STOCK PRICE RESPONSE TO EARNINGS ANNOUNCEMENTS: DEVELOPED VERSUS EMERGING ECONOMIES

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Abstract

This study aims to evaluate the usefulness and relevance of accounting earnings disclosures, as the key determinant of stock price changes. The main objective is to examine whether earnings response coefficient (ERC) behaviour could explain more fully the stock price changes, as to the reason why the stock price change is not equal to the number of announced earnings. The study is done with data sets from five countries of the Organization for Economic Co-operation and Development (OECD) group and Malaysia. The analysis is then grouped into developed markets: Japan, UK, Sweden, and Switzerland; and emerging markets: Malaysia and Mexico, for the period 2001-2014. Two measures of abnormal returns are regressed against the size of the announced earnings. The first regression uses measures from individual events. The second regression uses a new measure; that is, from portfolios made out of all observations sorted by size of earnings into ten portfolios for each country and combination of countries. The portfolio method used was aimed at controlling possible idiosyncratic-errors-in-variables problem using individual event measures. The results using individual-event measures resulted in reasonable ERC sizes with high R^2 explanatory power, a little higher than those reported in prior studies on other countries. Importantly, portfolio-based ERC is very close to the magnitude of the earnings in some tests, which supports the famous value relevance theory in accounting. This finding is new to this literature.

Keywords: Earnings Announcements, Share Prices, Earnings Response Coefficient, Emerging Economies, Developed Economies, Earnings Relevance, Portfolio Method.

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1. INTRODUCTION

1.1. Earnings response coefficient

Share prices are known to respond to disclosures of earnings changes around the time of announcements of earnings reported by listed firms: Not much is known on earnings response coefficient (ERC) in the targeted six stock exchange markets of Japan, UK, Sweden, Switzerland, Malaysia, and Mexico. Most studies observed regularity in pricing behaviour – stock prices increase when announced earnings are up and prices decrease when announced earnings are down – is widely acclaimed as a justification for the relevance of earnings reports for stock pricing under the Positive Accounting Theory for some time now. Meanwhile, there is a substantial 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. Although this behaviour has been studied, it has not been subjected to research for the most recent period of these six large, developed and emerging, markets. Furthermore, the writer employs an econometric innovation in test method applied in this study.

In addition, 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 longer intervals of time have bigger earning response coefficients, as also reported in tests measuring this price effect over financial firms. No one has tested the size of the coefficient using the portfolio method, first applied by Fama & MacBeth (1973), for earnings research. None has been done so far in regard to dealing with the size of stock price change for one unit of earnings change, ERC. Therefore, this study is motivated to first measure the stock returns to earnings increases/decreases in firms listed in the above stock exchange markets over the recent 14-years 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. This portfolio method is widely justified since it reduces idiosyncratic-errors-in-variables problem inherent in accounting studies using individual firm-based measures.

Stock price response to the accounting 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 the relation of stock returns to earnings surprises around the time of corporate earnings announcements*[1] or *The relationship between a change in a company's stock price and any unusual statements in a company's earnings announcement where the adjusted stock returns are the dependent variable*[2]. ERC is the size of stock market price response to the size of the earnings changes announced. The empirical literature about this return-to-earnings relationship commenced with the first study when Ball & Brown (1968) made an attempt to document the relationship between earnings changes at the individual firm level and share prices for firms listed on the New York Stock Exchange. Considerable empirical studies have followed their effort since then. However, the sum total of the findings is that the size of the ERC falls short of the full amount of earnings. Therefore, this study covers, among other issues, this main issue on why the ERC is not equal to the earnings amount.

To test the research hypotheses, the widely used event study method is applied together with the regression method as also the widely used quantitative method. They are used to investigate the earnings-to-stock-returns relationship. Therefore, market-adjusted abnormal return (AR) and cumulative abnormal return (CAR) are calculated, which are then used as inputs in the regression of stock returns on the size of the earnings per share to measure the ERC at both individual and portfolio levels.

The rest of the paper is organized as follows: The next sub-section is a brief explanation of how this study contributes to the literature and to the stock price formations in the respective countries. Section 2 is a summary of relevant literature while section 3 provides a description of the data, used variables, and test models. Meanwhile, descriptive statistics are revealed in section 4. The findings are then presented and discussed in sections 5 and 6, and the paper ends with a conclusion in section 7.

1.2. Contribution of the study

This study contributes to the literature in that the results are new and conducted over a recent 14-years period for six of the largest developed and emerging stock markets, using a new method. The earnings disclosure events are identified carefully with reference to the announcement dates and tested to ensure that these events do not overlap with other announcements. Thus, the results are unlikely to have contemporaneous contingent event effects. The author also uses data over two business cycles so as to remove cyclical impact on the findings.

Apart from verifying how the investors in these stock markets evaluate the earnings value, the author also refines the test methods by applying a portfolio method to reduce errors-in-variables problem so that the earnings response coefficient estimated for each market is accurate and free of that error. Overall, the results contribute to the earnings literature by extending to the respective developed and emerging economies using a new, portfolio, method over a recent 14-years period.

The author expects the tests to reveal, with the extensive sample (1,828 events), a sufficiently good model fitness by the F-ratio. The higher ERCs and larger R-squared values resulted in this study, particularly in the portfolio tests, add to the accounting literature on the behaviour of the tested markets, enhancing the investors' confidence in the accounting information, particularly in the sample countries. The results also add strong evidence on the usefulness of the earnings impact on stock prices that would be more supportive of the predicted value relevance theory, especially since the resulted portfolio-based ERCs are close to the size of the earnings.

Previous studies have helped to identify the distinguishing characteristics of the two types of economies studied in this research. These characteristics of developed and emerging economies include, but not limited to, the following: information availability, economic and institutional differences, size-related attributes, liquidity differences, and the nature of the market's integration within the financial system of each country. This present study also attempts to identify the multi-country differences among the sample countries, as well as comparing developed markets to emerging markets.

In order to generalize the findings to the countries within the OECD group as well as to Malaysia, the study focuses on the following six countries: Japan, the United Kingdom, Switzerland, Sweden, and Mexico as OECD countries in addition to Malaysia. Countries from both smaller and larger economies are included. Hence, these are classified into two categories: A: Developed markets that include Japan, United Kingdom, Switzerland, and Sweden; and B: Emerging markets that include Malaysia and Mexico.

Each country is studied separately, then its results are compared with the results of the other countries. A final comparison is then made between developed economies and emerging economies. The selected OECD countries are taken from the relevant three continents, that is Europe, Asia, and Latin America. In addition to the fact that Malaysia has not

[1] Definition is according to http://www.nasdaq.com/investing/glossary/e/earnings-response-coefficient: accessed in March 2017.

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

been studied in this regard yet, the country has been selected as an example of a well-established emerging economy. Some major countries where studies already exist, such as the United Kingdom, are included in order to find comparative results over the current period.

It is worth mentioning that there is no bias in selecting this sample of six countries for this research to apply the method chosen for the reason that these countries have yet been studied. Another reason is to have two groups, one group for developed countries and the other being emerging countries, so Malaysia was included in the latter group.

2. REVIEW OF EARNINGS IMPACT ON STOCK RETURNS

Research over the past four decades provides cumulative knowledge, which is generally found under the topic of ERC as a favourite topic of continued interest in the accounting-cum-finance research literature. In this section, a brief review of the relevant theories and empirical literature are provided.

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 therefore their utility is doubtful. In order to examine this assertion, they made the first attempt to document the empirical correlation between earnings reports and share price reaction at disclosure times using data from the US stock exchange in New York. Their original effort has been widely acknowledged as path-breaking[3]. They applied the standard event study method, a well-established process previously used in agricultural science, to concentrate on the impact of annual earnings announcements as an important reporting event that should or should not influence stock returns[4].

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 on stock price changes, contrary to the then held assertion. 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 announcements are relevant to stock price formation. Thus, the value relevance idea crept into the literature as a respective accounting theory. In addition, they found that the market responds to data sources other than the earnings reports.

Cohen et al. (1983) explained how the magnitudes of the different effects relate to a stock market value as well as to the length of various intervals. In the meantime, Hawawini (1984) reviewed 27 European event studies and noticed that European stock markets are efficient in a semi-strong form. He also noticed that equities anticipate major events fairly well similar to the equities traded on the New York Stock Exchange (NYSE). This present study includes 1,828 events using data from firms operating in the tested six countries for the past fourteen years.

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 the following year, Ohlson (1990) reviewed and synthesized the finance valuation literature on the 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 in which they suggested new ways to improve this theory.

In this regard, Cheng (1994) established a theoretical framework, providing an illustration of a step-by-step methodical process that shows how earnings-to-returns relation can be formally modelled in accounting. Under a different premise of a theory of accounting conservatism, Roychowdhury & Watts (2007) investigated the relationship between two conservatism measures: asymmetric timeliness of earnings and the ratio of market value to book value of equity.

In a similar context, 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. They proposed 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 that earnings announcements are value relevant to firm's valuation. They attempted to write about different formats of the relationship between earnings and returns.

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. 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.

A few years later, Ball et al. (2013) conducted their research to connect conservatism theory to the use of accounting information. They suggest that financial reporting has been supported with new insights through the conditional conservatism concept. The cross-sectional relationship 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).

The relation 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

[3] 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.

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

is a significant correlation between earnings and returns on the length of the windows of one year and more. Use of the 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. In a similar context, Ohlson (2014) shows that expected announced earnings for the next period are the same as stock price regardless of the transitory noise in reported earnings.

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

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 suggests that investors feel the non-reality of the high persistence of smoothed earnings, and hence discount such persistence when they react to announced earnings.

Additionally, Vijithe & Nimalathasan (2014) found that there is a significant correlation between accounting information, such as earnings per share and return on equity, and stock price; and that such information is useful and relevant as a key determinant for the stock price. In their study, Vasarhelyi et al. (2015) indicate the evolution of corporate data into Big Data in Accounting. They referred to the interaction of such Big Data and traditional sources of data. In the meantime, Muller, et al. (2015) argue that there is a relationship between equity prices and disclosed fair values of recognized investment property.

Peterson et al. (2015) found that there is a positive relationship between accounting consistency over time and earnings quality proxies such as earnings persistence, accrual quality, predictability, and absolute discretionary accruals. Meanwhile, Twedt (2016) found that the Dow Jones Newswire spread is related to larger initial price reactions. He argues that such spread is, more importantly, associated with an increase in the speed with which management earnings guidance information is incorporated into the price.

In the meantime, Lee (2016) found that during earnings conference calls, managers respond to investors' questions from prepared scripts in order to avoid any disclosure of bad news. He argues that such lack of spontaneity is negatively associated with the stock market reaction to the call and with the next quarter's abnormal return. He added that following these conference calls, analysts downgrade their relevant forecasts.

Through applying individual stocks and portfolios methods, Al-Baidhani et al. (2017a) found that there is a positive CAR when earnings increase and a negative CAR when earnings decreases. They also found that the size of the earnings response coefficient magnifies when the portfolio method is used, showing a stock price response that is very close to the earnings size. Meanwhile, Al-Baidhani et al. (2017b) reviewed considerable research about the importance of ERC and stated that the results of these research support the relevance of accounting information to stock price changes. They added that the stakeholders' confidence in such information is enhanced and that the information would be useful to financial accounting standards setters.

As an opposing view to Holthausen & Watts (2001) regarding the value relevance theory, Barth et al. (2001) contend that equity investment is a preliminary focus of financial information, and that any other uses of such information do not minimize the significance of the value relevance of such information for the investors' usage. They argue that it is appropriate to use the current valuation model(s) to address value relevance issues, which propped-up the useful notion that underlies a large body of research. It is clear that considerable research on ERC topic is based on this view that accounting information is very useful to stock investors, and consequently to the financial standards setters (Al-Baidhani et al., 2017a&b; Lee, 2016; Twedt, 2016; Peterson et al., 2015; Muller, et al., 2015; Vasarhelyi et al., 2015; Vijithe & Nimalathasan, 2014; Zhang, 2014; Kwag, 2014; Wang, 2014; Ohlson, 2014; Ball et al., 2013; Patatoukas, 2013; Ariff et al., 2013; Huang & Zhang, 2012; Wang, 2012; Kothari et al., 2010; Dimitropoulos & Asteriou, 2010; Easton et al., 2009; Visvanathan, 2006; Barth et al., 2001; Healy & Palepu, 2001; Ball et al., 1993; Swaminathan & Weintrop, 1991; Collins & Kothari, 1989; Easton & Zimijewski, 1989; Ball & Brown, 1968). This present study is also founded on this view, provided newer research approaches that could help refine prior findings. Therefore, the study result that ERC values reach close to 1.0 in some tests is an empirical evidence supporting this view.

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 relevant stock prices has led to the establishment of the accounting theory on ERC. Thus, this study is based on this theory. Moreover, respective research models are developed as indicated hereunder.

To test the research hypotheses, quantitative method is applied to examine the earnings-to-stock-returns relation. 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 size of EPS in the prior report. Each group consists of financial and non-financial firms. Datastream database is accessed to select these firms. The study uses 1,828 events of firms that have been operating continuously in the aforementioned five OECD countries as well as Malaysia for the past fourteen years: these firms represent active stocks in all industries. The market-adjusted abnormal return (AR) and cumulative abnormal return (CAR) are calculated and ERCs are measured.

Grouping the data into portfolios mitigates the problem of "errors in variables" (Beaver, 1968; Ariff et al., 2013). Hence, the research data are grouped into two settings: individual stock setting and portfolio setting. Each portfolio consists of financial and non-financial firms. To form a portfolio, companies' earnings are ranked from small to big in order to form portfolio deciles.

According to Ariff et al. (2013), "the expected changes in future earnings are normally specified in ERC studies using cross-sectional models". Therefore, these models were used for measuring ERCs as well as calculating ARs and CARs. In the meantime, the event study method (Brown & Warner, 1985; Ariff & Cheng, 2011; Ariff et al., 2013) 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.

Ball & Brown (1968), followed by many other researchers indicated in this study, applied the event study method, a well-established approach previously used in agricultural science to study how plants respond to various treatments using the interventions as events. Similarly, this method has been used in this present research to study how the stock prices respond to the earnings announcements. That is, to study the impact of earnings announcement as an important reporting event that should or should not affect stock returns. In this research, the writer studied how the share price changes according to the change in EPS data of all the tested 1,828 events (events where EPS goes up and events where EPS goes down). For each event, this study of the stock price responses commenced on the 40th day prior to the announcement and ended on the 15th day after the announcement to determine the daily stock price changes during that period.

Following the practice in the 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

The main source for data needed for this study is Datastream database which contains data for companies listed in the six sample stock exchange markets. Additionally, relevant companies' websites have been used in the study. To test the ERC behaviour in the long-run, the study covers a period of fourteen years, 2001-2014. The sample size consists of 1,828 events of firms, from all six countries, as stated above. 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 are determined through other means.

To form a representative sample, a randomly selected sample is around 15 per cent 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 the relevant composite index. Company's interim to interim reports is desirable as known in the literature. Therefore, company's quarterly reports were used taken into consideration the whole year's movement (i.e., 220 working days before the announcement date and 30 working days after) as the sources for unexpected changes in earnings. Using annual audited reports is known to provide no useful impact on share prices since such reports contain no or little surprises. Thus, only interim reports were used.

3.3. Test models

Test models are run separately for individual observations where individual observations refer to $i = EPS$ reports for each country, replaced with p for portfolios sorted by size of the *EPS* changes from low to high (that is 10 deciles) also for each country. 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* changes 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 actually 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. $E(R_{it}|X_t)$ refers to the expected normal returns for firm i, or portfolio p as relevant, at time period t, and X_t 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 normally 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 correlation 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 R_{mt} 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 α_i and β_i 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:

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

where *ΣAAR* 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 the 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 lead 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. Thus, the reports used in this study are those of the first three quarters of each year.

3.4. Hypothesis development

The main objective of this study is to investigate whether ERC behaviour could explain more fully the stock price changes, as to the reason why the stock price change is not equal to the number of earnings. Continuing study of ERC is founded on the view that accounting information is relevant and useful to equity investors and to the financial accounting standards setters (Al-Baidhani et al., 2017a&b; Lee, 2016; Twedt, 2016; Peterson et al., 2015; Muller, et al., 2015; Vasarhelyi et al., 2015; Vijithe & Nimalathasan, 2014; Zhang, 2014; Kwag, 2014; Wang, 2014; Ohlson, 2014; Ball et al., 2013; Patatoukas, 2013; Ariff et al., 2013; Huang & Zhang, 2012; Wang, 2012; Kothari et al., 2010; Dimitropoulos & Asteriou, 2010; Easton et al., 2009; Visvanathan, 2006; Barth et al., 2001; Healy & Palepu, 2001; Ball et al., 1993; Swaminathan & Weintrop, 1991; Collins & Kothari, 1989; Easton & Zimijewski, 1989; Ball & Brown, 1968). The writer is in agreement with these researchers and the findings of this present research support this mainstream view.

The first objective of this study is to investigate into the relevance of accounting information (earnings announcements) to stock price changes. Thus, a major hypothesis is that a direct relation in sign and magnitude is predicted between market adjusted abnormal returns which represent stock price changes adjusted for market returns, and the unexpected earnings changes. 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. The writer agrees with this finding, and therefore the first research hypothesis is:

H_{1a}: There are positive stock price reactions to earnings increase announcements.

H_{1b}: There are negative stock price reactions to earnings decrease announcements.

The second objective of the study is to measure the difference in ERC behaviour of individual stocks, applying individual stock method. In this regard, Ohlson (2014) shows that the expected reported earnings for the next period are the same as the individual 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 individual banking firms, to be the same as those of individual non-banking firms, which are affected significantly by the disclosed earnings information.

Similarly, Wang (2012) found that investors assess earnings persistence in accordance with their reactions to earnings news. He documents that such assessment can be derived from the investors' reactions to reported earnings information; that is, the ratio of the coefficient on earnings changes relative to the coefficient on earnings level in the return-to-earnings relationship. In addition, Visvanathan (2006) reports an inverse relationship between ERC and the size-adjusted absolute magnitude of the accrual component of quarterly earnings, after controlling for other ERC determinants. To estimate the ERC size, he used interim (quarterly) earnings announcements of individual firms as his study sample.

Easton et al. (2009) also found that information on the interim quarterly earnings information by early announcers spread slowly among the late announcers' returns. They show the positive relationship between accounting earnings information and stock return predictability at individual stock level. They argue that such information is helpful for investors to make large spreads through buying with the highest correlation implied stock returns and selling with the lowest correlation implied returns.

In this study, the writer first investigates the relationship between interim earnings announcements and stock price changes. The resulted CAR values are then related to the ERC by applying this individual stock method. Based on the above research results and on the aforementioned relevant explanations, the second research hypothesis is:

H_2: There is a significant relationship between earnings announcement effect and return predictability at the individual stock level.

The focus of ERC research has been on individual aggregation. However, using such method limits the ERC size due to the non-diversification of the respective tests. Therefore, in this study both individual stock and portfolio methods are applied. Portfolio tests are used to help reduce the relevant idiosyncratic errors and consequently improve the respective results. In this study, the writer first investigates the relationship between interim earnings announcements and stock price changes. The resulted CAR values are then related to the ERC by applying this portfolio method.

Grouping the data into portfolios reduces the errors in variables, and therefore leads to an increase in the correlation between unexpected earnings and stock price changes (Ariff et al., 2013; Ariff & Cheng, 2011; Beaver et al., 1987, 1980, 1979; Beaver, 1968). Hence, the research data are grouped into two settings: individual stock setting and portfolio setting. Meanwhile, Easton et al. (2009) also found that information spreads slowly from the quarterly earnings information by early announcers and then late announcers' returns. They reveal the positive relationship between earnings information and return predictability at industry portfolio level. They argue that such information is helpful for investors to make large spreads by buying a portfolio with the highest correlation implied returns and selling such portfolio with the lowest correlation implied returns.

The third objective of this study is to measure the size of ERC using portfolios of stocks (removing idiosyncratic noise), applying portfolio method. The writer agrees with the results of the above-cited studies. Based on these results and on the relevant explanations stated above, the third research hypothesis is:

H_3: There is a significant relationship between earnings announcement effect and return predictability at the portfolio level.

4. DESCRIPTIVE STATISTICS

A review of the statistics in the tables suggests that the decision to separate the sample into two groups of events where EPS goes up and events where EPS goes down, is well justified. The following two tables are: Table 1 is a summary of descriptive statistics of 1,212 events of representative firms that have been operating continuously in the four developed markets. It shows the descriptive statistics on CAR and EPS change variables. The **CA**R variable has a mean of 0.020 and a standard deviation of 0.173. The skewness is 2.0874 with a kurtosis coefficient of 11.38. Therefore, the distribution is close to a bell-shaped normal distribution. Meanwhile, the EPS change variable has a mean of 0.3227 and a standard deviation of 1.1789. The skewness is 5.5090. The kurtosis coefficient is 49.87.

Table 1. Descriptive statistics of CAR and EPS change variables – developed markets

(Y) CAR		*(X) EPS Change*	
Mean	0.019556453	Mean	0.32270263
Standard Error	0.005015455	Standard Error	0.034146098
Median	0.002198059	Median	0.122335601
Mode	#N/A	Mode	1
Standard Deviation	0.173160346	Standard Deviation	1.178906092
Sample Variance	0.029984505	Sample Variance	1.389819575
Kurtosis	11.3851299	Kurtosis	49.86771076
Skewness	2.087415729	Skewness	5.508983331
Range	2.155011945	Range	15.49275362
Minimum	-0.821945415	Minimum	-1
Maximum	1.33306653	Maximum	14.49275362
Sum	23.31129249	Sum	384.6615352
Count	1192	Count	1192
Confidence Level(95.0%)	0.00984011	Confidence Level(95.0%)	0.066993202

Note: the values are from daily returns.

Table 2 shows a similar summary of 616 events of firms from the two emerging markets. The CAR variable has a mean of 0.042 and a standard deviation of 0.220. The skewness is 2.2544 with a kurtosis coefficient of 8.64. Therefore, the distribution is close to a bell-shaped normal distribution. Meanwhile, the EPS change variable has a mean of 0.2353 and a standard deviation of 0.7812. The skewness is 1.7942. The kurtosis coefficient is 8.18.

5. FINDINGS ON ANNOUNCEMENT EFFECT

The first set of test results on the impact of earnings announcements on CAR values of firms' shares are presented in the following tables. These findings relate to Hypothesis H_1. The overall picture regarding the finding on announcement effect of the sample of 1,828 events presented in Table 3 shows a directional sign effect on earnings announcements in regard to each respective country as well as the two combinations of countries. That is, share prices react positively to the good news of earnings increase announcements and react negatively to the bad news of earnings decrease announcements.

As regards the significance of the values of average abnormal returns in response to earnings announcements, it appears that generally the investors of all the sampled countries and the combinations of countries react positively and significantly to earnings increase announcements, but they do not react significantly, in general, to earnings decrease announcements. This latter observation is somewhat unexpected and may be explained in the details that follow.

It is suggested that the market appears to have anticipated the earnings changes via other information that has been spread through the quarter, semi-annual, annual, or firm-performance reports. This also implies that investors react positively without hesitation and more strongly to the earnings increase announcements, while they react slowly and with caution in regard to the earnings decrease announcements.

In a similar context, it appears that CAR values for cumulating periods vary among the subject countries and combinations of countries. Regarding earnings increases, generally, the CAR values are statistically significant although with different level of significance. Meanwhile, the CAR values for earnings decreases are statistically significant only in Japan and the combination of the developed countries, and to a lesser extent in Malaysia and the combination of the emerging economies.

Table 2. Descriptive statistics of CAR and EPS change variables – emerging markets

(Y) CAR		*(X) EPS Change*	
Mean	0.041748352	Mean	0.235333485
Standard Error	0.008972313	Standard Error	0.031917083
Median	0.005364237	Median	0.111111111
Mode	#N/A	Mode	1
Standard Deviation	0.219592666	Standard Deviation	0.781153895
Sample Variance	0.048220939	Sample Variance	0.610201407
Kurtosis	8.638755545	Kurtosis	8.18346499
Skewness	2.254378704	Skewness	1.794164322
Range	2.194412514	Range	7
Minimum	-0.73018595	Minimum	-1
Maximum	1.464226565	Maximum	6
Sum	25.00726306	Sum	140.9647573
Count	599	Count	599
Confidence Level (95.0%)	0.017621074	Confidence Level (95.0%)	0.062683198

Note: the values are from daily returns.

Table 3. Market-adjusted average abnormal returns on earnings announcements during 2001-2014

Country/ Combination of countries	*Directional sign effect on earnings announcements**	*For EPS Increases: AARs are Significant*	*For EPS Decreases: AARs are Significant*	*CAR values for different cumulating periods for earnings increases are significant*	*CAR values for different cumulating periods for earnings decreases are significant*
Developed Markets	Yes	Yes	Significant on one day only	Yes	Yes
Emerging Markets	Yes	Yes	Yes, but to a lesser extent	Yes	Yes, but to a lesser extent
Japan	Yes	Yes	Yes, but to a lesser extent	Yes	Yes
United Kingdom	Yes	Yes, to a certain extent	No	Yes	No
Switzerland	Yes	Significant on one day only	No	Yes, to a lesser extent	No
Sweden	Yes	Yes, to a certain extent	No	Yes	No
Malaysia	Yes	Yes	Yes, but to a somewhat lesser extent	Yes	Yes, but to a somewhat lesser extent
Mexico	Yes	Yes, to a certain extent	Significant on one day only	Yes	No

*Note: * Positive share price reactions to the good news of earnings increases and negative share price reactions to the bad news of earnings decreases.*

In addition to the differences in the level of significance from a country to another and from a combination of countries to another, it is worth mentioning that there are differences in the level of significance from a cumulating period to another as appears in the following relevant tables. This result supports the view that the long window measures the abnormal returns more accurately than in the short window. This is probably due to the information leakage that takes place in the respective stock exchange markets before the earnings announcements (Lakhal, 2008; Agrawal et al., 2006; Brunnermeir, 2005; Bailey et al., 2003). The result indicates the highly significant directional sign effect of earnings announcements on abnormal returns.

5.1. Developed markets (Japan, UK, Switzerland, and Sweden)

Table 4 reveals the statistics obtained for the above Models 1 – 5 showing results as regards the data for 1,212 events of firms of the tested four developed countries during the period 2001-2014. The statistics in the table presents the share price changes and the change in EPS data for all the aforementioned events. There were 804 earnings increases and 408 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 the announcement, on announcement day, and one day after announcement are 0.105, 0.201, and 0.032 per cent respectively with t-values of 1.698 (significantly different from zero at 0.05 level), 3.000 (significantly different from zero at 0.01 level), and 0.649 that is not significant. Again, it appears that there are positive share price reactions to the earnings increases and negative share price reactions to the earnings decreases, with various rates of positive or negative daily average returns. The largest daily average excess return occurred on the announcement day; AAR = 0.201 per cent with a t-value of 3.000, 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.

Table 4. Market-adjusted average abnormal returns on earnings announcements of firms operating in the four developed countries during 2001-2014: n=1212

EPS Increase: n=804				*EPS Decrease: n=408*			
Days	***AAR***	***t-value***	***CAR***	***Days***	***AAR***	***t-value***	***CAR***
-40	-0.009915	-0.184	-0.009915	-40	0.111427	1.368	0.111427
-39	0.144480	2.354**	0.134565	-39	-0.116543	-1.200	-0.005116
-38	0.028535	0.484	0.163100	-38	-0.045953	-0.420	-0.051069
-37	0.082065	1.419	0.245165	-37	-0.030260	-0.425	-0.081329
-36	0.031315	0.506	0.276481	-36	-0.051116	-0.573	-0.132445
-35	0.081502	1.464	0.357983	-35	-0.026731	-0.319	-0.159176
-34	0.050443	0.887	0.408426	-34	-0.103732	-1.073	-0.262908
-33	0.093953	1.090	0.502378	-33	-0.082639	-0.869	-0.345547
-32	0.089851	1.186	0.592229	-32	-0.089173	-1.030	-0.434720
-31	0.124181	1.835*	0.716410	-31	-0.085410	-0.898	-0.520130
-30	0.035038	0.632	0.751448	-30	-0.082392	-0.858	-0.602522
-29	0.091747	1.438	0.843195	-29	-0.040716	-0.453	-0.643238
-28	0.119809	1.797*	0.963004	-28	-0.025357	-0.291	-0.668595
-27	0.170741	2.547**	1.133745	-27	-0.041915	-0.436	-0.710510
-26	0.026913	0.446	1.160658	-26	-0.021716	-0.294	-0.732226
-25	0.079561	1.349	1.240219	-25	-0.032767	-0.410	-0.764993
-24	0.078930	1.440	1.319149	-24	-0.078255	-0.817	-0.843248
-23	0.139349	2.006*	1.458498	-23	-0.026422	-0.299	-0.869671
-22	0.042488	0.695	1.500986	-22	-0.070475	-0.724	-0.940145
-21	0.070604	1.221	1.571589	-21	-0.108505	-0.957	-1.048650
-20	0.046606	0.939	1.618195	-20	-0.081258	-0.714	-1.129909
-19	0.146714	1.932*	1.764909	-19	-0.080771	-1.083	-1.210680
-18	0.092184	1.587	1.857093	-18	-0.112403	-1.248	-1.323083
-17	0.050641	0.869	1.907734	-17	-0.058972	-0.740	-1.382055
-16	0.072309	1.233	1.980042	-16	-0.132086	-1.612	-1.514141
-15	0.078112	1.248	2.058154	-15	-0.040287	-0.551	-1.554428
-14	0.138162	2.123*	2.196316	-14	-0.085484	-0.808	-1.639912
-13	0.162610	2.238*	2.358926	-13	-0.033640	-0.450	-1.673552
-12	0.067104	0.925	2.426030	-12	-0.030404	-0.387	-1.703956
-11	0.024026	0.450	2.450056	-11	-0.081069	-0.977	-1.785025
-10	0.023200	0.465	2.473255	-10	-0.014442	-0.178	-1.799468
-9	0.021232	0.359	2.494487	-9	-0.038077	-0.404	-1.837545
-8	0.096010	1.414	2.590497	-8	-0.042119	-0.518	-1.879663
-7	0.145116	2.278*	2.735613	-7	-0.044743	-0.608	-1.924406
-6	0.067655	1.156	2.803268	-6	-0.067121	-0.813	-1.991527
-5	0.113211	1.763*	2.916479	-5	-0.051259	-0.529	-2.042785
-4	0.105394	1.905*	3.021873	-4	-0.023817	-0.271	-2.066603
-3	0.081418	1.319	3.103291	-3	-0.093754	-0.842	-2.160357
-2	0.053687	0.818	3.156978	-2	-0.064070	-0.753	-2.224426
-1	0.104598	1.698*	3.261576	-1	-0.067610	-0.686	-2.292037
0-date	0.201473	3.000**	3.463050	0-date	-0.137473	-1.331	-2.429510
+1	0.031953	0.649	3.495002	+1	-0.178923	-2.329**	-2.608433
2	0.098553	1.829*	3.593555	2	-0.028592	-0.295	-2.637025
3	0.028319	0.555	3.621874	3	-0.039757	-0.500	-2.676783
4	0.099564	1.664*	3.721438	4	-0.053328	-0.598	-2.730110
5	0.063587	0.993	3.785024	5	-0.041460	-0.545	-2.771571
6	0.121844	1.534	3.906869	6	-0.034825	-0.472	-2.806396
7	0.040550	0.732	3.947419	7	-0.051808	-0.597	-2.858204
8	0.173319	2.748**	4.120738	8	-0.112546	-1.302	-2.970750
9	0.016978	0.269	4.137716	9	-0.066151	-0.782	-3.036900
10	0.052762	0.896	4.190479	10	-0.017846	-0.269	-3.054746
11	0.027648	0.556	4.218127	11	-0.112009	-1.070	-3.166756
12	0.068539	1.178	4.286665	12	-0.057717	-0.680	-3.224473
13	0.070329	1.140	4.356995	13	-0.029870	-0.358	-3.254342
14	0.126774	1.911*	4.483768	14	-0.058941	-0.828	-3.313284
15	0.077310	1.385	4.561078	15	-0.022067	-0.338	-3.335351

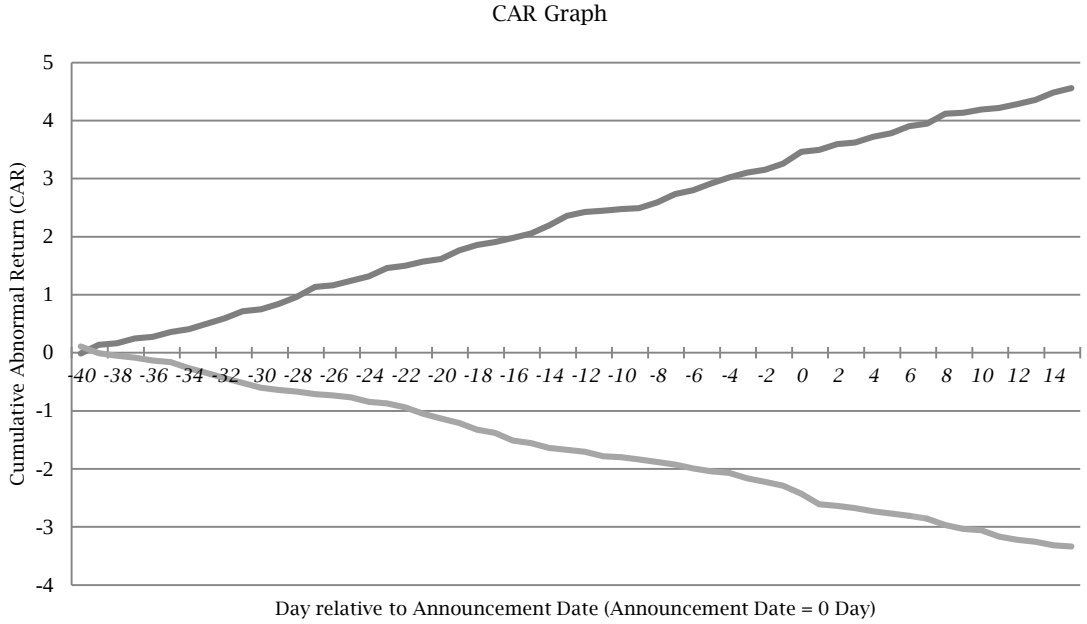
Note: significant at 0.05 (*) and 0.01 (**) levels.

On the other hand, the earnings decrease category shows that the AARs at one day before the announcement, an announcement date, and one day after announcement are -0.068, -0.137, and -0.179 per cent with corresponding t-values of -0.686, -1.331, and -2.329. The latter AAR, -0.179, is the only abnormal return that is significantly different from zero at 0.01 level. There is no other significant negative abnormal return in this earnings decrease category. The market appears to have anticipated the earnings changes via other information, represented in the reports referred to above. Similar to the earnings increase category, the daily average returns for the earnings decrease category also commenced on the 40th day prior to the announcement, and both categories level off within a short period after the 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 4.56 per cent for earnings increase category while it is -3.34 per cent for earnings decrease category. As stated above, this implies that investors react positively without hesitation and more strongly to the earnings increase announcements, while they react slowly and with caution in regard to the earnings decrease announcements.

Figure 1 shows 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 previously 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 (Lakhal, 2008; Agrawal et al., 2006; Brunnermeir, 2005; Bailey et al., 2003).

Figure 1. Plot of market-adjusted CAR around earnings announcements of firms operating in the four developed countries over the period 2001-2014: n=1212. (Earnings increase versus earnings decrease)



The figure reveals that there is a significant directional sign effect both before and after the earnings announcements. It also shows that stock prices are affected more by the earnings increase announcements than by the earnings decrease announcements.

Table 5 shows the t-test for the significance of CAR over different cumulating periods. All the CAR values for earnings increases and earnings decreases are statistically significant with t-values that are at least significant at 0.01 level. All the four CAR values for earnings increases category as well as the values for the first two cumulating periods of the earnings decreases category are highly significant at 0.001 level. Meanwhile, the values for the third and fourth cumulating periods of this category are significant at 0.01 level. This result supports the view that the long window measures the abnormal returns more accurately than in the short window. Again, this is probably due to the above-referenced information leakage that takes place in the relevant stock markets before each earnings announcement. The result also indicates the highly significant directional sign effect of earnings announcements on abnormal returns.

Table 5. Test of Significance on CAR over different cumulating periods during earnings announcements (market adjusted car) – developed markets

Earnings Increase: n=804			*Earnings Decrease: n=408*		
Period	***CAR***	***t-value***	***Period***	***CAR***	***t-value***
CAR (-40, 15)	4.5611	8.128***	CAR (-40, 15)	-3.3354	-3.64***
CAR (-20, 10)	2.6189	6.741***	CAR (-20, 10)	-2.0061	-3.194***
CAR (-10, 5)	1.3350	5.684***	CAR (-10, 5)	-0.9865	-2.514**
CAR (-5, 5)	0.9818	4.889***	CAR (-5, 5)	-0.7800	-2.601**

Note: significant at 0.05 (*), 0.01 (**), and 0.001 (***) levels.

5.2. Emerging markets (Malaysia and Mexico)

Table 6 reveals the statistics obtained for the above Models 1 – 5 showing results related to the data for 616 events of firms operating in the above two emerging countries during the same fourteen years' period. It shows share price changes and change in EPS data of these events. There were 408 earnings increases and 208 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 the announcement, on announcement day, and one day after announcement are 0.069, 0.189, and 0.103 per cent with t-values of 0.691, 1.524, and 1.491 respectively.

Table 6. Market-adjusted average abnormal returns on earnings announcements of firms operating in the two emerging countries during 2001-2014: n=616

EPS Increase: n=408				*EPS Decrease: n=208*			
Days	***AAR***	***t-value***	***CAR***	***Days***	***AAR***	***t-value***	***CAR***
-40	0.175444	1.943*	0.175444	-40	0.033185	0.286	0.033185
-39	0.132144	1.392	0.307587	-39	-0.159604	-1.655*	-0.126419
-38	0.323358	2.893**	0.630946	-38	-0.012742	-0.149	-0.139161
-37	0.179996	1.766*	0.810942	-37	-0.030226	-0.314	-0.169387
-36	0.169219	2.037*	0.980161	-36	-0.033886	-0.337	-0.203273
-35	0.031021	0.366	1.011182	-35	-0.027585	-0.274	-0.230858
-34	0.044337	0.547	1.055520	-34	-0.200715	-1.760*	-0.431573
-33	0.047406	0.544	1.102926	-33	-0.099091	-1.001	-0.530664
-32	0.037985	0.408	1.140911	-32	-0.236254	-1.751*	-0.766918
-31	0.177762	1.766*	1.318673	-31	-0.291767	-1.130	-1.058685
-30	0.018746	0.196	1.337418	-30	-0.020767	-0.237	-1.079452
-29	0.304192	2.241*	1.641610	-29	-0.018984	-0.160	-1.098436
-28	0.134712	1.196	1.776322	-28	-0.041476	-0.327	-1.139912
-27	0.185100	1.951*	1.961422	-27	-0.020532	-0.203	-1.160444
-26	0.138248	1.248	2.099671	-26	-0.045971	-0.322	-1.206415
-25	0.030033	0.253	2.129704	-25	-0.021988	-0.232	-1.228402
-24	0.046298	0.508	2.176002	-24	-0.090044	-0.711	-1.318447
-23	0.066571	0.682	2.242573	-23	-0.122310	-0.877	-1.440756
-22	0.052166	0.485	2.294739	-22	-0.027092	-0.207	-1.467848
-21	0.124703	1.306	2.419442	-21	-0.054918	-0.447	-1.522766
-20	0.175313	1.684*	2.594756	-20	-0.043037	-0.314	-1.565804
-19	0.254296	2.835**	2.849051	-19	-0.044227	-0.352	-1.610030
-18	0.048018	0.480	2.897069	-18	-0.137556	-1.189	-1.747586
-17	0.095778	0.956	2.992846	-17	-0.020587	-0.173	-1.768173
-16	0.011171	0.148	3.004017	-16	-0.013630	-0.127	-1.781803
-15	0.101729	1.100	3.105746	-15	-0.088797	-0.508	-1.870600
-14	0.106321	1.030	3.212067	-14	-0.128546	-0.879	-1.999146
-13	0.259288	1.893*	3.471355	-13	-0.094926	-0.650	-2.094072
-12	0.397754	3.786***	3.869109	-12	-0.036716	-0.188	-2.130789
-11	0.033400	0.323	3.902508	-11	-0.025117	-0.191	-2.155906
-10	0.069246	0.731	3.971755	-10	-0.048490	-0.337	-2.204396
-9	0.043049	0.542	4.014804	-9	-0.039999	-0.277	-2.244395
-8	0.062169	0.769	4.076973	-8	-0.063138	-0.406	-2.307533
-7	0.164311	1.832*	4.241284	-7	-0.026867	-0.156	-2.334400
-6	0.201071	2.341**	4.442355	-6	-0.027711	-0.158	-2.362111
-5	0.174757	1.394	4.617111	-5	-0.258714	-1.440	-2.620825
-4	0.140705	1.353	4.757816	-4	-0.023704	-0.156	-2.644530
-3	0.173642	1.084	4.931458	-3	-0.160697	-0.948	-2.805227
-2	0.173520	1.279	5.104978	-2	-0.037805	-0.256	-2.843032
-1	0.068507	0.691	5.173485	-1	-0.123696	-0.803	-2.966727
0-date	0.188628	1.524	5.362113	0-date	-0.277145	-1.614	-3.243873
+1	0.103194	1.491	5.465307	+1	-0.013354	-0.114	-3.257226
2	0.159944	1.560	5.625252	2	-0.072373	-0.431	-3.329599
3	0.008896	0.106	5.634148	3	-0.065037	-0.532	-3.394636
4	0.038712	0.450	5.672860	4	-0.040652	-0.371	-3.435288
5	0.123353	1.422	5.796213	5	-0.032277	-0.299	-3.467565
6	0.020198	0.166	5.816411	6	-0.094639	-0.932	-3.562205
7	0.326833	3.367***	6.143244	7	-0.018414	-0.190	-3.580619
8	0.176955	1.673*	6.320200	8	-0.013664	-0.151	-3.594283
9	0.083621	0.996	6.403821	9	-0.012729	-0.120	-3.607012
10	0.182849	1.892*	6.586669	10	-0.073579	-0.623	-3.680591
11	0.018876	0.249	6.605546	11	-0.074124	-0.521	-3.754715
12	0.022478	0.259	6.628023	12	-0.087997	-0.629	-3.842712
13	0.271625	2.667**	6.899648	13	-0.027634	-0.262	-3.870346
14	0.083288	0.897	6.982937	14	-0.129985	-0.953	-4.000331
15	0.075202	0.783	7.058139	15	-0.025197	-0.282	-4.025528

Note: significant at 0.05 (*), 0.01 (**), and 0.001 (***) levels.

Similarly, this is reflected in the positive share price reactions to the good news and negative share price reactions to the bad news, with various rates of positive or negative daily average returns. The largest aily average excess return occurred on the 12th day prior to announcement; high AAR of 0.398 per cent with a high t-value of 3.786, very significantly different from zero at 0.001 level. In addition to this largest daily average excess return, there are a number of other values that are significantly different from zero at 0.05, 0.01, and 0.001 levels.

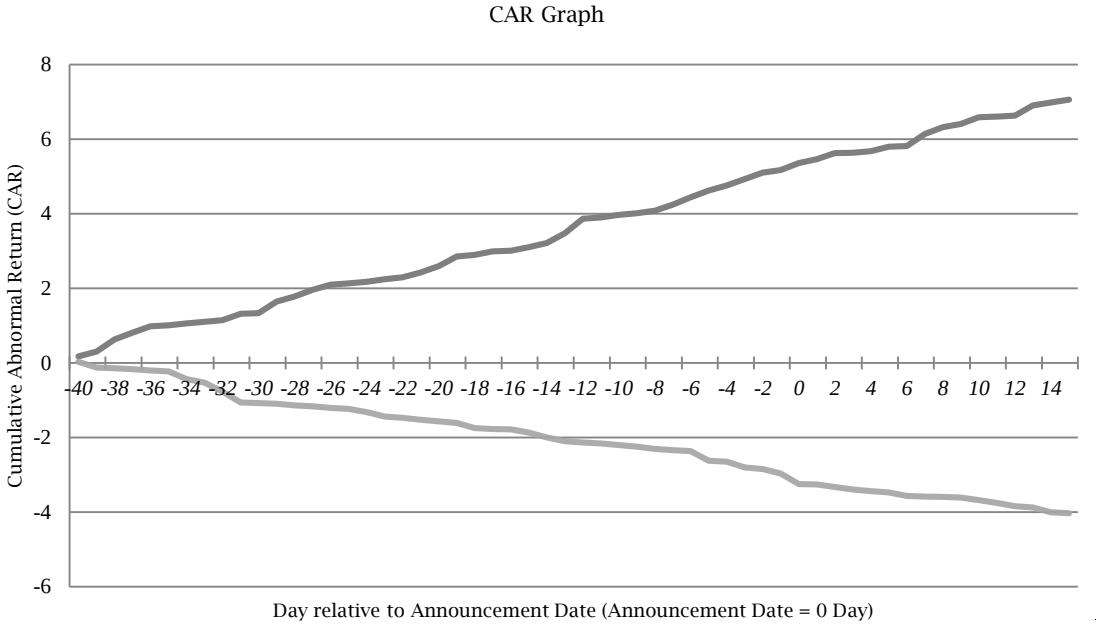
On the other hand, the earnings decrease category shows that the AARs at one day before the announcement, an announcement date, and one day after announcement are -0.124, -0.277, and -0.013 per cent with corresponding t-values of -0.803, -1.614, and -0.114. All three price effects are not significantly different from zero. Except for the significant negative abnormal returns that occurred on the days -39, -34, and -32, there are basically no other significant negative abnormal returns. The market appears to have anticipated the earnings changes via other information that was probably disseminated through relevant reports.

Similar to the earnings increase category, the daily average returns for the earnings decrease category also commenced on the 40th day prior to the announcement, and both categories level off within a short period after the 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 7.06 per cent for earnings increase category while it is -4.03 per cent 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 in regard to the earnings decrease announcements.

Figure 2 reveals the plots of CAR value for earnings increases and earnings decreases for the whole emerging countries 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 previously 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 referenced above.

Figure 2. Plot of market-adjusted CAR around earnings announcements of firms operating in the two emerging countries over the period 2001-2014: n=616. (Earnings increase versus earnings decrease)



In the meantime, Table 7 shows the t-test for the significance of CAR values for different cumulating periods. All the CAR values for earnings increases category are statistically significant with t-values that are highly significant at 0.001 level. Meanwhile, the CAR value for the first cumulating period of the earnings decreases category is significant at 0.05 level. The remaining values as regards the other cumulating periods are insignificant. This is probably because investors respond slowly and with hesitation to the negative earnings announcements. This may also imply that the stock exchange markets in these two countries appear to have anticipated the negative earnings changes via other channels of information, as indicated above. The overall result, however, indicates the significant directional sign effect of earnings announcements on abnormal returns.

Table 7. Test of significance on CAR over different cumulating periods during earnings announcements (market adjusted CAR) – emerging markets

Earnings Increase: n=408			*Earnings Decrease: n=208*		
Period	***CAR***	***t-value***	***Period***	***CAR***	***t-value***
CAR (-40, 15)	7.0581	6.462***	CAR (-40, 15)	-4.0255	-1.779*
CAR (-20, 10)	4.1672	5.516***	CAR (-20, 10)	-2.1578	-1.136
CAR (-10, 5)	1.8937	4.227***	CAR (-10, 5)	0.0104	0.009
CAR (-5, 5)	1.3539	3.812***	CAR (-5, 5)	-1.1055	-1.368

Note: significant at 0.05 (*), 0.01 (**), and 0.001 (***) levels.

6. FINDINGS ON EARNINGS RESPONSE COEFFICIENT

6.1. Individual event test results

The second set of test results is on the relationship between CAR of firms' shares (both per individual stocks and later per portfolios) and the unexpected earnings changes are presented in this section and the following one: see Table 8 for individual stocks. These findings relate to Hypotheses H_2 and H_3 as regards individual stocks and portfolios, respectively.

With regard to the earnings response coefficient, the overall picture of the regression results of return-to-earnings relation using the individual stock of companies are presented in Table 8. This table shows various ERC values. The highest ERC value of 10 per cent is shown for Malaysian companies and for

companies in the combination of emerging markets, Malaysia and Mexico. This result reveals that the unexpected earnings variable has an earnings response coefficient of 0.10, with a very high corresponding t-value of 8.782 for the emerging markets combination and t-values of 7.924 and 4.603 for Malaysia and Mexico, respectively. Consequently, the t-statistics show that their coefficients are statistically significant and different from zero at or below 0.001 acceptance level. The magnitude of these coefficients indicates that for every unit increase/decrease in unexpected earnings, there is around ten per cent increase/decrease in the abnormal returns. This directional response rate for the individual stock is considered reasonable for such emerging markets. This magnitude is consistent with the magnitudes in the descriptive statistics detailed above.

The table also shows the highest R-squared value, 17.26 per cent for the Malaysian companies, followed by 11.82 per cent for the Japanese companies, and 11.44 per cent for the combination of the emerging countries. These values are considered a little higher than the previous research results: the results are for the volatile period of the first 14 years of this century. The R-squared values of the remaining countries and combinations of countries are within the range of the previous research results. This is the percentage variation in the dependent variable explained by the independent variable as measured by the R-squared. These high R-squared values are an indication of the high explanatory power of the test. The findings are consistent with the results of research conducted in other countries, which also have low R-squared values of between 3 to 10 per cent (Lev 1989).

The findings related to Malaysia and the combination of emerging markets also support the view that a long window measures the abnormal returns more correctly than in the short window as detailed in the above "Test of Significance" tables. This may be due to the already proposed explanation that trading in the respective stock exchange markets is speculative, with a lot of information leakage, as indicated and referenced above, before the earnings announcement.

Table 8. Regression results of return-to-earnings relation using the individual stock of companies during 2001-2014: overall picture

Country/ Combination of countries	*Earnings response coefficient (ERC)*	*R-squared values*	*t-values*	*P-values*
Developed Markets	0.02	0.0215	5.115	< 0.001
Emerging Markets	0.10	0.1144	8.782	< 0.001
Japan	0.05	0.1182	6.180	< 0.001
UK	0.07	0.0503	3.912	< 0.001
Switzerland	0.06	0.0612	4.296	< 0.001
Sweden	0.05	0.0570	4.152	< 0.001
Malaysia	0.10	0.1726	7.924	< 0.001
Mexico	0.07	0.0679	4.603	< 0.001

In spite of the differences in the values of ERC from a country to another and from a combination of countries to another, the t-statistics noticeably show that all of the ERCs are extremely significant and different from zero at or below 0.001 acceptance level for all countries and combinations of countries. It is also noticeable that the ERC values of the emerging markets, Malaysia and Mexico (separate and combined) are higher than the ERC values of the developed markets, Japan, UK, Switzerland, and Sweden (separate and combined). The former shows ERC values between 7 and 10 per cent while the latter shows ERC values between 2 and 7 per cent. This implies that investors in the emerging markets react strongly and without hesitation to the earnings announcements, while investors in the developed markets react slowly and with caution to these announcements.

The table reveals the regression results of CAR with the unexpected earnings at the individual company level of the firms of the four developed markets. These results reveal that the unexpected earnings variable has an ERC of 0.02, with a high corresponding t-value of 5.115. Therefore, t-statistics show that their coefficients are significantly different from zero at or below 0.001 acceptance level. The magnitude of the coefficient regarding these countries indicates that for every unit increase/decrease in unexpected earnings, there is around two per cent increase/decrease in the abnormal returns. This directional response rate for the individual stock is considered less than reasonable for such developed markets.

The magnitudes of the coefficients are consistent with the magnitudes in the descriptive statistics detailed above. The R-squared value is 2.15 per cent. This is the percentage variation in the dependent variable explained by the independent variable as measured by the R-squared. This R-squared value is an indication of a low explanatory power of the test. The findings are consistent with previous results indicated above, which also have low R-squared values of between 3 to 10 per cent (Lev 1989). It is worth mentioning that the findings for this combination also support the above view that a long window measures the abnormal returns more correctly than in the short window as stated above. This may be due to the above explanation that there are speculation and information leakage in such trading.

Table 8 also reveals the regression results as regards the combination of emerging markets. These results reveal that the unexpected earnings variable has an ERC of 0.10, with a very high corresponding t-value of 8.782. Therefore, the t-statistics show that their coefficients are extremely significant and different from zero at or below 0.001 acceptance level. The magnitude of the coefficient as regards these two countries indicates that for every unit increase/decrease in unexpected earnings, there is around ten per cent increase/decrease in the abnormal returns. This directional response rate for the individual stock is considered reasonable for such emerging markets.

Similar to the above combination of developed markets, the magnitudes of the coefficients of this

combination of emerging markets are consistent with the magnitudes in the above descriptive statistics. The R-squared value is 11.44 per cent. Again, this R-squared value is an indication of the high explanatory power of the test. The findings are consistent with the results of research conducted in other countries indicated above, which also have low R-squared values of between 3 to 10 per cent (Lev 1989).

Once again, the findings related to this combination of emerging markets also support the aforementioned view that a long window measures the abnormal returns more correctly than in the short window as detailed above. This may be due to the aforementioned speculation and information leakage.

6.2. Portfolio level test results

In addition to the previous section, the second set of test results is presented in this section as well. The findings of this section relate to the Hypothesis H_3. As mentioned above, ten decile portfolios were formed out of each sample; that is of each country and each combination of countries, with tests done on the ERC of the portfolios. The data were sorted from low (including negative) to large EPS changes.

The overall picture of the regression results of return-to-earnings relation using a portfolio of companies is presented in Table 9. This table shows various values of earnings response coefficients. The highest ERC value of 93 per cent is shown for Malaysian companies, 88 per cent for Mexican companies, and 87 per cent for companies in the combination of these two emerging markets. The table also shows lesser ERC values for the developed markets as follows: 0.86 for the UK, 0.54 for Switzerland, 0.52 for Sweden, 0.49 for Japan, and 0.30 for the developed markets combination. Again, this implies that investors in the developed markets react slowly and with caution to the earnings announcements while investors in the emerging markets react strongly and without hesitation to such announcements.

It is clear that the magnitudes of the coefficients in the portfolio tests have increased tremendously, which is due to the effect of grouping. The grouping procedure mitigates the errors in the unexpected earnings variables. At this portfolio level, the R-squared value for the ERC test showed considerable improvement to an average of 87.5 per cent for Mexico, 79 per cent for the emerging markets combination, and 75 per cent for Malaysia.

This would then suggest that the unexpected earnings surprise effect explains greater degree of variation than in any other studies. Second, the size of the ERC in this test has increased substantially and is statistically significant as shown in this table. For example, the above-mentioned highest ERC value of Malaysian companies is 93 per cent with a t-value of 4.901, highly significant at or below 0.001 acceptance level.

It is worth mentioning that the R-squared percentages in this test are close to the results obtained by Beaver et al. (1980), using US market data. Their R-squared values vary from 80 per cent to 95 per cent by grouping the percentage change in price in similar portfolios. This indicates that for such an emerging market, the unexpected earnings explained variation very efficiently.

This new finding would 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 $0.93 for every one unit change in EPS announced in these test markets. This result is, in the writer's view, very striking, and is clearly in support of the theory of value relevance as have been advanced in the accounting theories.

Table 9. Regression results of return-to-earnings relation using company portfolios during 2001-2014: overall picture

Country/ Combination of countries	*Earnings response coefficient (ERC)*	*R-squared values*	*t-values*	*P-values*
Developed Markets	0.30	0.5701	3.257	0.012
Emerging Markets	0.87	0.7945	5.561	< 0.001
Japan	0.49	0.7108	4.434	0.002
UK	0.86	0.7002	4.322	0.003
Switzerland	0.54	0.4832	2.735	0.026
Sweden	0.52	0.5269	2.985	0.017
Malaysia	0.93	0.7502	4.901	0.001
Mexico	0.88	0.8750	7.482	< 0.001

In spite of the differences in the ERC values from a country to another and from a combination of countries to another, the t-statistics noticeably show that all of the earnings response coefficients are extremely significant and different from zero at or below 0.05 acceptance level for all countries and combinations of countries.

It is also noticeable that the ERC values of the emerging markets, Malaysia and Mexico (separate and combined) are higher than the ERC values of the developed markets, Japan, UK, Switzerland, and Sweden (separate and combined). The former shows ERC values between 87 and 93 per cent while the latter shows ERC values between 30 and 86 per cent. Again, this implies that investors in the emerging markets react strongly and without hesitation to the earnings announcements, while the investors in the developed markets react slowly and with caution to these announcements.

The table reveals the results of the combination of developed countries on portfolio tests. The ERC value of the portfolio is 0.30. Such an ERC size is considered large in relation to the prior studies using an 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 eight 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 above results as shown in Table 9. These findings relate to the research hypothesis H_3.

The magnitudes of the coefficients in the portfolio tests have increased tremendously, which is due to the effect of grouping. The grouping procedure mitigates the errors in the unexpected earnings variables. At the portfolio level, the R-squared value for the ERC test showed considerable improvement to an average of 57 per cent for the ten portfolios. This would then suggest that in this developed market, the unexpected earnings surprise effect explains greater degree of variation than in any other studies. Second, the size of the ERC in this test has increased substantially and is statistically significant. The ERC is 0.30 with a t-value of 3.257, significant at or below 0.05 acceptance level.

The R-squared percentage for this combination of developed markets, however, is lower than the results obtained by Beaver et al. (1980), using US market data. Their R-squared values vary from 80 per cent to 95 per cent by grouping the percentage change in price in similar portfolios. Here again, this indicates that for such a developed market, the unexpected earnings explained variation very efficiently.

Once more, this new finding would 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 $0.30 for every one unit change in EPS announced in this test market.

Table 9 also reveals the findings of the combination of emerging countries on portfolio tests. The ERC value of the portfolio is 0.87. Such an ERC size is considered large in relation to the prior studies using an 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 the aforementioned Ariff et al. (2013) and Ariff & Cheng (2011).

Once again, 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 results shown above in Table 9. These findings relate to the research hypothesis H_3.

Again, the magnitudes of the coefficients in the portfolio tests have increased tremendously, which is due to the effect of grouping. The grouping procedure mitigates the errors in the unexpected earnings variables. At the portfolio level, the R-squared value for the ERC test showed considerable improvement to an average of 79 per cent for the ten portfolios. This would then suggest that in this emerging market, the unexpected earnings surprise effect explains greater degree of variation than in any other studies. Second, the size of the ERC in this test has increased substantially and is statistically significant. The ERC is 0.871 with a t-value of 5.561, highly significant at or below 0.001 acceptance level.

It is worth mentioning that the R-squared percentage here is closer to the results obtained by Beaver et al. (1980), using US market data. Their R-squared values vary from 80 per cent to 95 per cent by grouping the percentage change in price in similar portfolios. Here again, this indicates that for such an emerging market, the unexpected earnings explained variation very efficiently.

This new finding would 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 $0.87 for every one unit change in EPS announced in this test market. This result is considered very striking and is clearly in support of the theory of value relevance as have been advanced in the accounting theories.

7. CONCLUSION

This study examines the earnings-to-return relation of company shares in six established developed and emerging markets with robust capital market regulations and with well-developed accounting institutions. The author studied the stock price responses to the earnings change disclosures, measuring the ERC for the period 2001-2014, a period that has not been previously researched. The study covers both financial and non-financial firms. The main motivation of this study is to examine whether ERC behaviour could explain more fully the stock price changes, investigating into the reason why the ERC size is not equal to the number of earnings announced.

The results suggest that accounting earnings change disclosures positively affects stock prices when EPS increases, and negatively if EPS decreases, as reported in previous research in different markets. The tests using all events at individual firm levels – as done for this yet researched period – reveals two main points. First, the direction of the price changes is as per the theory and empirical evidence; and second, the sizes of the ERCs are rather small at the individual stock level which is opposite to the prediction of the value relevance theory. The focus of ERC studies has been on individual aggregation. However, using the individual stock method limits the ERC size due to the non-diversification of the related tests. Hence, the writer applies both individual stock and portfolio methods in this study.

Portfolio tests are used to help reduce the relevant idiosyncratic noise and therefore improve the respective results. When the portfolio method is applied, the results from 10 portfolios reveal much higher ERC and R-squared values than those found when the individual stock was tested. The ERC size for Malaysia portfolio is 0.93, meaning the price change is $0.93 for every dollar of EPS change announced. The Mexican result on portfolio also shows a high ERC size of 0.88, and the Malaysia-Mexico combination result shows an ERC value of 0.87. This is as per the general direction of the value relevance theory. These new findings add significantly to better understand EPS link to stock prices, and especially on value relevance proposition. In my view, these results could add value to the existing literature on the debate about the size of the earnings response coefficient from both developed and emerging economies.

Generally, the ERC values of the two emerging markets and relevant combination are higher than the four developed markets and relevant combination at

both individual stocks and portfolio levels: this is consistent with the emerging markets being riskier. This is due to the different reactions to earnings announcements by the investors in these two types of markets. The investors of the emerging markets react strongly, given the high-risk markets they invest in, while the investors of the developed markets react by a lesser size consistent with their less risky markets. Therefore, the evidence in this study supports the argument that the emerging markets are more speculative than the developed markets.

This study is about a specific ERC topic for the sampled OECD countries and Malaysia. Therefore, the expected results cannot be generalized to all other similar topics or countries. Future studies of similar topics and/or countries are recommended. Additionally, the writer only used unexpected earnings announcements (i.e., the change in EPS) to determine the effect on share price changes, which is consistent with the value relevance theory in accounting and with previous empirical results. However, there are other accounting sources of variations that may be used in this regard such as interest rate and debt-equity ratio.

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