.0317 (94)	4.684 (***)	0.0304 (83)	3.976 (***)
2007 (SMA10-C)	0.0648 (95)	4.521 (***)	0.0578 (95)	4.033 (***)	0.0440 (95)	3.514 (***)	0.0515 (85)	3.784 (***)
2008 (SMA10-C)	0.0533 (108)	3.906 (***)	0.0462 (108)	3.392 (***)	0.0374 (108)	3.544 (***)	0.0758 (95)	3.196 (**)
2009 (SMA10-C)	0.2276/0.1156 (67/63)	3.134 / 4.927 (***)	0.2206/0.1086 (67/63)	3.038 / 4.628 (***)	0.1619 (67)	2.431 (***)	0.1562 (62)	2.188 (**)
2010 (SMA10-C)	0.0998 (28)	2.697 (***)	0.0928 (28)	2.508 (***)	0.0642 (29)	2.044 (**)	0.0868 (27)	2.221 (***)
2011 (SMA10-C)	0.0475 (94)	4.934 (***)	0.0404 (94)	4.207 (***)	0.0277 (94)	3.317 (***)	0.0263 (83)	2.887 (***)
2007 (SMA10-A)	0.0890 (95)	5.886 (***)	0.0819 (95)	5.423 (***)	0.0658 (95)	4.915 (***)	0.0746 (85)	5.067 (***)
2008 (SMA10-A)	0.0804 (108)	6.037 (***)	0.0733 (108)	5.512 (***)	0.0539 (108)	5.108 (***)	0.1085 (93)	4.544 (**)
2009 (SMA10-A)	0.2695/0.1512 (67/63)	3.511 / 6.117 (***)	0.2625/0.1442 (67/63)	3.419 / 5.891 (***)	0.1893 (67)	2.684 (***)	0.1843 (62)	2.426 (***)
2010 (SMA10-A)	0.1271 (28)	3.317 (***)	0.1200 (28)	3.135 (***)	0.0859 (29)	2.587 (***)	0.1061 (27)	2.574 (***)
2011 (SMA10-A)	0.0652 (94)	6.522 (***)	0.0581 (94)	4.207 (***)	0.0430 (94)	5.005 (***)	0.0405 (83)	4.218 (***)

This table shows the results of tests of Hypothesis 1.

Table 4: Return Based on Signal after Earnings Announcements

Years (Strategy)	Rttaa (n)	Sig.	Rttaa after fee (n)	Sig.	Rttaa After adjusted market return (n)	Sig.	Abnormal Rttaa based on market model (n)	Sig.
2007-2011 (SMA 5-C)	-0.0020 (414)	n.s	-0.0089 (414)	*** (Negative)	-0.0026 (414)	n.s	-0.0010 (371)	n.s
2007-2011 (SMA 5 - A)	-0.0236 (414)	*** (Negative)	-0.0305 (414)	*** (Negative)	-0.0183 (414)	*** (Negative)	-0.0165 (371)	*** (Negative)
2007-2011 (SMA 10-C)	0.0131 (393)	***	0.0061 (393)	**	0.0084 (393)	***	0.0086 (351)	**
2007-2011 (SMA 10-A)	-0.0115 (393)	*** (Negative)	-0.0185 (393)	*** (Negative)	-0.0087 (393)	*** (Negative)	-0.0085 (351)	*** (Negative)

This table shows returns related to signals after earnings announcements.

Discussion

These results show that technical analysis signals before earnings announcements are reliable information. The signals produce profit for the users. This research confirmed that technical analysis is profitable strategy in developing markets (Bessembinder and Chan, 1995; Ahmed, Beck, and Goldreyer,

2000; Fifield et al., 2005; Milionis and Papanagiotou, 2008) including Indonesian stock market (McKenzie, 2007; Sulistiawan, 2009). This study also confirms that there are bad and good signals (Brock, Lakonishok, and LeBaron, 1992; Balsara, Chen and Zheng, 2007). Signals before (after) earnings announcements are good (bad) signals because price reactions are (not) supported by new information. It means that information content will support the reliability of signals.

Informed investors who trade prior earnings announcements produce price reactions. Retail investors can use technical analysis signals before earnings announcements to detect informed investors reactions. In average, signals before earnings announcements produce profitable return. This strategy will overcome information asymmetry between informed investors and retail investors. SMA5 signals usually appear in 3-4 days before announcements, while SMA10 signals appear in 6-7 trading days before earnings announcements. It means that, in average investors, who speculate on information before earnings announcement signals detected by the SMA5 (SMA 10) at 3-4 (6-7) trading days.

In supplementary analysis, this study complements the examination by testing every year. These results are robust. Based on those results, this study contributes to (1) the relation between technical analysis and earnings announcements literatures (2) trading strategy around earnings announcements. Signals after earnings announcements also give supporting evidences to Balsara, Chen and Zheng, (2007) and Brock, Lakonishok, and LeBaron (1992). In failed signals, the price movements do not form a clear trend or pattern that makes the signals are difficult to detect. These signals will produce unprofitable return.

CONCLUDING COMMENTS

The purpose of this study is to examine whether technical analysis signals able to detect price reactions around earnings announcement dates. Using data from Indonesian stock market, this study determine technical signal based on the intersection of stock price and simple moving average of its price. This article measures profitability of technical signal based on price on the date of buy (sell) signal. The results show that technical analysis signals before earnings announcements are reliable signals, because the signals are able to produce profit. This study gives evidence that reaction before earnings announcements can be detected by technical analysis signal. Conversely, signals after earnings announcements are not reliable signals, because reactions after earnings announcements cannot be exploited.

There are some limitations of this study that could be developed for subsequent researches. First, this research could be developed by intraday data, such as using reaction in units of 15 or 30 or 60 minutes. The rise of on-line trading and the availability of intraday data based on minutes and hours daily will provide stimulation to the needs of this research. The second, this study does not consider trading volume. It can be used in further researches, because reliable signals are usually followed by an increase in trading volume (Murphy, 1999). Beaver (1968) and Landsman, Maydew, and Thornock (2012) also show there are volume reactions around earnings announcements. The third, this study does not use accounting numbers. Future researchers may discuss the relation between accounting numbers and technical analysis signal around earnings announcements.

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BIOGRAPHY

Dedhy Sulistiawan is a Lecturer of Accounting at University of Surabaya. His research interest is market based accounting research. He can be contacted at EB Building 2nd floor, Faculty of Business and Economics, University of Surabaya, Jl Raya Kalirungkut, Surabaya, Jawa Timur, 60295, dedhy@ubaya.ac.id.

Jogiyanto Hartono is a Professor of Accounting at Universitas Gadjah Mada. He received his Ph.D in Accounting from Temple University, USA. His research interest is market based accounting research. He can be contacted at Faculty of Economics & Business, Universitas Gadjah Mada, Jl. Sosio Humaniora No.1, Bulaksumur, Yogyakarta, 55281.

