EARNINGS RESPONSE COEFFICIENT: APPLYING INDIVIDUAL AND PORTFOLIO METHODS

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Abstract

This paper reports new findings from applying portfolio method, which shows a much bigger earnings impact on share prices (ERC) compared to the erstwhile reports of ERC using individual events, averaged over the sample. We estimate cumulative abnormal returns, CAR, across a test window for each quarterly earnings announcement event across one accounting year. The CARs are then regressed against earnings changes of individual firms and portfolios. The findings show a significant positive CAR when earnings increases; and a negative CAR if earnings declines. The ERC is very small in the test period of 2001-14, which is consistent with published results for years before 2000. The ERC size magnifies substantially due to the grouping effect used through portfolio formation. What is significant is that the use of portfolio method, by removing the idiosyncratic errors, show a price response very close to the size of earnings. The last evidence supports strongly the value relevance accounting theory that has not seen much support from averaging the price responses of individual event responses.

Keywords: Earnings Announcements, Share Prices, Earnings Response Coefficient, Malaysia, Earnings Relevance, Portfolio Method

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1. INTRODUCTION

Stock prices are known to respond to disclosures of earnings changes around the time of announcements of earnings reports by firms. This observed regularity of pricing behavior is widely-acclaimed as a justification for the relevance of earnings reports for stock pricing under the Positive Accounting Theory for some time now. There is considerable agreement in the literature that earnings increases lead to share price increases because of good news attracting positive effect and bad news of earnings declines attract stock prices to go down. This behavior is well studied, but not yet for the most recent period 2001-14 in the case of an emerging capital market, Malaysia.

Further, the size of the response to one unit of earnings change is an area of continuing research and debate in many countries. Researchers have shown that financial firms have bigger earning response coefficients, as also are tests measuring this price effect over longer intervals of time. No one has tested the size of the coefficient using the portfolio method first initiated by Fama & MacBeth (1973) for a finance research, not dealing with earnings response. Hence, this paper is motivated to first measure the stock returns to earnings increases/declines in the most recent 14-year period while also exploring another approach using portfolio aggregation method by sorting the earnings impact measure on size of the earnings, and then forming deciles for testing at portfolio levels. Portfolio method is widely justified to remove idiosyncratic errors in individual measures.

Stock price response to the earnings announcements is measured as stock returns adjusted for market-wide price changes using the 1963 Sharpe's Market Model as the return generating

model. Amongst its various definitions, ERC has been defined as: *A measure of relation of stock returns to earnings surprises around the time of corporate earnings announcements*[7] or *The relationship between a change in a company's stock price and any unusual statements in a company's earnings announcement*[8] where the adjusted stock returns is the dependent variable. ERC is the size of stock market price response to the size of the earnings announced. The empirical literature about this return-to-earnings relationship goes way back to the first paper when Ball & Brown (1968) made an attempt to document the relationship between earnings changes and share prices in the United States (US) stock exchange. Considerable empirical research has followed although the sum total of the findings is that the size of the ERC falls short of the full amount of earnings. Hence, this study covers, among other issues, this main issue by extending the test to portfolio levels.

The unexpected earnings estimation by Ball & Brown (1968) is the adjusted returns of a given stock price after subtracting the model-suggested expected return in the Market Model (see Sharpe, 1963). The considerable empirical evidence of a positive relationship between the changes in unexpected earnings announcements and changes in respective stock prices has led to the establishment of the accounting theory on ERC (Watts & Zimmerman, 1990; Olson, 1990; Cheng, 1994) and used later by Ariff & Cheng (2011) and Ariff et al. (2013). Hence, this study is based on this theory, and relevant research models are applied to measure the (i) announcement effect and then (ii) the ERC. It focuses on 308 events of a large number of firms operating continuously in the stock exchange for the past fourteen years. The events are separated into two groups: events where earnings per share (EPS) goes up and events where EPS goes down, in both cases by 5 or more percentage points from the previous announced earnings. Datastream database and access to other information sources such as individual firms and stock exchange websites are accessed to select these firms.

To test the research hypotheses, the widely used event study method (Brown & Warner, 1985) and the regression method (Ball & Brown, 1968) as the widely used quantitative methods were used to investigate the earnings-to-stock-returns relationship. Hence, market-adjusted abnormal return (AR) and the cumulative abnormal return (CAR) are calculated, which are then used as inputs in the regression of the CAR on the size of the earnings per share to yield the ERC estimates for both individual and portfolio of the earnings-changing firms.

The rest of the paper is organized as sections. Section 2 is a review of selected papers on this topic, especially with reference to Malaysia and the Asia pacific economies. Section 3 provides a description of the data, variables and test models. The findings are presented and discussed in section 4 and the paper ends in section 5 with a conclusion.

[7] Definition is according to http://www.nasdaq.com/investing/glossary/e/earnings-response-coefficient.

[8] Definition is according to http://financialdictionary.thefreedictionary.com/Earnings + Response+Coefficients.

2. REVIEW ON EARNINGS IMPACT ON STOCK RETURNS

Research over past four decades resulted in the cumulative knowledge, which is generally found under the topic of ERC as a favorite topic of continued interest in accounting-cum-finance literature. In this section we provide a brief review relevant to this topic.

2.1. Theories

According to Ball & Brown (1968), the argument during the period 1929-1967 was based on the dearth of share evaluation methods, which suggested that earnings amounts cannot be defined substantively as they lack meaning and hence their utility is doubtful. In order to examine this assertion, they made a first attempt to document the *empirical* relationship between earnings reports and share price reaction at disclosure times using data from the US stock exchange in New York. Ball & Brown's original effort has been widely acknowledged[9]. They applied the standard event study method, a well-established agricultural science, to focus on the announcement impact of annual earnings as an important reporting event that should or should not influence stock returns[10].

They categorized earnings changes into good news (earnings observations that are increases, compared to reports a year before as having likely to have a positive effect on stock prices) and bad news (observations of losses having a downward effect on stock prices). The finding was startling in that the direction of changes in the earnings had direct effects, contrary to the then held belief. They reached a definite conclusion that the content of all the information about an individual firm is considerably useful, leading to the idea first backed by this research, that earnings reports are relevant to stock price formation, so *value relevance* crept into the literature. They also found that the market responds to data sources other than annual income reports.

More than two decades later, Ohlson (1990) reviewed and synthesized the finance valuation literature on value of the firm using accounting data. In the meantime and after being ignored for a while, the positive accounting theory was resurrected again by Watts & Zimmerman (1990) following the publication of their two papers in 1978 and 1979 whereby they proposed new ways to improve theory. In a similar context, two decades later, Kothari et al. (2010) put forward the strong argument for a positive theory for the generally-accepted accounting principles (GAAP) as providing a theoretical framework. He said that GAAP addresses the performance measurement and stewardship challenges that form the nature of the two primary financial statements, the income statement and the balance sheet. Two years later and after further studies, the conclusion was earnings reports are value relevant for firm's valuation. They attempted

[9] In 1986, Professor Brown and Professor Ball both received the AAA's (US accounting body) inaugural award for this article's seminal contributions to accounting literature and are credited with having laid the foundation for much of modern accounting literature.

[10] The method itself was borrowed from agricultural science, where event-based interventions have long been studied using the intervention as events to study how plants respond to various treatments. Philip Brown was familiar with this method from his undergraduate days in Australia.

to write about different formats of the relationship between earnings and returns. Cheng (1994) established a theoretical framework, providing an illustration of a step-by-step process that shows how earnings-to-returns relationship can be formally modeled in accounting.

Under a different premise of a theory of accounting conservatism, Roychowdhury & Watts (2007) examined the relationship between two conservatism measures: asymmetric timeliness of earnings and the ratio of market value to book value of equity. A few years later, Ball et al. (2013) conducted their research to connect conservatism theory to the use of accounting information. They stated that financial reporting has been supported with new insights through the conditional conservatism concept. The cross-sectional correlation between the expected component of returns and earnings biases were estimated as the way earnings incorporate the accounting information contained in returns (e.g., timeliness).

To determine the relevance of earnings and book value on stock prices, Dimitropoulos & Asteriou (2010) found that book values are relevant only when they are combined with earnings in the OLS regression model. In a similar context, Ohlson (2014) reveals that expected reported earnings for the next period are the same as stock price regardless of the transitory noise in reported earnings. Moreover, Payne & Thomas (2011) found a little non-consistent evidence of a torpedo effect (i.e., about whether there is an extra market penalty for barely missing an earnings threshold).

The relationship between earnings and returns on disclosure window sizes has been an added research feature from the Chicago School, as started by Easton in the 2000s. Maditinos et al. (2013) found that there is a significant relationship between earnings and returns on the length of the windows of one year and more. Use of cumulative model where earnings were aggregated up to four years yielded higher ERC. Contrarily, they found low ERCs if short measurement windows of up to three quarters are used.

As regards investors' reaction to earnings announcement, Kwag (2014) found that investors become more active during the earnings announcement period, placing a discount on optimistic earnings forecasts. In his evaluation of the literature on return-to-earnings relationship, Zhang (2014) stated that this relationship has been continued primarily through empirical studies resulting in considerable research findings to improve our understanding of the benefit and also the shortcoming of earnings as an explanatory of stock returns.

2.2. Review of Empirical Literature

Cohen et al. (1983) explain how the magnitudes of the different effects relate to a stock market value and also to the length of various intervals. Meanwhile, Hawawini (1984) reviewed 27 European event studies. He noticed that European stock markets are efficient in a semi-strong form, and that equities anticipate major events quite well similar to the equities traded on the New York Stock Exchange (NYSE). Our study includes 308 events using data of firms operating for the past fourteen years continuously in the country.

Collins & Kothari (1989) found that the ERC is a function of risk-free interest rates as well as the growth in earnings, risk and/or earnings persistence. They also found that the ERC differs cross-sectionally with the holding period return intervals.

In addition, Ohlson (2014) shows that the expected reported earnings for the next period are the same as stock price regardless of the transitory noise in reported earnings. Meanwhile, Ariff & Cheng (2011) and Ariff et al. (2013) found that the stock prices of banking firms, to be the same as those of non-banking firms, which are affected significantly by the disclosed earnings information for a number of countries. In a similar context, investors assess earnings persistence in accordance with their reactions to earnings news: Wang (2014). He documents that such assessment of earnings persistence is negatively correlated with the income smoothing level after controlling for time-series earnings persistence. Therefore, he proposes that investors feel the non-reality of high persistence of smoothed earnings, and hence discount such persistence when they react to reported earnings.

3. RESEARCH PROCESS, DATA SOURCES, AND TEST MODELS

3.1. Research Process

The considerable empirical evidence of a positive relationship between the changes in unexpected earnings announcements and changes in respective stock prices has led to the establishment of the accounting theory on ERC. Hence, this study is based on this theory. Moreover, relevant research models are developed as indicated hereunder.

To test the research hypotheses, quantitative method is used to investigate the earnings-to-stock-returns relationship. Research data are classified into two groups: events where EPS goes up and events where EPS goes down by about 5 percentage points or more relative to the prior report. Each group consists of financial and non-financial firms. Datastream database is accessed to select these firms. The study uses 308 events of firms that have been operating continuously in Malaysia for the past fourteen years: these firms represent active industries. Hence, market-adjusted abnormal return (AR) and cumulative abnormal return (CAR) are calculated and ERCs are measured.

According to Ariff et al. (2013), "the expected changes in future earnings are normally specified in ERC studies using cross-sectional models" Hence, we used such models for measuring ERCs as well as calculating AR and CAR. Meanwhile, the event study method is used to examine the impact of unexpected earnings announcement (event) on the stock price to find out whether there is a positive or negative AR in response to good or bad news of such announcement. The immediate reflection of this announcement event in stock prices makes the event study approach one of the important and useful methods in this regard.

Following the practice in majority of earnings-to-returns research on ERC's significance in the regression analysis, the variables in this study include the following: abnormal returns (AR) and cumulative abnormal returns (CAR) as dependent variables, and earnings per share (EPS) announcements as an independent variable.

3.2. Data Sources

In addition to respective websites such as the companies' websites, Datastream, which contains data from Bursa Malaysia stocks, is our main source for data needed for this study. To test the ERC behavior in the long-run, the study covers a period of fourteen years, 2001-14. The sample size consists of 308 events of firms that have been operating continuously during the fourteen years of test period, covering both financial and non-financial firms. Firms that do not have their audited financial statements published to the public are excluded from the sample unless the transparency and accuracy of these firms' financial information is determined through other means.

To form a representative sample, a randomly selected sample is around 15 percent of the companies listed in Datastream. Data on adjusted stock returns, i.e., adjusted for capitalization changes, is used. Market Index Return observations came from relevant composite index. Company's interim to interim reports are desirable as known in the literature. Hence, we used company's quarterly reports considering the whole year's movement (i.e., 220 working days before the announcement date and 30 working days after) as our sources for unexpected changes in earnings. Using audited reports is known to provide no useful impact on share prices since such reports contain no or little surprises. So, only interim reports were used.

3.3. Test Models

Test models are run separately for individual observations where individual observations refer to i = 308 EPS reports, and for 10 portfolios sorted by size of the EPS changes from low to high (that is 10 deciles). Individual aggregation has been the norm in this line of research. However, such tests in the literature would severely limit the size of the ERC because of the non-diversifying nature of such tests. Portfolio tests help to reduce idiosyncratic noises, thus capture the permanent effect of the EPS change on a portfolio of firms.

Abnormal return (AR) is the residual value after regressing the log change of stock prices against the log change of market index. That is, AR is the difference between the actual observed return and the normal expected return without conditioning on the event taking place, as shown in the following model:

$$AR_{it} = R_{it} - E(R_{it}|X_t) \quad (1)$$

where i indicates the individual firm (replace the i with p for portfolio tests) and t refers to the relevant time. R is the actual observed return. E(Rit Xt) refers to the expected normal returns for firm i or portfolio p as relevant at time period t, and Xt is the conditional information for the normal return model. If the expected change is that of the market, then this provides the market-adjusted abnormal returns, which is the most commonly used measure.

To estimate the normal expected returns, there are two common models: the market-adjusted return model described above and the risk-adjusted market model (ignoring the mean adjusted return model, which is seldom used). In this study, the former model is used. The procedure regarding the market-adjusted return model assumes that there is a direct relationship between the expected return and market portfolio. Therefore, this procedure removes the market return from stock returns, and treats the difference as due to surprises. Meanwhile, the announcement effect is assumed to cause share price reaction during the announcement period. Hence, all general market reactions caused by the country's overall economy should be removed from the AR calculation, which becomes:

$$AR_{it} = R_{it} - R_{mt} \quad (2)$$

Also where i indicates the individual firm or p for portfolio and t refers to the relevant time. R is the actual observed return, AR is the abnormal return, and Rmt is the market return that would be removed from the stock return. This market adjusted return model can be shown as a restricted market model with αi and βi as follows (firm-specific risk is not included):

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (3)$$

In this study, the aggregation of the average AR (or AAR) through time is also examined, using the following widely-used primary model, to obtain the cumulative abnormal return (CAR) as a dependent variable:

$$CAR_{it} = \Sigma AAR_{it} \quad (4)$$

where Σ AAR refers to the summation of the AAR for firm i or portfolio p at time period t. Using the CAR variables for cumulative average abnormal returns, charts are generated showing the positive and negative of earnings announcements. Each CAR is examined for its relationship with the unexpected earnings announcement.

According to Ball & Brown (1968) repeated in Ariff, et al. (2013), unexpected earnings (UE) are calculated using the naive expectation model, which presumes that the best unbiased estimate of the next period's expectation is the current period's earnings. This is also in agreement with a research design to study concurrent impact of price change at a point in time. UE is calculated using this naive model as follows:

$$UE_{it} = E_{it} - E_{i(t-1)} \quad (5)$$

In this regard, the accounting earnings per share (EPS) is calculated by reducing preferred dividends from net income and dividing the result by the number of common shares issued and outstanding. It is defined as:

$$EPS = (NI - PrefDiv) / CSO \quad (6)$$

where NI refers to net income while PrefDiv refers to preferred dividends, and CSO indicates the number of common shares issued and outstanding in the market. Although the announcements of the interim and annual accounting earnings leads to future earnings expectations, it is emphasized that interim to interim reports contain more relevant and useful information, and that annual audited reports are not relevant in this regard. Hence, we used the reports of the first three quarters of each year.

As stated above, previous research has suggested that there are positive share price reactions to the good news of earnings increases and negative share price reactions to the bad news of earnings decreases (Ariff et al., 2013; Ariff & Cheng,

2011; Ball & Brown, 1968). We agree with this finding, and therefore our first research hypothesis is:

H1: *There are positive stock price reactions to earnings increase announcements and negative price reactions to earnings decrease announcements.*

We also agree with the result of the study conducted by Easton et al. (2009) that there is a positive correlation between earnings information and return predictability at both individual stock and portfolio levels. Consequently, our second and third research hypotheses are:

H2: *There is a significant relationship between earnings announcement effect and return predictability at individual stock level.*

H3: *There is a significant relationship between earnings announcement effect and return predictability at portfolio level.*

4. FINDINGS

The descriptive statistics are summarized in the following tables and graph. A review of the statistics in the tables suggests that the decision to separate the sample into two groups: events where EPS goes up and events where EPS goes down, is well justified.

Table 1 is a summary of descriptive statistics of 308 events of representative firms that have been operating continuously in Malaysia during the period 2001-14.

It shows the descriptive statistics on CAR and EPS change variables. The CAR variable has a mean of 0.045 and a standard deviation of 0.235. The skewness is 2.4814 with a kurtosis coefficient of 9.65. Therefore, the distribution is close to a bell-shaped normal distribution. Meanwhile, the EPS change variable has a mean of 0.3684 and a standard deviation of 0.9732. The skewness is 2.1258. The kurtosis coefficient is 8.11.

Table 1. Descriptive statistics of CAR and EPS Change variables

(Y) CAR		*(X) EPS Change*	
Mean	0.044686474	Mean	0.368357279
Standard Error	0.013513587	Standard Error	0.055907468
Median	0.005177463	Median	0.147058824
Mode	#N/A	Mode	1
Standard Deviation	0.235229597	Standard Deviation	0.973175429
Sample Variance	0.055332963	Sample Variance	0.947070416
Kurtosis	9.652956241	Kurtosis	8.111992546
Skewness	2.481437519	Skewness	2.125789152
Range	2.194412514	Range	7
Minimum	-0.73018595	Minimum	-1
Maximum	1.464226565	Maximum	6
Sum	13.54000155	Sum	111.6122556
Count	303	Count	303
Confidence Level(95.0%)	0.026592715	Confidence Level (95.0%)	0.110017519

4.1. Findings on Announcement Effect

The first set of test results on the effect of earnings announcements on CAR of firms' shares in Malaysia are presented in this section: see Table 2. These findings relate to the Hypothesis H1. Table 2 reveals the statistics obtained for the above Models 1-5 showing results as regards the data for 308 events of firms that have been operating continuously in the country during the whole fourteen years period (2001-14). The statistics in Table 2 shows the share price changes and the change in EPS data of all the aforementioned events.

There were 204 earnings increases and 104 earnings decreases. The numbers in first column are the days related to the announcement date (i.e., 0 Day) and the subsequent columns list the market-adjusted AARs, t-values, and CARs. The CAR for the long window (-40,+1) is found to be 7.22 percent for earnings increases and -3.73 for earnings decreases. As regards the earnings increases category, the market reaction apparently started as far back as 40 days before announcement date. The AARs at one day before announcement, on announcement day, and one day after are 0.028, 0.299, and 0.177 percent respectively with t-values of 0.194, 1.582, and 1.629.

It appears that there are positive share price reactions to the good news of earnings increases and negative share price reactions to the bad news of earnings decreases, with various rates of positive or negative daily average returns. The largest daily average excess return occurred on the 19th day prior to announcement; AAR = 0.476 percent with a t-value of 2.701, significantly different from zero at 0.01 level. In addition to this largest daily average excess return, there are a number of other values that are significantly different from zero at both 0.05 and 0.01 levels.

On the other hand, the earnings decreases category shows that the AARs at one day before announcement, on announcement date, and one day after are -0.067, -0.264, and -0.014 percent with corresponding t-values of -0.351, -1.089, and -0.115. All three price effects are not significantly different from zero. Except for the significant negative abnormal returns that occurred on the days -39, -34, and -5, there were basically no other significant negative abnormal returns. The market appears to have anticipated the earnings changes via other information that may have been spread through quarter, semi-annual, annual, or firm-performance reports.

Similar to the earnings increase category, the daily average returns for the earnings decrease category also commenced on the 40th day prior to announcement, and both categories level off within a short period after announcement date. Although both categories have been affected by the earnings announcements, the study shows that they are not affected by the same rate since the highest rate for CAR is 9.25 percent for earnings increase category while it is -4.70 percent for earnings decrease category. This implies that investors react positively without hesitation and more strongly to the earnings increase announcements, while they react slowly and with caution as regards the earnings decrease announcements.

Table 2. Market-adjusted Average Abnormal Returns on Earnings Announcement of Malaysian Firms during 2001-14: n=308

Days	*AAR*	*t-value*	*CAR*	*Days*	*AAR*	*t-value*	*CAR*
-40	0.246898	0.995	0.246898	-40	0.074647	0.461	0.074647
-39	0.242316	0.974	0.489214	-39	-0.307279	-2.415**	-0.232632
-38	0.397398	1.609	0.886612	-38	-0.001990	-0.016	-0.234622
-37	0.257728	1.090	1.144340	-37	-0.042441	-0.346	-0.277063
-36	0.307486	1.406	1.451825	-36	-0.021200	-0.186	-0.298263
-35	0.033022	0.147	1.484848	-35	-0.033570	-0.220	-0.331833
-34	0.066957	0.318	1.551805	-34	-0.381387	-1.909*	-0.713220
-33	0.022465	0.104	1.574270	-33	-0.183552	-1.147	-0.896772
-32	0.032357	0.145	1.606627	-32	-0.023255	-0.122	-0.920028
-31	0.332585	1.604	1.939212	-31	-0.487052	-1.071	-1.407080
-30	0.033674	0.174	1.972886	-30	-0.026635	-0.199	-1.433715
-29	0.428201	1.594	2.401087	-29	-0.034510	-0.257	-1.468225
-28	0.232022	0.981	2.633109	-28	-0.032966	-0.201	-1.501191
-27	0.362697	1.739*	2.995806	-27	-0.024445	-0.170	-1.525636
-26	0.253974	1.156	3.249780	-26	-0.066107	-0.289	-1.591743
-25	0.021352	0.089	3.271132	-25	-0.027292	-0.214	-1.619035
-24	0.010354	0.055	3.281486	-24	-0.176340	-0.834	-1.795375
-23	0.112457	0.603	3.393943	-23	-0.222525	-1.187	-2.017900
-22	0.003344	0.019	3.397288	-22	-0.038588	-0.242	-2.056487
-21	0.033816	0.208	3.431104	-21	-0.080400	-0.469	-2.136888
-20	0.262069	1.424	3.693172	-20	-0.076553	-0.392	-2.213440
-19	0.475928	2.701**	4.169100	-19	-0.007962	-0.045	-2.221402
-18	0.033847	0.216	4.202947	-18	-0.266290	-1.612	-2.487692
-17	0.100602	0.619	4.303549	-17	-0.029864	-0.222	-2.517556
-16	0.022131	0.170	4.325680	-16	0.006452	0.052	-2.511104
-15	0.070735	0.465	4.396415	-15	-0.022095	-0.145	-2.533198
-14	0.178893	0.953	4.575308	-14	-0.050036	-0.319	-2.583234
-13	0.425774	1.673*	5.001081	-13	-0.001460	-0.012	-2.584694
-12	0.413804	2.576**	5.414885	-12	-0.010406	-0.064	-2.595100
-11	0.040760	0.256	5.455645	-11	-0.020710	-0.135	-2.615810
-10	0.123663	0.798	5.579308	-10	-0.053571	-0.280	-2.669380
-9	0.061517	0.450	5.640825	-9	-0.039177	-0.192	-2.708558
-8	0.053009	0.383	5.693835	-8	-0.068627	-0.391	-2.777184
-7	0.097389	0.691	5.791224	-7	-0.020489	-0.124	-2.797673
-6	0.372173	2.444**	6.163397	-6	-0.018780	-0.115	-2.816453
-5	0.063940	0.450	6.227337	-5	-0.513691	-1.908*	-3.330144
-4	0.188966	1.231	6.416303	-4	-0.016223	-0.071	-3.346367
-3	0.278768	0.978	6.695070	-3	-0.038942	-0.316	-3.385309
-2	0.024271	0.125	6.719342	-2	0.002771	0.019	-3.382538
-1	0.028259	0.194	6.747601	-1	-0.066507	-0.351	-3.449045
0-date	0.298586	1.582	7.046187	0-date	-0.264321	-1.089	-3.713366
+1	0.177239	1.629	7.223425	+1	-0.013608	-0.115	-3.726974
2	0.305414	1.706*	7.528839	2	-0.024897	-0.162	-3.751871
3	0.003468	0.028	7.532307	3	-0.102775	-0.551	-3.854646
4	0.054904	0.412	7.587211	4	-0.035071	-0.240	-3.889717
5	0.036171	0.280	7.623383	5	-0.027305	-0.151	-3.917021
6	0.016259	0.085	7.639642	6	-0.184293	-1.040	-4.101315
7	0.334650	2.237*	7.974292	7	-0.028269	-0.178	-4.129584
8	0.340715	1.893*	8.315006	8	-0.024359	-0.200	-4.153943
9	0.058832	0.459	8.373838	9	-0.011986	-0.077	-4.165929
10	0.166481	1.127	8.540319	10	-0.115674	-0.601	-4.281603
11	0.006570	0.054	8.546889	11	-0.141585	-0.759	-4.423189
12	0.031895	0.220	8.578784	12	-0.030976	-0.253	-4.454165
13	0.365565	2.011*	8.944349	13	-0.040747	-0.282	-4.494912
14	0.155449	0.899	9.099798	14	-0.178060	-0.973	-4.672972
15	0.146303	0.808	9.246101	15	-0.030744	-0.224	-4.703716

Figure 1 reveals the plots of CAR value for earnings increases and earnings decreases for the whole sample. It appears that CAR increases for earnings increase announcements and decreases for earnings decrease announcements. Therefore, it is noticeable that there is an ordinal relationship in the directions of share price changes and earnings changes that seem to be consistent with pervious documented findings in this regard. The plots indicate the gradual revaluation of the shares in anticipation of forthcoming announcements. It is suggested that there is a gradual leakage of information. Thus, the plots show that, after the announcements, the share prices stabilized at different levels.

4.2. Findings on Earnings Response Coefficient

4.2.1. Individual Event Test Results

The second set of test results is on the relationship between CAR of firm's shares and the unexpected earnings changes in Malaysia are also presented in this section: see Table 3. These findings relate to the Hypothesis H2.

Figure 1. Plot of Market-adjusted CAR around Earnings Announcements over the period 2001-14: n=308. (Earnings Increase versus Earnings Decrease)

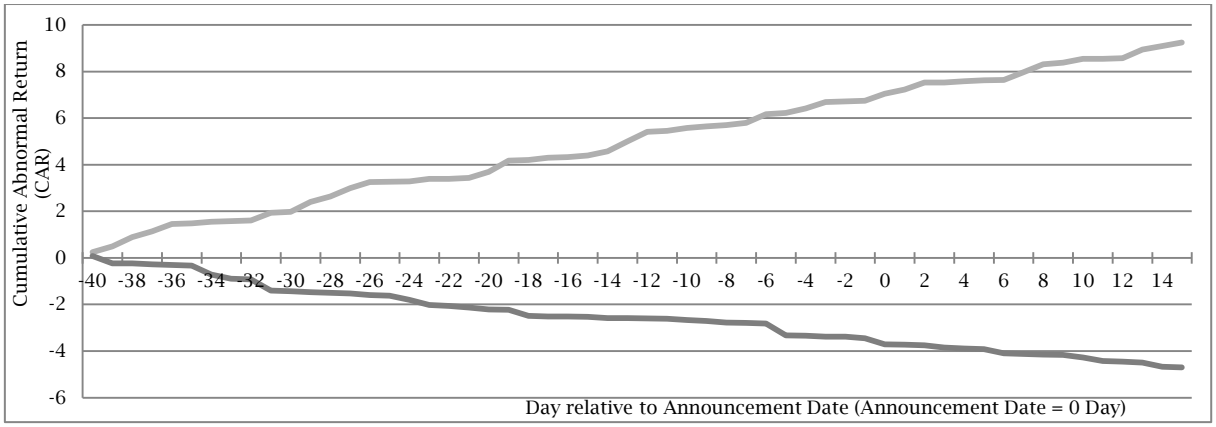


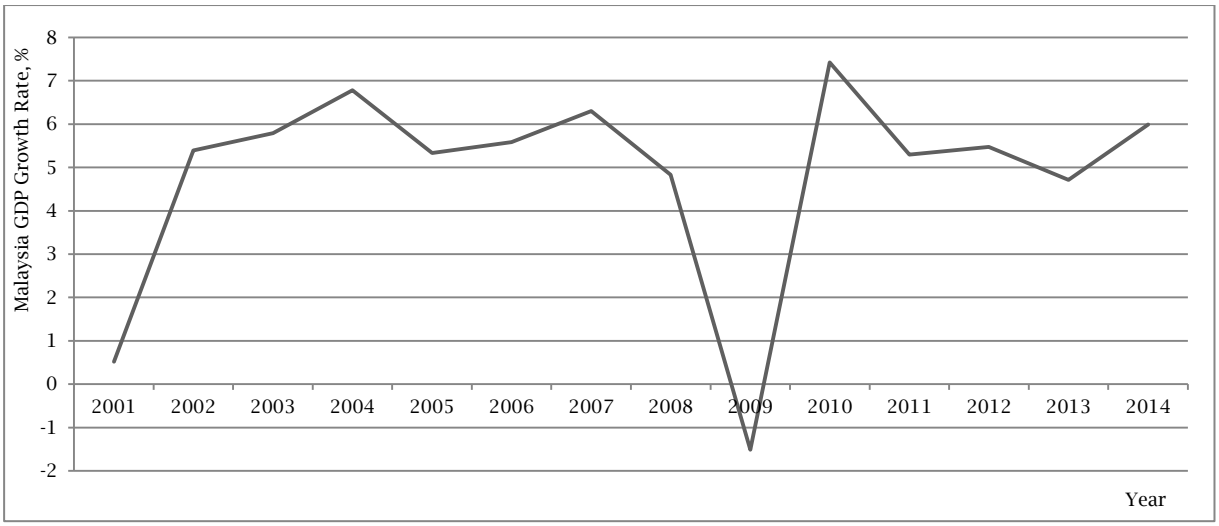
Table 3. Regression results of return-to-earnings relation using individual stock of Malaysian firms (2001-14)

	Regression Statistics				
Multiple R	0.41546411				
R Square	0.17261043				
Adjusted R Square	0.16986163				
Standard Error	0.21432223				
Observations	303				
	ANOVA				
	df	***SS***	***MS***	***F***	***Significance F***
Regression	1	2.884416083	2.88441608	62.79477225	0.0000000000000449
Residual	301	13.82613886	0.04593402		
Total	302	16.71055495			

	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	0.00769483	0.013167716	0.58437107	0.559408405	-0.018217606	0.03361	-0.01822	0.03361
X Variable 1	0.10042327	0.012672801	7.92431525	0.0000000000000449	0.075484761	0.12536	0.07548	0.12536

The magnitude of the coefficient related to Malaysia indicates that for every 1 unit increase/decrease in unexpected earnings, there is around ten percent increase/decrease in the abnormal returns. This directional response rate for individual stock is considered reasonable for such an emerging market since the period covered by this present study (2001-2014) is one where, following the Global Financial Crisis in 2008, the economy and therefore the firms are not doing as well as they did in earlier periods (GDP growth rate in the earlier period was high at about 6.91 percent over 1961-2000). The country's GDP growth rate averaged 4.85 percent over 2001 until 2014, reaching a record low of -1.51 percent during 2009 as reported by The World Bank: Figure 2.

Figure 2. Malaysia GDP Growth Rate (2001 – 2014)



Source: The World Bank

Meanwhile, the regression statistics of these individual events reveals R-squared value of 0.173, which is an indication of the high explanatory power of the test.

4.2.2. Portfolio Level Test Results

Table 4 is a summary of results using portfolio tests after sorting the individual events on size of earnings and then forming ten deciles. As mentioned, the ten portfolios are formed from a large sample of events, with test done on the measured ERC of the portfolios. The data were sorted from low (including negative) EPS to large EPS changes. The ERC value of the ten portfolios is 0.93. Such an ERC size is considered very large in relation to the prior studies using aggregation of individual event effects and then averaging the individual ERC. As for the direction of the ERC, these findings are consistent with relevant prior studies, such as Ariff et al. (2013) and Ariff & Cheng (2011) for 8 different countries, and they did not use portfolio aggregation.

The magnitude of EPS changes and the CAR are averaged for each portfolio. For example, three portfolios with EPS declines had negative portfolio CARs. Seven portfolios which had EPS increases had positive CARs, which were higher for higher sized EPS changes. The regression using the 10 portfolios as observations produced the following results as shown in Table 4. These findings relate to our Hypothesis H3.

Table 4. Regression results of return-to-earnings relation using portfolios of Malaysian firms (2001-14)

	Regression Statistics							
Multiple R	0.8661307							
R Square	0.7501825							
Adjusted R Square	0.7189553							
Standard Error	0.5037191							
Observations	10							
	ANOVA							
	df	*SS*		*MS*	*F*		*Significance F*	
Regression	1	6.095521		6.095521	24.023373		0.0011917	
Residual	8	2.0298635		0.2537329				
Total	9	8.1253845						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.1119511	0.1724323	0.649247	0.5343704	-0.285678	0.5095807	-0.285678	0.5095807
X Variable 1	0.9258744	0.1889014	4.9013644	0.0011917	0.4902671	1.3614817	0.4902671	1.3614817

At the portfolio level, the R-squared value for the ERC test showed considerable improvement to an average of 75 percent for the ten portfolios: see Table 4. This would then suggest that in this market covered in this study, the unexpected earnings surprise effect explains greater degree of variation than in any other studies. Second, the size of the ERC in our test has increased substantially, and is statistically significant. The ERC is 0.925 with a t-value of 4.901, significant at or below 0.01 acceptance level.

This new finding would have us suggest that the proper process to be applied in ERC studies is the portfolio aggregation method, which has helped to identify the underlying average effect of EPS announcement to be at the rate of $0.925 for every one unit change in EPS announced in this test market. This result is, in our view, very striking, and is clearly in support of the theory of *value relevance* as have been advanced in the accounting theories.

5. CONCLUSION

This study is about the earnings-to-return relation of company shares in an established emerging market with well-developed accounting institutions as well as capital market laws/institutions. The stock market is known to be Fama efficient: see Ariff et al., (1994). We study the stock price responses to the earnings change disclosures, measuring the earnings response coefficient for the period 2001-14, a period that has not been researched. The study covers both financial and non-financial firms. The main motivation of this paper is to report results from two different research methods.

The results suggest that the earnings change disclosures do positively affect the share prices if EPS increases, and negatively if the EPS decreases, as reported in prior studies in several markets. Second, the tests using all events at individual firm levels – as done for this yet researched period - show two things. First, the direction of the price changes are as per the theory and empirical evidence, and that the size of the ERC is rather small during the recent period coinciding with the post 2008 low economic growth period in this country. The fact that the ERC is hugely smaller than the value-relevance-theory-suggested dollar for dollar change has been a subject of debate for some time now.

When the portfolio method of aggregating the events into portfolios sorted by EPS size, is applied, the results from 10 portfolios showed a very large size for the ERC, 0.93. Because the portfolio method removes idiosyncratic errors in individual observations, the results from portfolios reveal that the ERC is 0.93, meaning the price change is $0.93 for every dollar of EPS change announced at the portfolio level. This result is as per the general direction of the theory. At the negative EPS level, the ERC was small and statistically significant: vice versa for positive EPS. These new finding adds significantly to have a better understanding of how EPS is linked to stock prices at the portfolio level.

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