



## **Earnings Response Coefficient of Banking Shares: A Multi-Country Study with Control for Risk**

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### **ABSTRACT**

This paper reports new finding on earnings response coefficients of banking firms on how information disclosed regarding (i) total earnings and (ii) fee earnings is associated with share price changes around the time of financial report releases. This paper extends to banking firms a widely used analysis of earnings response studies on non-banking firms. To obtain robust test results, we extended this common model, for the first time, by adding control variables and also by applying panel regression. Changes in total earnings do influence share prices significantly in the four countries studied i.e. Malaysia, Thailand, South Korea and Australia. Australian investors appear to use disclosed information on *fee* income also to revise share prices significantly as being value relevant. Investors regard both total and fee incomes as equally important in Australia whereas investor actions in the other three markets studied lead to weak evidence on fee income effect. This paper reports new findings on value relevance of disclosures extended to banking firms.

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### **INTRODUCTION**

This paper is on banking firms with a focus on value relevance of accounting earnings disclosures. After four decades of research on *non-bank* firms by accounting researchers, the change in *total* earnings as disclosed in financial statements used by market participants has been shown in

this paper to be a major determinant of share price changes in the four markets included in this paper. There is an excellent review of this literature on non-bank firms in Kothari (2001) and Lev (1989) for interested readers.<sup>1</sup> These two reviews conclude that the earnings change variable is significantly associated with non-bank share price changes around accounting earnings report releases, with R-squared values typically below 10 %. Fairfield *et al.* (1996) is also a significant study on US non-bank firms while Rose (1989) tests non-financial US firms. Chen and Zhang (2007) is a later study, and there are also studies of other countries on non-bank firms, but not banking firms.

This paper is motivated, therefore, to extend the theory to banking firms on what is known in accounting literature. We also extend this analysis to the banking firms of four countries by more carefully modelling the use of an improved method to control some known factors by including new variables and finally applying panel regression, which leads to robust test results,

<sup>1</sup>Continuing research on this topic appears to have changed focus. The latest studies in earnings response coefficients (ERC) are about auditor selections, equity fund raising, stock splits and other accounting variables as these affect the *non-bank* stock price movements (Park and Pincus 2001 and Chen and Zhang 2007). Another study is Anandrajana *et al.* (2010) on value relevance of banks. Their findings show a consensus that the ERC of non-bank firm changes are correlated with firm-specific variables. With the addition of such firm-specific variables, ERC regressions produce higher explained variations as shown by improved R-squared values of about 20 %.

by extending the well-known earnings response model to banking firms.

Because banking firms are more regulated than non-banking firms, and also because bank earnings are dependent on monetary policy changes; bank prices are greatly dependent on business cycles; any investor's revaluation of bank share prices to unexpected earnings news releases is important enough to be studied as a separate topic from that of non-bank firms. Banking firms have yet to be studied systematically on this issue, and this paper aims to make a modest start to contribute to this new accounting research topic.

Further, banking firms are indeed up for special attention in current research. A measurement of a bank's earning response coefficient, ERC, (thus, earning relevance theory) would add significantly new insights to banking share price behaviour. The earnings of commercial banks consist of (i) interest income and (ii) non-interest fee income report as disaggregated items whereas the revenue and earnings of non-bank firms are much more complex. We also incorporate controls, for the first time, for risk and growth in our modelling as suggested by a commentator.<sup>2</sup> We test the established regression model using the new and more reliable panel regression for the first time applied to this type of study so that residual errors in cross sections and in time series are eliminated to produce robust estimates of earnings coefficient parameters.

<sup>2</sup>Controlling the effects of some rather obvious variables is meant to improve the robustness of the test results. We thank an anonymous reviewer for this improvement in our modelling.

The rest of the paper is divided into four sections. The next section contains a very brief review of literature and a short rationale for having selected these four countries for this study. The research process, starting with the hypothesis development, the test models and so forth are included in the following section. The findings are presented in a penultimate section while the paper ends with a short conclusion.

### **RELEVANCE OF BANK EARNINGS RESPONSE COEFFICIENT (ERC)**

Studies to-date over five decades have focused on and identified stock price sensitivity to changes in earnings as a key accounting parameter, hence the development of the value relevance theory of accounting disclosures. The resulting finding has largely helped to justify the price-relevance of earnings reports as strong evidence of the usefulness of accounting earnings disclosures churned out by the profession across all markets at great costs. Applying this to *non-bank* firms has been the mainstay of this line of research in prior research. This has yet been widely applied to studying share prices of banking firms, which, *a priori*, are more sensitive to information. The components of earnings of banks are also quite different in that earnings arise essentially from interest spread and fee income. Therefore earnings are critically connected to a country's monetary regime, which is not the case for the earnings of non-bank firms.

Cheng *et al.* (2008), a first study of commercial banks, provides evidence

of the information content in earnings announcements of commercial banks in a small economy. There is another study relating bank stock price changes to some key factors of US commercial banks: see DeYoung and Rice (2004). They use US data over 1989 and 2001 to study the empirical links between bank's non-interest income (so it does not test the total earnings as is commonly done in such tests), business strategies, market conditions, technological change and financial performance. They indicate that well-managed banks expand more slowly into fee activities and that marginal increases, on average, in fee income are associated with poorer risk-return trade-offs. These studies do not measure share price reactions directly.

In a further indirect study of the banking industry, Rose (1989) shows US results for bank/non-bank financial-services firms as well as non-financial firms over the period 1966-85. He notes that the diversification of banks into non-bank product lines reduced risk to banking returns and the resulting cash flows satisfied appropriate portfolio conditions. He also found evidence consistent with a proposition that individual bank risk may be reduced through selected product line diversification, particularly in the insurance/data processing firms; hence, risk is a known factor for inquiry. There was no direct test of ERC.

As for tests on non-bank firms, which started this line of inquiry a long time back, researchers are very familiar with the earliest study by Ball and Brown (1968) that provides a major impetus for

empirical examination of stock market price formation to disclosures of accounting information. Hence, the concept of value relevance of information releases has been further developed in accounting. In a much later study Kothari (2001) showed strong evidence of how the total change in share prices could be traced to the amount of a firm's value change from earnings changes i.e. ERC. In a 1989 theory paper, Collins and Kothari showed how accounting earnings are related to share price changes. These published theory papers suggest that earnings impact can fully accommodate earnings changes at a time.

The latest studies using the same approach for non-bank firms in non-American stock markets are Lee, Han, Wu and Chow (2005) for the Chinese stock market and Song, Douthett and Jung (2003) for the Korean stock market.<sup>3</sup> The former explores the determinants of government practices of listed Chinese non-bank firms and how the practices affect domestic investor reaction to earnings reports; note that this is not on ERC. They find that investors base their valuation decisions, at least in part, on these earnings reports. This is indicated by a significant relationship between disclosed unexpected earnings and CAR. The second study examines how liberalisation of stock markets affected stock price behaviour, which suggests that non-bank stock prices decreased and the stock price differentiation based on individual firm characteristics increased after market liberalisation. The results also show that the explanatory power of accounting numbers

<sup>3</sup>See also Footnote # 1.

measured by earnings changes increased after market liberalisation.

There is thus a need to explore if the information on total income and disaggregated income released by banking firms is relevant for investors to revise share prices around the time of the release of such information. This is our modest research attempt: to study the value relevance of disclosures by banking firms. In addition, there is a need to link the ERC to find the factors correlated to the price effect.

#### *Country and Sample Selection*

The brief summary above shows that there is but one study of a minor market using ERC-type analysis applied to banking firms: US studies did not directly measure ERC. Few of the Asia Pacific countries are selected in this paper (see Table 1). These countries were among the earliest to first initiate capital market opening, currency reforms and banking sector reforms in the 1980s and 1990s while also adopting efforts to align standards to international accounting practices to improve disclosure quality and coverage of information released. There are at least four countries that have carried out modernisation relevant to our choice in so far as these four countries have reforms promoting market-based signals in capital markets while also providing relevant internationally-accepted accounting information. Tests on more countries would be desirable, although due to time and resource limitations, our selection is a representative sample of Asia Pacific banking markets.

TABLE 1  
Broader Similarities of Accounting, Banking and Market

Countries	Banking Reforms	Accounting institutions
Australia	Currency floated in 1984 Bank supervision separated Interest rate controls dropped Broader bank reforms in 1990s Foreign ownership rule relaxed Broad and liquid stock market	Profession well established Rigorous accounting training CPA and CA competing Good number of standards Strict accreditation standards
South Korea	Currency floated in 1999 Entry barrier relaxed in 1980s Supervision by central bank Foreign ownership rule relaxed Broad and liquid stock market	Profession well established Local university training Harmonisation with international accounting standards Disclosure rules tightened 2000
Malaysia	Currency basket-managed 2005 Capital and currency controls off Competition in capital market enhanced by foreign entry Entry barriers lifted for players Foreign ownership limit lifted Broad and active stock market	2 professional accounting bodies University-based training Moderate number of standards International standards adopted Foreign training recognition; link up with overseas bodies
Thailand	Currency free-floated in 1998 Competition improved with Entry barriers lifted Foreign ownership limits lifted Alien board established: larger A large liquid stock market	Profession university based Moderate number of standards Foreign training accepted International standards accepted very early, attracting foreign firms

The four countries selected de-regulated the financial systems over the mid to late 1980s: freed restrictions on charging bank fees, returned interest rates and exchange rates to be determined by market forces; restrictions on foreign ownership of all shares were lifted/reduced in Korea, Malaysia and Thailand. Australia had little restriction on such matters and the ones (currency; banking supervision) in place have been removed/rearranged since 1984 and again in 1994. On the quality improvements to accounting reports, the three countries selected have made much progress.

Chief among the changes is the adoption of international accounting standards, for example, by Malaysia, which facilitated the entry of foreign firms to this market. Improved quality of financial statements also clearly benefitted the investors to use the information to determine their value relevance actions in the markets. The joint impact of market opening actions improved liquidity in capital markets, removed entry barriers, resulting in improved competition and harmonisation of accounting standards to best practices. These reforms collectively helped the investor to have confidence in information quality and also in the efficiency

of price formation. Accounting training moved from trade institutions such as polytechnics to the universities as degree programmes, thereby enhancing the value of professional training in all these countries.

Unlike these four selected Asia Pacific countries, reforms to financial systems in most other Asian countries such as China and India were put in place only in the mid or late 1990s. So we excluded these countries in this study. Without a competitive and liquid market and the ready availability to and acceptance of accounting information by investors in the market, price reaction study is meaningless, or at best, less accurate. So, care is needed in country selection.

This study places a different focus on the effect of earning announcements on stock prices of commercial banks in Australia, South Korea, Malaysia and Thailand.<sup>4</sup> Following the 1997/8 Asian financial crisis, banks have been restructured in three of these countries, with banks given greater freedom to decide on how they would charge for their services. Thus the magnitude of non-interest income is growing although it has, as of 2010, not surpassed the interest incomes in the four countries. Fee income is increasing steadily as a proportion of total income (in the US, it is 34 % of banking

<sup>4</sup>Interested readers are referred to the following sources for a description of the respective banking sectors of three countries in Cheng *et al.* (2008), Chansarn (2005) and the central bank websites of the four countries. These countries together are often described as having developed accounting institutions sufficiently well and that the share markets are Fama-efficient.

income) and it is a lot less than that, at below 20 %, in these four countries.

The four countries selected follow the too-big-to-fail banking policy, which means the top few banks dominate the whole economy. Also, this policy results in only a few banks being listed on the respective stock exchanges. There are only 10 banks in Malaysia, and all are listed; of the 65 bank-like firms, only 11 are listed in Australia; the 10 Korean listed banks account for two thirds of the total assets; Thailand, likewise, is dominated by the 10 selected banks. Therefore, our original sample consists of 4 countries x 10 banks x 8 years of data for the regression tests. In the case of share prices, we obtained monthly share prices to measure the CAR via market model parameters: so the share price data is 12 times larger than the panel data.

## **DATA, HYPOTHESES AND METHODOLOGY**

### *Hypotheses*

The central hypothesis is that the already established positive earnings-to-price relationship of non-banking firms is also likely observable for commercial banking firms in the four markets included in this study. Earnings increases (decreases) of banks should induce a direct impact on share prices at the time of disclosures of earnings reports. If it is so, we test to see whether this relationship is also evident for both total income and non-interest income disclosures by the banks in the four countries. Therefore, the null hypothesis is:

*H<sub>1</sub>: Bank's stock price changes are not significantly correlated with the magnitude of unexpected changes in their reported total annual earnings.*

Since this study is conducted in four different markets, *a priori* expectation is that this hypothesis is rejected in the four different markets. There is no *a priori* reason to suspect that the positive relation is absent for banks especially since these four markets operate with market-based incentives under largely de-regulated financial environments. The null hypothesis is expected to be rejected if there is no significant relation between the stock price changes and the unexpected annual earnings changes. That is, the coefficients denoted as *ds* are significant in all tests using several models that will be discussed later.

The second hypothesis concerns the additional use of disaggregated income items:

*H<sub>2</sub>: Bank's non-interest income has no information content beyond unexpected changes as reported in reported total annual earnings.*

This hypothesis is rejected if the non-interest income contains information beyond unexpected total earnings. This will be the case if the coefficients denoted as *θs* are significant (or did have the correct signs) in the models to be specified later.

The control variables are included, for the first time, in our extended models. These

control variables are firm-specific variables to be added after the usual earnings variables to more fully specify the model. The expected signs of the variables are described in the relevant discussion on variables. We added two key risk variables to extend the basic model in the literature. We include risk and growth variables in case there is an effect from these omitted variables in the original model. There are likely to be other variables omitted here but which may have some effect. For example, size variable is often used, but we decided that the size of the change in total earnings captures to some extent the size effect. We felt that risk could be included as a standard deviation of share price returns. For growth, we use a very commonly used variable (popular price-to-book ratio in finance literature) as a robustness check; we specify price-earnings ratio for this<sup>5</sup>. Hence, the extension of the original model with controls is meant to verify the impact of known factors on the ERC.

<sup>5</sup>There are several variables, as suggested during the review process, which could be explored for modelling. For example, earnings level if included will introduce the econometric issue of stationarity. To avoid that, we excluded this variable. There could be an effect from the risk of low/high capital adequacy of banks or even non-performing loans: to include these factors, we needed information of the type, which is not readily available. The same may be said of a couple of other omitted variables found in the literature. We trimmed the earnings events by deleting coinciding non-earnings events disclosed in the test windows. Thus, it could be worthwhile to extend this study as a separate future effort, using more firm-specific, even macroeconomic variables, to explore the omitted variable problem.

To ensure that the results do not suffer from multi-collinearity, we measure the Variance Inflation Factor (see the statistics in the tables): the test results suggest that this is not a problem for our multiple regressions mainly because the variables are ratios of rate of changes. Our *a priori* expectation is that the null will be rejected since the banks report some growing amount of earnings from both total earnings and non-interest incomes. There are also prior studies that show a significant impact of some control variables. To improve the robustness of parameters estimated in the model, we use the more current panel regression so that there is control for variations across subjects and across time periods.

#### *Test models*

ERC has been predominantly defined as the coefficient measure of unexpected total accounting earning obtained by regressing abnormal share market returns (returns are usually adjusted by Sharpe (1963) market model) on earnings changes of each firm and then aggregating the impact across all firms. Some studies included other variable(s) placed as control variables (Collins and Kothari, 1989; Kothari & Zimmerman, 1995; Willet *et al.*, 2002; Chansarn, 2005). The price effect is normally derived by regressing unexpected (i.e. abnormal) share returns, the CAR, and the unexpected total earnings of usually non-financial firms to test for a significant relationship. There are many published studies on the topic, and we refer the reader to those existing review

articles cited in this paper<sup>6</sup>.

Therefore, the dependent variable in this research is a well-established share price returns measure, the CAR, and the independent variable is the unexpected changes in earnings. The estimation of CAR is explained in the next section.

**Model 1:** Following the very commonly used model, we have:

$$\begin{aligned} \text{CAR}_{jt} \\ = c_1 + d_1 \text{SUE}_{jt} + v_{jt} \end{aligned} \quad (1)$$

where,

$\text{CAR}_{jt}$  is the measure of risk-adjusted returns for bank  $i$  over the announcement period  $t$ ,  $\text{SUE}_{jt}$  is a change in earnings over two consecutive years is the unexpected earnings change (to be defined later); the value of standardised unexpected total annual earnings, SUE, is the value divided by standard deviation of earnings over the test period,

$d_1$  is the slope coefficient of the regression is the ERC, and

$v_{jt}$  is the random disturbance term assumed to be normally distributed

**Model 2:** To test the second hypothesis of whether a disaggregated income is relevant for share price, we developed this model:

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<sup>6</sup>One critical commentator states that the low explanatory power of such regressions in this line of research can be interpreted as accounting earnings being uninformative about value changes (Lev, 1989). However, the mainstream position is that this kind of research establishes the usefulness of accounting releases to market price formation.



$$\begin{aligned} \text{CAR}_{jt} \\ = c_2 + d_2 \text{SUE}_{jt} + \theta_1 \Delta \text{NI}_{jt} + \varepsilon_{jt} \end{aligned} \quad (2)$$

where,

$\text{CAR}_i$  is a measure of abnormal returns, over and above market price changes attributed to the disclosure of earnings report,

$\text{SUE}_i$  is the standardised unexpected earnings from unexpected earnings, and

$\Delta \text{NI}_i$  is a change in non-interest income/total income

Since this variable is a ratio, there is no need to use unit normal transformation as done in the case of UE for statistical robustness.

**Model 3:** The relationship between abnormal returns, CAR, is tested with the unexpected total earnings and the non-interest income/total income as an alternative specification of Model 2.

$$\text{CAR}_{jt} = c_3 + d_3 \text{SUE}_{jt} + \theta_2 \text{NITI}_{jt} + \tau_{jt} \quad (3)$$

where,

$\text{CAR}_{it}$  is the abnormal returns over a 12-month window,

$\text{SUE}_i$  is the standardised unexpected annual earnings, and

$\text{NITI}_i$  : non-interest income/total income (a variation of the same variable used in Model 2)

The three regression models are run for each country, one at a time. In these tests, the parameters of interest are the ERC parameters (the  $d$ s and  $\theta$ s) in each of the equations. Those parameters will be tested to see if the variables SUE,  $\Delta \text{NI}$  and NITI are relevant for bank stock price changes. The

theory suggests that the coefficients should be positive and significant if the investors value the changes in the total earnings and the non-interest earnings (disaggregated item) as price-relevant information.

**Models with control variables:** The two most common control variables are risk and the growth of earnings of a firm. We specify standard deviation ( $\sigma_p$ ) of share price return as total risk of share price changes. The price earnings ratio (P/E) is specified as a proxy for earnings growth. Therefore, the final model is as follows:

$$\begin{aligned} \text{CAR}_{jt} \\ = c_4 + d_4 \text{SUE}_{jt} + \theta_3 \Delta \text{NI}_{jt} + \theta_4 \text{NITI}_{jt} \\ + \delta_1 \sigma_{pj} + \delta_2 \text{P/E} + \varepsilon_{jt} \end{aligned} \quad (4)$$

where, in addition to variables defined earlier,

$\sigma_p$  is the standard deviation of the bank share price returns, and

P/E is the price earnings ratios of the banks as growth variable

Model 4 (and its variants as 5, 6 and 7) is a different specification of the basic model with control variables to obtain a parsimonious set of results<sup>7</sup>.

<sup>7</sup>A further refinement would be to apply pooled regression across all four countries with a dummy variable for countries. That could produce one set of collective results for the four countries. We decided to show results for each country rather than one group as we believe this manner of presenting results provides a richer set of results for each country, as all four countries are in any known sense not closely-knit as a group. A study of EU countries, for example, could perhaps adopt that method since countries from the EU would be economically integrated.

Two methodological issues that may be of concern need to be commented upon. One is the confounding effects of events coinciding with or appearing as delayed effects from other announcements. We took care to eliminate all known accounting information disclosures falling within the test windows. The only confounding effects could have been from non-accounting disclosures in the same period. For this, we appeal to the general assumptions, of which some of the pertinent information may have affected the prices randomly, so that on average, their effects are neutral.

A second issue is whether accounting information effect fully captures price effect. This is a debatable issue because firstly, there is non-accounting information that is always coming in, and secondly, the semi-strong form of efficient market theory rests on the basis that the effect is seen anticipated, and rarely is significant in the post-event window. Hence, the methodology adopted here to take care of the econometric and statistical errors found in earlier studies should produce results that are unbiased although in terms of non-accounting information effect, one appeals to their random nature so that there is no systematic bias in the results reported in the paper.

#### *Variable derivations*

Sharpe's (1963) market model is usually applied as a standard general equilibrium model relationship for asset return generation. To identify the date over which the CAR has to be measured, we needed the

announcement month of earnings report. Studies suggest final earnings reports are released during the first to third months from the end of the financial years, so the time of disclosure  $t=0$  is the announcement month spanning end of months 1 or 2 or 3 following the accounting year ends. If one takes the prices of the third month using the actual release date report, then stock price effect in that month as well the price changes in the prior months are in fact due to the impact of disclosures by a bank. Most reports are made in the months 2 and 3 after the year end. So, the abnormal returns are first obtained by running an OLS regression using monthly return data series of each stock market index ( $R_{mt}$ ) and the share prices of each of the selected country's disclosing bank, ( $R_{it}$ ).

The market model regression is run as  $R_{it} = \alpha_i + \beta_i R_{mt} + e_{it}$  with five years of monthly returns data to estimate the parameters ( $\alpha_i$  and  $\beta_i$ ) of the  $i$ -th bank around the disclosure months  $t=1$  or 3 and backwards to months 1 month before the previous year end. This enables the abnormal returns at the  $t$ -th month to be estimated for each bank as follows:

$$AR_{it} = R_{it} - [\alpha_i + \beta_i R_{mt}] \quad (5)$$

where,

$R_{it}$  is  $[P_{it} - P_{i(t-1)}] / P_{i(t-1)}$ ,

$R_{mt}$  is  $[I_t - I_{(t-1)}] / I_{(t-1)}$ ,

$I$ ,  $P$  are market price index value using a composite index ( $I$ ) and adjusted prices of bank stocks ( $P$ ),

$\alpha_i$  is the intercept of the regression between stock returns and market returns, measured

as monthly returns, and  $\beta_i$  is the slope of the regression between stock returns and market returns representing the responsiveness of the stock price to price movements in the overall market represented by a composite index of the market

The window of analysis for the ARs is taken as the months starting with the month of announcements (month  $t=0$ ) and prior months up to at most 11 months, in conformity with similar usage in accounting studies.<sup>8</sup> Hence, the market price reactions to observations in the post-disclosure months are not likely to be significantly different from zero as price changes pick up the information in disclosures. The abnormal returns of each bank's response over the period from month 0 and prior months are cumulated as follows,

$$CAR_i = \sum_{t=0..T} AR_{it} \quad (6)$$

for each bank  $i$  so that for each country  $j$  (symbol not shown) share price effect is measured as the CAR for each of the 10 banks for each year of the seven years under observation. Thus there are  $10 \times 7 = 70$  observations for each country's test(s) sufficient for reliable parametric test statistics.

Next, we measure the change in earnings over each consecutive year over 8 annual observations for each bank in each country. Observations of earnings can be specified as total income, interest income and non-

interest income. Non-interest income is included in the regression equation as independent variable to study if the effect of this disaggregated reporting item also affects the share prices in addition to the total earnings. The non-interest income and a bank's financial performance are interrelated in general, so using this item of disclosure will reveal if this disclosure affects share prices<sup>9</sup>.

The changes in earnings over any two periods are computed as:

$$\Delta NI_i = [NI_{it} - NI_{i(t-1)}] / NI_{i(t-1)} \quad (7)$$

To provide a robustness check, this variable on non-interest income is specified alternatively as a ratio: non-interest income divided by total income.

$$\begin{aligned} NITI_i \\ = \text{Non-interest income/total income} \end{aligned} \quad (8)$$

These variables sets are now grouped by country  $j=1, 2, 3, 4$ . The individual bank data of each country are matched with bank price variables. The variables are tested using three versions of the theory: Model 1 is the original version on total earnings closely following established procedure in accounting (except that we use panel regression across 10 banks in each country, so our results are clearly robust) while

<sup>9</sup>Cheng *et al.* (2008) finds that (in one emerging country) banks with large amounts of fee income suffered share price declines despite the common aphorisms that it is the banks with high-quality management that should generate fee income; thus, one would expect share prices to go up.

<sup>8</sup>There are several dated and well cited studies of market efficiency of these markets. Hence, we are citing them in this paper.

the other two sets of results are meant to examine if the information conveyed by the disaggregated items has additional impact on share prices. Finally, in a final test of the basic models, we also re-estimate the coefficients of the main variables after controlling the effects of control variables.

#### *Data sources*

The data are sourced from two databases at University Putra Malaysia: Bankscope and Datastream. The data relate to the four countries over 8 years from 2000 to 2007 (before the world financial crisis) so that the changes in earnings are computed over seven consecutive two years. The data set includes only the stock market listed banks: the 40 largest banks in the four countries. The 10 banks in each of the four countries are large banks, and together these accounts for four fifths of the assets in each banking sector. In the case of Malaysia, the 10 banks are the only banks resulting from mergers of some 54 deposit-taking institutions as part of a 1999-01 central bank reform process. Thus, the 10 banks represent the total banking system. The names of the banks are listed in the Appendix.

The observations on monthly closing prices of banks over the test period and the respective market index values are obtained from Datastream whereas the financial statement items relating to banks are taken from the Bankscope database. These were annual earnings, interest income, non-interest income, and total assets as at the reporting period used for this study. In some cases, where the data series were

incomplete, access to financial statements of the banks in the web sites provided additional data for completing and, in some cases, corroborating the data items. The data set for the tests was then screened using Winsorian tests so as to remove transcription errors or extreme outliers. Also, elimination of coinciding events is meant to eliminate confounding effects.

## **FINDINGS**

### *Descriptive statistics of banks*

The summary descriptive statistics of the banks by country are found in Table 2. The Australian banks are the largest in this study in terms of total assets, as befits the size of the Australian economy. The 10 largest listed banks have total assets amounting to USD296 billion. The banking sectors of the other three countries have the following total assets in billions: USD71.3 (Malaysia), USD48.8 (Thailand) and USD183.7 (Korea). The smallest single bank is a Thai bank with total assets of USD172 million while the smallest bank in Malaysia has assets of USD409 million and the smallest bank in Korea has assets of USD653 million.

Columns 4, 5 and 6 of Table 2 indicate the average total income, interest incomes and the percentage of interest incomes to total incomes for the banks in the respective countries. The Australian banks have interest incomes ranging from 45.2 % to 90.3 % with a mean of 76.2 % across the selected banks. That means the non-interest income is about 24 % of total income. The Korean banks have interest incomes ranging

between 32.8 % and 91.7 % with an average of 69.5 %. Malaysian bank numbers are anywhere in the range of 66.8 % to 82.7 % with a mean of 75.8 %. We also provide the median numbers for the variables. As is seen, the medians are not close to the values of averages, as is common in studies using such values. We believe, given the absence of multi-collarity and use of panel regressions as shown in our tests in later tables, this aspect of the variable is unlikely to lead to errors in our test statistics.

Thailand's banks have a mean of 75.8 % with a range of 66.5 % and 89.5 %.

Comparing the four countries, two (Malaysia and Thailand) have a similar income breakdown of non-interest income while Korean and Australian banks have a wider spread in their interest incomes.

Table 3 shows the averages of the same variables over a seven-year period. Comparing these numbers against the 2007 numbers in Table 3 shows how non-interest income has increased/decreased in these countries. The non-interest incomes of Australian banks have steadily increased from USD10.3 billion in the year 2001 to USD17.9 billion. The Australian banks

TABLE 2

Descriptive Statistics of Representative Banks in Thailand, Korea, Malaysia and Australia, Most Recent Year 2007 (USD million) with  $n=10 \times 4$

		Total Assets	Total Income	Interest Income	%	Non-Int Income	%
1	2	3	4	5	6	7	8
			A	B	B/A	C	C/A
Australia	Mean	111,038.3	8,030.8	6,236.0	76.2	1,794.8	23.8
	Median	65,149.3	4,703.8	3,030.2	64.4	2,072.9	44.0
	Min	9,286.3	653.9	554.9	45.2	70.3	9.7
	Max	296,252.1	19,793.9	15,615.7	90.3	4,178.2	62.1
South Korea	Mean	79,117.9	3,453.0	2,101.7	69.5	1,351.3	30.5
	Median	27,298.3	2970.1	1798.3	19.2	1424.2	16.7
	Min	2,772.2	137.7	118.5	32.8	11.5	8.3
	Max	223,044.4	8,666.7	4,848.0	91.7	4,091.2	67.2
Malaysia	Mean	27,906.9	1,695.2	1,257.4	75.8	350.3	18.3
	Median	20,839.6	1,321.9	1,019.2	84.4	252.9	15.6
	Min	7,333.1	409.2	311.7	66.8	60.0	13.1
	Max	71,296.4	4,063.5	3,015.6	82.7	1,183.5	30.9
Thailand	Mean	22,108.4	972.1	716.6	75.8	255.5	24.2
	Median	24,492.4	705.9	537.3	74.3	168.6	25.7
	Min	171.7	171.8	124.9	66.5	24.3	10.5
	Max	48,726.8	2,024.1	1,436.5	89.5	602.3	33.5

Note: Exchange rate: 1 USD = 1.6 Australian Dollar; = 1,454.96 Korean Won; = 3.6 Malaysian Ringgit; = 33.5571 Thai Baht

have a positive increase in the amount of fee incomes but the increase is less than the increase in interest incomes. The non-interest income in terms of percentage declined by 2 % over the period. The fee incomes of Malaysian banks increased from USD1.2 billion in the year 2001 to USD3.4 billion in the year 2007; from 15 % of the total income in the year 2001 to 20.6 % of total income in the year 2007. The increase is more than 5 %. Therefore, the rate of increase in the non-interest fee incomes is greater than the rate of increase in the interest incomes, a result opposite to that seen in the Australian banks.

Thai banks' non-interest fee incomes increased from USD1.4 billion in the year 2001 to USD2.5 billion in the year 2007. The increase is 34.4 % of the total income in the year 2001 and 26.3 % in the year 2007. Thai banks have a positive increase in the amount of fee incomes but the increase is less than the interest income. Therefore, the percentage dropped by 8 %. The rate of increase in the fee income for Thai commercial banks is less than the rate of increase in the interest incomes, as in Australia. The non-interest fee incomes of Korean banks increased from USD5.4 billion (2001) to USD9.4 billion (2007). The increase is 35 % of the total income to 33 % in the period. Similar to the Thai banks, Korean banks have a positive increase in the amount of fee income but the increase is less than the increase in interest income. The fee income dropped by 2 %. Therefore, the rate of increase in the fee income for Korean banks is less than the rate of increase in

interest incomes. This suggests that, unlike in Malaysia, there have been declines (thus increased risk) in the expectations about this item in the other three countries.

Table 3 also provides information on total income, interest income and fee income from 2001 to 2007. The fee income for Malaysian commercial banks has been increasing from USD1.2 billion in the year 2001 to USD3.4 billion in the year 2007. The increase formed 15 % of the total income in the year 2001 and 20.6 % of total income in the year 2007.

The increase is more than 5 %. Therefore, the rate of increase in the fee income for Malaysian commercial banks is greater than the rate of increase in the interest income.

The fee income for Australian commercial banks increased from USD10.3 billion in the year 2001 to USD17.9 billion in the year 2006. The increase formed 24.7 % of the total income in the year 2001 and 22.3 % of total income in the year 2007. The Australian banks have a positive increase in the amount of fee income but the increase is less than the interest income. The fee income in terms of percentage dropped by 2 %. Therefore, the rate of increase in the fee income for Australian commercial banks is greater than the rate of increase in the interest incomes.

The fee income for Thai commercial banks increased from USD1.4 billion in the year 2001 to USD2.5 billion in the year 2007. The increase formed 34.4 % of the total income in the year 2001 and 26.3 % of the total income in the year 2007. The

TABLE 3  
Total Income, Interest Income and Fee-income of Banks in Australia, Korea, Malaysia and Thailand,  
(USD million) with n=270

Yr-end	Total Income (A)	Interest Income (B)	% B/A	Fee Income (C)	% C/A
Australia - Panel A					
2006	80,307.9	62,360.2	77.7	17,947.7	22.3
2005	70,169.6	51,723.8	73.7	18,445.8	26.3
2004	48,036.4	34,783.2	72.4	13,253.2	27.6
2003	41,418.7	29,669.4	71.6	11,749.2	28.4
2002	38,687.0	27,615.5	71.4	11,071.5	28.6
2001	41,721.8	31,434.9	75.3	10,286.8	24.7
South Korea - Panel B					
2007	28,438.6	19,016.6	66.9	9,422.0	33.1
2006	24,062.6	16,279.2	67.7	7,783.3	32.4
2005	20,478.4	15,166.5	74.1	5,311.9	25.9
2004	19,514.7	14,769.6	75.7	4,745.2	24.3
2003	18,329.1	12,629.5	68.9	5,699.6	31.1
2002	15,379.3	10,038.3	65.3	5,340.9	34.7
2001	13,342.2	5,945.1	44.6	7,397.2	55.4
Malaysia - Panel C					
2007	16,369.4	12,991.0	79.4	3,378.4	20.6
2006	13,667.4	11,069.8	81.0	2,597.6	19.0
2005	11,933.0	9,652.4	80.9	2,280.7	19.1
2004	11,276.3	9,313.6	82.6	1,962.8	17.4
2003	10,138.3	8,554.7	84.4	1,583.6	15.6
2002	9,034.9	7,653.3	84.7	1,381.6	15.3
2001	8,613.4	7,319.3	85.0	1,294.1	15.0
Thailand - Panel D					
2007	9,720.9	7,165.7	73.7	2,555.2	26.3
2006	9,242.7	6,725.6	72.8	2,517.1	27.2
2005	7,830.4	5,720.5	73.1	2,110.0	27.0
2004	6,860.9	4,689.8	68.4	2,171.1	31.6
2003	5,512.7	3,541.0	64.2	1,971.7	35.8
2002	4,803.3	3,075.5	64.0	1,727.8	36.0
2001	4,188.2	2,748.8	65.6	1,439.3	34.4

Thai banks have a positive increase in the amount of fee income but the increase is less than the interest income. Therefore, the percentage amount dropped 8 %, and the rate of increase in the fee income for Thai commercial banks is less than the rate of increase in the interest income.

The fee income for Korean commercial banks increased from USD5.4 billion in the year 2002 to USD9.4 billion in the year 2007. The increase formed 35 % of the total income in the year 2002 and 33 % of the total income in the year 2007. Similar to the Thai banks, Korean banks have a positive increase in the amount of fee income but the increase is less than that of the interest income. The fee income in terms of percentage dropped by 2 %. Therefore, the rate of increase in the fee income for Korean commercial banks is less than the rate of increase in the interest income.

#### *Do earnings disclosures affect bank share prices?*

This sub-section reports the main findings on ERC using the commonly used model as extended in this study. Our aim is to test and discuss if the findings on banking firms are similar to those on non-bank firms. The results are presented by country.

**Australia:** The statistics in Table 4 obtained for Model 1 show results using the Australian data over seven years for the 10 largest banks. The coefficient of standardised unexpected total earnings (SUE) is 0.040 with t-statistics of 2.753 with a highly significant p-value of 0.008. Thus, as in the other countries to be discussed in

this section, information on unexpected change in total earnings had a positive and significant impact on share prices because investors used the disclosures to revalue share prices in the period ahead of disclosure date. The R-squared value is 10 %. This result is consistent with all previous research on non-bank earnings response coefficients reported. The earnings response coefficient is a significant factor in bank share price revisions as tested in this study.

The results from Model 2 include an additional variable, the unexpected fee income ( $\Delta NI$ ), as another independent variable besides total earnings. The results show that the coefficient for unexpected earnings, SUE, in this model is about the same, again 0.040, with a t-statistic of 2.725, which is also significant as indicated by the p-value of 0.009. The coefficient on unexpected fee income is 0.021, and it has a t-statistic of 0.174, which is not significant at all. It appears, as has been shown in several studies of non-bank firms using extraordinary income, Australia investors in this major market appear to value total income more than non-interest income, which is a minor portion of the earnings.

The results from using an alternative specification of non-interest income as in Model 3 produced a significant result. The coefficient for SUE is 0.046 with a t-statistic of 3.145, thus significant with a p-value of 0.003. The coefficient on non-interest (fee) income is significant with a value of 0.133 and t-value at 1.801 and p-value at 0.077, acceptable 0.10 probability level. This suggests that unexpected fee income



TABLE 4  
Regression Results of Returns-to-Earnings Relation of Banks, Australia: 2001-2007

This table provides a summary of results of seven regressions using the four basic models developed in this paper. The basic model (Equation 1:  $CAR_{jt} = c_1 + d_1 SUE_{jt} + v_{jt}$ ) is extended by including an additional variable for fee income in Model 2. The other 4 models from 4 to 7 include control variables on growth and risk to specify key omitted variables.

Australia, n = 70							
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant, $a_1$	-0.034	-0.039	-0.060	-0.066	-0.087	-0.265	-0.284
	-1.625	-1.077	-2.390	-1.709	-1.927	-2.658	-2.786
	(0.110)	(0.286)	(0.020)**	(0.093)	(0.059)*	(0.010)**	(0.007)***
SUE, $d$	0.040	0.040	0.046	0.047	0.046	0.054	0.053
	2.753	2.725	3.145	3.115	3.071	3.614	3.589
	(0.008)***	(0.009)***	(0.003)***	(0.003)***	(0.003)***	(0.001)***	(0.001)***
$\Delta NI$ , $\theta_1$		0.021		0.026	0.005	0.087	0.067
		0.174		0.214	0.041	0.733	0.551
		(0.862)		(0.831)	(0.967)	(0.467)	(0.584)
NII, $\theta_2$			0.133	0.133	0.135	0.091	0.093
			1.801	1.790	1.814	1.219	1.246
			(0.077)*	(0.079)*	(0.075)*	(0.228)	(0.218)
Risk $\sigma$ , $\delta_1$					0.025		0.025
					0.900		0.909
					(0.372)		(0.367)
P/E Ratio, $\delta_2$						1.157	1.153
						1.152	1.140
						0.136)	(0.137)
Adj-R-squared	0.100	0.085	0.134	0.119	0.116	0.173	0.170
F-stat	7.579***	3.741***	5.557***	3.658***	2.937**	4.079***	3.418***
Variance Inflation Factor = VIF	1.000	1.023	1.056	1.081- 1.024- 1.056	1.082- 1.061- 1.057- 1.038	1.138- 1.087- 1.134- 1.208	1.140- 1.125- 1.135- 1.038- 1.208

Note: Values in bracket are t-statistics and p-values are significant at (\*) 0.1, (\*\*) 0.05 and (\*\*\*) 0.001 levels. VIF shows no multi-collinearity problem in the regression.

SUE = standardised unexpected earnings;  $\Delta NI$  = change in net income; NITI = change in net income relative to total assets; Risk = standard deviation of EPS over 8 years; P/E = price to book ratio of bank shares as growth proxy

disclosures by banks have significant information value to investors in addition to the information disclosure on total earnings change. This result is consistent with the concept that well-managed banks in this market are seen by investors as earning significant interest and fee income, both being valuable for revaluation of share prices. The use of a refined variable as in Model 3 made a difference to test results. So, specification of the variable is important.

Model 4 (and its variation of) regression analyses includes control variables in addition to interest income, non-interest income by including risk and growth of earnings (also price-to-earnings variable) as controls. The results are surprising. The risk and growth variables have no influence on the earnings response after the earnings variables have extracted the value. However, the growth variable (P/E) appears to be relevant only if the  $\Delta$ NI variable is included.

**Korea:** Table 5 provides a summary of test results of regressions using the models with the data set relating to 10 South Korean banks.

The results from Model 1 yielded a coefficient of 0.129 on total earnings with t-statistic of 2.258, which is significant at 0.031 probability level. The R-squared value is 11.7 %, low but similar in size to findings in most studies. Compared with the Australian market, this R-squared value is quite similar in size. The results indicate that the information disclosed as unexpected total earnings had a similar effect on the returns of the stocks as in Australia. This indicates that Korean investor behaviour

relating to bank stock pricing is somewhat similar to that of Australia and also similar to non-bank firms.

The findings from using Model 2 would suggest that the coefficient for SUE is 0.127 with a t-statistic of 2.00, which is significant at 0.030 probability level. The coefficient for the change in non-interest income is -0.504 with t-statistic of -1.529, and, contrary to theory, with a negative sign. It is not significant at any acceptable confidence level as the probability is 0.137.

Results from Model 3 suggest that the coefficient on SUE is 0.131 with a t-statistic of 2.264, which is also significant at 0.031 probability level. The coefficient for non-interest income over total income is 0.042 with a t-statistic of 0.527. That coefficient is positive but is not significant at levels usually acceptable given that the measured probability is 0.602. This shows the non-interest income effect is positive as predicted but the investors do not appear to value this information as significant. Taken together, Korean investors value disclosures on total income and not non-interest income, although the sign is correct.

Model 4 (and its variants) produced results for control variables added in addition to interest income, non-interest income, risks and earnings growth. The results show that after the effect of change in total income (SUE) and non-interest (fee) income, risk and growth variables have no influence on the share price revisions. The control variables did not matter.

**Malaysia:** The statistics in Table 6 from regression Model 1 show share price

TABLE 5  
Regression Results of Returns-to-Earnings Relation of Banks, Korea: 2001-2007

This table provides a summary of results of seven regressions using the four basic models developed in this paper. The basic model (Equation 1:  $CAR_{jt} = c_1 + d_1 SUE_{jt} + v_{jt}$ ) is extended by including an additional variable for fee income in Model 2. The other 4 models from 4 to 7 include control variables on growth and risk to specify key omitted variables.

South Korea, n = 70							
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7
Constant, $a_1$	-0.008	0.119	-0.017	0.114	0.125	0.145	0.157
	-0.159	1.245	-0.321	1.179	1.161	1.440	1.406
	(0.875)	(0.223)	(0.751)	(0.248)	(0.256)	(0.161)	(0.172)
SUE, $d$	0.129	0.127	0.131	0.130	0.131	0.136	0.136
	2.258	2.275	2.264	2.303	2.268	2.398	2.361
	(0.031)**	(0.030)**	(0.031)**	(0.029)**	(0.032)**	(0.024)**	(0.026)**
$\Delta NI$ , $\theta_1$		-0.504		-0.532	-0.521	-0.478	-0.465
		-1.529		-1.591	-1.515	-1.415	-1.340
		(0.137)		(0.123)	(0.141)	(0.169)	(0.192)
NII, $\theta_2$			0.042	0.057	0.055	0.047	0.045
			0.527	0.722	0.687	0.590	0.555
			(0.602)	(0.476)	(0.498)	(0.560)	(0.584)
Risk $\sigma$ , $\delta_1$					0.000		0.000
					-0.251		-0.270
					(0.804)		(0.789)
P/E Ratio, $\delta_2$						-0.004	-0.004
						-1.052	-1.039
						(0.302)	(0.308)
Adj-R-squared	0.117	0.155	0.095	0.140	0.111	0.144	0.113
F-stat	5.099***	3.833***	2.627**	2.687**	1.963*	2.300**	1.791*
Variance Inflation Factor = VIF	1.000	1.000	1.006	1.006- 1.014- 1.019	1.006- 1.033- 1.026- 1.024	1.015- 1.038- 1.035- 1.046	1.016- 1.058- 1.042- 1.024- 1.046

Note: Values in bracket are t-statistics and p-values are significant at (\*) 0.1, (\*\*) 0.05 and (\*\*\*) 0.001 levels. VIF shows no multi-collinearity problem in the regression.

SUE = standardised unexpected earnings;  $\Delta NI$  = change in net income; NITI = change in net income relative to total assets; Risk = standard deviation of EPS over 8 years; P/E = price to book ratio of bank shares as growth proxy

changes and the change in total earnings data, SUE, of all the banks over seven years. The coefficient on SUE is 0.086 with t-statistics of 2.444 with a p-value of 0.019, which is significant. The R-squared value is 7 % meaning that about 7 % of variation in share price returns is explained by earnings changes. The result is consistent with all previous research on earnings response coefficient literature relating to non-financial corporations. Thus, our tests on banking firms help to verify that this is true for commercial banks in this emerging economy. Thus, in the case of Malaysian banking firms, the earning impact is binding.

The results from Model 2 are from adding unexpected fee income as another independent variable. The results show that the coefficient for SUE is 0.066 with a t-statistic of 1.95 and a p-value of 0.059. Thus, the earnings impact continues to be significant in this economy. The coefficient for unexpected fee income ( $\Delta NI$ ) is -1.884 with a t-statistic of -2.412 but a p-value of 0.021, which is significant but not positive as expected. This suggests that unexpected fee income information has significant negative information for investors, and so it does significantly affect share valuation by investors at the time of information release. It is possible that this result is driven by extreme values (despite Winsorian checks) since some banks in this banking sector have a large fee income while most banks have a very low fee income. The results from alternative specification of fee income produced a positive coefficient, but it is not statistically significant. Thus, one should

conclude that fee income disclosure has no discernible effect in Malaysia's banking sector.

The results shown against model 4 (and its variations) are with control factors. This test is meant to fully specify earnings with non-interest income, risks and growth factors. As with all three prior countries, the risk and growth variables have no influence on share price changes after earnings impact.

**Thailand:** A summary of results for this country is to be found in Table 7. The statistics show that the coefficient for unexpected change in total earnings in the measured relationship in Model 1 is 0.136 with a t-statistic of 2.746, which is significant since the computed p-value is 0.009. The coefficient for change in non-interest income in Model 2 is -0.034 with a t-statistic of -0.168, the sign being contrary to theory.

The coefficient for change in non-interest income is negative (as in Malaysia and in the US) and is not significant since the computed p-value is 0.868, below the acceptable 0.10 level. This suggests that investors do not value the change in non-interest income information. But the re-specification of fee income appears to make a difference to the result. The results using Model 3 indicate the SUE coefficient is still significant with a coefficient of 0.117 with t-statistic of 2.127 and a computed p-value of 0.039. The coefficient for non-interest income over total income is 0.056 with a t-statistic of 0.831, a result that matches expectation. The adjusted R-squared value is 11.4 %, which is almost similar to 12 %

TABLE 6  
Regression Results of Returns-to-Earnings Relation of Banks, Malaysia: 2001-2007

This table provides a summary of results of seven regressions using the four basic models developed in this paper. The basic model (Equation 1:  $CAR_{jt} = c_1 + d_1 SUE_{jt} + v_{jt}$ ) is extended by including an additional variable for fee income in Model 2. The other 4 models from 4 to 7 include control variables on growth and risk to specify key omitted variables.

Malaysia, n = 70							
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant, $a_1$	-0.016	0.282	-0.017	0.291	0.270	0.293	0.272
	-0.565	2.225	-0.452	2.267	1.990	2.230	1.976
	(0.575)	(0.032)**	(0.654)	(0.029)**	(0.054)	(0.032)**	(0.056)
SUE, $d$	0.086	0.066	0.086	0.063	0.061	0.064	0.063
	2.444	1.950	2.402	1.807	1.722	1.774	1.735
	(0.019)***	(0.059)*	(0.021)**	(0.079)*	(0.094)*	(0.085)*	(0.091)*
$\Delta NI, \theta_1$		-1.884		-2.031	-2.077	-2.020	-2.056
		-2.412		-2.488	-2.504	-2.426	-2.441
		(0.021)**		(0.017)***	(0.017)***	(0.020)**	(0.020)**
NII, $\theta_2$			0.001	0.106	0.121	0.109	0.137
			0.006	0.674	0.751	0.677	0.809
			(0.995)	(0.504)	(0.457)	(0.503)	(0.424)
Risk $\sigma, \delta_1$					0.072		0.094
					0.508		0.598
					(0.615)		(0.554)
P/E Ratio, $\delta_2$						0.000	-0.001
						-0.128	-0.350
						(0.899)	(0.729)
Adj-R-squared	0.070	0.098	0.133	0.113	0.115	0.097	0.092
F-stat	5.973***	6.266***	2.910**	4.269***	3.202***	3.120***	2.523**
Variance Inflation Factor = VIF	1.000	1.059	1.008	1.085- 1.141- 1.086	1.098- 1.155- 1.127- 1.046	1.128- 1.155- 1.125- 1.102	1.129- 1.161- 1.215- 1.233- 1.299

Note: Values in bracket are t-statistics and p-values are significant at (\*) 0.1, (\*\*) 0.05 and (\*\*\*) 0.001 levels. VIF shows no multi-collinearity problem in the regression.

SUE = standardised unexpected earnings;  $\Delta NI$  = change in net income; NITI = change in net income relative to total assets; Risk = standard deviation of EPS over 8 years; P/E = price to book ratio of bank shares as growth proxy

TABLE 7  
Regression Results of Returns-to-Earnings Relation of Banks, Thailand: 2001-2007

This table provides a summary of results of seven regressions using the four basic models developed in this paper. The basic model (Equation 1:  $CAR_{jt} = c_1 + d_1 SUE_{jt} + v_{jt}$ ) is extended by including an additional variable for fee income in Model 2. The other 4 models from 4 to 7 include control variables on growth and risk to specify key omitted variables.

Thailand, n = 60							
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7
Constant, $a_1$	-0.036	-0.026	-0.039	-0.026	0.014	-0.060	-0.025
	-1.256	-0.401	-1.330	-0.402	0.195	-0.910	-0.338
	(0.215)	(0.690)	(0.190)	(0.690)	(0.846)	(0.368)	(0.737)
SUE, $d$	0.136	0.138	0.117	0.119	0.111	0.086	0.083
	2.746	2.682	2.127	2.105	1.973	1.482	1.438
	(0.009)***	(0.010)***	(0.039)**	(0.041)**	(0.055)*	(0.046)*	(0.058)*
$\Delta NI, \theta_1$		-0.034		-0.042	-0.020	-0.040	-0.023
		-0.168		-0.206	-0.099	-0.205	-0.118
		(0.868)		(0.838)	(0.921)	(0.838)	(0.907)
NITI, $\theta_2$			0.056	0.057	0.073	0.052	0.065
			0.831	0.831	1.065	0.776	0.966
			(0.410)	(0.410)	0.293)	(0.442)	0.340)
Risk $\sigma, \delta_1$					-0.017		-0.014
					-1.466		-1.167
					(0.150)		(0.250)
P/E Ratio, $\delta_2$						0.002	0.001
						1.896	1.658
						(0.165)	(0.105)
Adj-R-squared	0.120	0.101	0.114	0.095	0.118	0.145	0.152
F-stat	7.538***	3.705***	4.090***	2.684**	2.602**	3.027***	2.714**
Variance	1.000	1.056	1.219	1.265-	1.278-	1.396-	1.398-
Inflation				1.059-	1.065-	1.059-	1.065-
Factor=VIF				1.221	1.253-	1.224-	1.260-
					1.033	1.146	1.069-
							1.185

Note: Values in bracket are t-statistics and p-values are significant at (\*) 0.1, (\*\*) 0.05 and (\*\*\*) 0.001 levels. VIF shows no multi-collinearity problem in the regression.

SUE = standardised unexpected earnings;  $\Delta NI$  = change in net income; NITI = change in net income relative to total assets; Risk = standard deviation of EPS over 8 years; P/E = price to book ratio of bank shares as growth proxy

obtained for Model 1. The market perceives the interest income and fee income of Thai banks to be important.

Finally, results using Model 4 (and its variations) included control factors in addition to the two earnings factors. The results would have us believe that the risk and earnings growth variables have no influence on investor behaviour in revising share prices. The relevant information for share price changes is from change to total earnings only.

## CONCLUSION AND LIMITATIONS

This paper reports significant share price impacts in four banking sectors from accounting reports disclosing earnings changes in four moderate-sized economies with efficient capital markets and well-developed accounting institutions. We believe this is a first multi-country study of value relevance of accounting disclosures focused on banking firms. In terms of size measured by total assets, Australian banks are the largest banks while Thai banks are the smallest, and the banks included accounted for four fifths of their national banking sectors.

Testing the bank's earnings-to-share price relation is the objective of this paper as is commonly done in value relevance studies. We tested if (i) changes in total earnings (ii) changes in non-interest (fee) incomes and (iii) control variables are significantly correlated with share price changes over eight years in four significant economies in the Asia Pacific, namely

Malaysia, Thailand, South Korea and Australia. We selected only those countries with sufficient stock market reforms, banking reforms and developed accounting institutional development for accounting disclosure, so that inefficiency and lack of quality of information are unlikely to affect the findings reported in this paper. The samples of listed banks selected in each country (in the case of Malaysia all banks were selected) are representative of the banking sector. Australian and Korean economies are modestly large economies with institutional and market-based incentives promoting pro-private sector actions, with strong supervisory history, as in Australia.

The regression results using data from four countries suggest that the unexpected changes in total earnings as disclosed in the final reports appear to significantly affect the banking share prices in each of the four countries. The results for the 10 listed banks in each of the four Asia Pacific markets are somewhat similar in that share prices across the four countries react positively to unexpected total earnings changes while in three countries there is also some impact of fee-income on share prices of the banks. This result is the first to be provided for fee income in any country, and so, is important. Also, this is contrary to the impact of extraordinary income in the studies of non-bank firms: extraordinary income effect is absent as reported in most studies. Obviously, investors in banks do value fee income although in two of the four countries, that is not the case.

Our attempt to refine the usually applied common model by applying the panel regression and control variables could well be a significant factor in the refined results reported in this paper. For example, the explained variation is slightly larger in this study than in previous studies on non-bank firms: this could well be due to the higher sensitivity of commercial banks to information. Further refinements were done by including control variables (risk and earnings growth) which did not produce any findings of significant correlation arising from risk and earnings growth, in addition to total income and fee income.

These findings are from four significant Asia Pacific economies since we could not include other less liberalised, less institutionally-developed economies. The excluded countries, in our opinion, have yet made sufficient reforms to assure us that share price is efficiently formed and the accounting information framework is well-developed. An extension of this study to major non-Asian economies with open share markets and accounting institutional development may help to reveal if similar results are evident, for example in the EU. Also, testing these propositions with control variables for a more integrated set of economies such as the EU could be done as pooled regression with dummy variables. In that event, our refined modeling and test procedures may serve to yield reliable findings to generalise the results relating to the very critical banking firms to generalise our findings to a large population of countries. Confounding events effect in

our measure of share price returns may have some impact on our results, but we hope it is trivial. Extending the value-relevance findings to a new set of firms, the banking firms, is a modest contribution of the paper.

The methodology developed for earnings research in this paper has the unique advantage of removing errors in the response coefficients reported in earlier papers. Adoption of this methodology would improve future research on earnings. In addition, applying this model to a larger sample of banking firms from more countries would lead to more generalisable findings on the earnings behaviour of banking firms. This task is left as an extension to this research effort.

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**APPENDIX**

Names of Commercial Banks in this Study: Australia, Malaysia, South Korea and Thailand

No	Australian Banks	South Korean Banks	Malaysian Banks	Thai Banks
1	Commonwealth Bank of Australia	Cheju Bank	Affin Holding Berhad	Ayudha Bank
2	National Australia Bank	Daegu Bank	AMMB Berhad	Bangkok Bank
3	Australia and New Zealand Banking Group	Hana Bank	Commerce Assets Berhad	Bankthai
4	Westpac Banking Corporation	Jeonbuk Bank	EON Capital Berhad	Kasikornbank Bank
5	Bank of Queensland Limited	KEB Bank	Hong Leong Bank Berhad	Kiatnakin Bank
6	Bendigo Bank	Kiup Bank	Maybank Bank Berhad	Krung Thai Bank
7	Macquarie Bank Ltd	Kookmin Bank	M. Plant Berhad (Alliance Bank)	Siam City Bank
8	Adelaide Bank Ltd	Pusan Bank	Public Bank Berhad	Siam Commercial Bank
9	St. George Bank Limited	Shinhan Bank	RHB Capital Berhad	Thanachart Bank
10	Suncorp-Metway Ltd	Woori Bank	Southern Bank Berhad	TMB Bank