Reconsideration for the Relationship Between Earnings and Stocks Returns in Taiwan

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ABSTRACT

This study reexamines the returns/earnings relationship in Taiwan by controlling several variables. The results indicate:

1. The returns/earnings test is sensitive to the choice of market variable which measures market's abnormal performance. Choice of the market model may not apprehend a superior returns/earnings relationship than the size-adjusted or risk-adjusted model.
2. An obvious early market reaction and significant post-announcement drift manifest the importance of the window choice. Long window is strongly recommended in Taiwan.
3. Price limit in Taiwan may deter the market reaction to the accounting information. Evidence shows that daily return does not follow a random walk. The suggestion of long window for CAR is reinforced by this market characteristic.
4. The returns/earnings relationship is sensitive to the choice of net income or operating income as the explanatory variable for market's abnormal performance.
5. Non-operating income, which is theoretically less important, plays a prominent role for the returns/earnings relationship in Taiwan. The phenomenon is explained by the unclear definition of non-operating income in Taiwan.

The study suggests that the returns/earnings studies in Taiwan need further consideration, including the refinement of methodology as well as the adjustment of market characteristics. Simply replication the U.S. studies by using Taiwan's stock market data may bias the relationship between returns and accounting earnings in certain degree.

Key Word : Earnings, Return, Information, Content, ERC

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I. INTRODUCTION

Ball and Brown (1968) triggered an explosion of empirical accounting research over the last two decades. Voluminous studies have focused on topics of either information content of accounting data or overall relationship between stock returns and accounting reported earnings. A system of well described market-based accounting research has been developed in the U.S.. The returns/earnings relationship was by now the most prevalent form of research in the U.S.. These studies have not only presented the relationship between the stock market returns and accounting information, but also developed a systematic methodology for related studies.

The methodology used by Ball and Brown (1968) as well as its following studies have been applied in Taiwan, a newly booming stock market, in the past few years. Many scholars and graduate students in Taiwan employed the theoretical arguments and methodologies of the market-based accounting research developed in the U.S. in testing the earnings/returns relationship or the information content of accounting data. Their results were usually compared to those of the U.S. studies. Few existed outcomes have been stroked. Two explanations are plausible:

1. The institutional differences between the U.S. stock market and the Taiwan stock market shadow the testing results using the theory or methodology developed in the U.S..

2. The studies in Taiwan have not been enforced by the variant considerations, i.e. size effect, window length, etc..

This study reconsiders the returns/earnings relationship by several robust tests. The following topics are included:

I. Market-Based Variable:

1. Choice of the market model: Should the market's abnormal performance, Cumulative Abnormal Returns (CAR), be measured by choice of the market model, risk-adjusted model, or size adjusted model?

2. Measurement period, "window" for the market's performance: Does the

long window or short window present a better measurement for the market's abnormal performance?

II. Accounting Data:

1. Reported Earnings: Does accounting net income or operating income capture a better market response to accounting data?

2. Market Characteristics: Do the market characteristics in Taiwan influence the returns/earnings relationship?

The above mentioned issues are examined using the empirical data from the Taiwan stock market. The results demonstrate the following suggestions:

1. The returns/earnings test is sensitive to the choice of measurement of abnormal performance. Choice of the market model may not apprehend a superior returns/earnings relationship than the size-adjusted or risk-adjusted model.

2. An obvious early market reaction and significant post-announcement drift manifest the importance of the window choice. Long window is strongly recommended in Taiwan.

3. Price limit in Taiwan may deter the market reaction to the accounting information. Evidence shows that daily return does not follow a random walk. The suggestion of long window for CAR is reinforced by this market characteristic.

4. Returns/earnings relationship is sensitive to the choice of net income or operating income as the explanatory variable for market's abnormal performance.

5. Non-operating income, which is theoretically less important, plays a prominent role for the returns/earnings relationship in Taiwan. The phenomenon may be due to the unclear definition of non-operating income in Taiwan. Incomes from investment, for example, are excluded from the operating activities, but they are the main resources of income for many corporations.

The structure of this study is as follows. Section 2 reviews previous studies and develops the hypothesis. Section 3 introduces the methodology. Section 4 discusses

the results. Section 5 concludes the study.

II. LITERATURE REVIEW AND HYPOTHESIS

Lev (1990) summarized the returns/earnings studies in his paper entitled "On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research" as the following:

> What is the incremental contribution of the recent methodology improvements in the returns/earnings research to our understanding of how and to what extent earnings are used by investors? What is the contribution ...? The answer seems to be - very little.

Lev also concluded that most papers in the U.S. present statistically significant relationship between earnings and returns but with less than 5% of explanatory power. The low R^2 or the reasons of failure are suggested to be either the less refinement of methodology or the lack of consideration of real response of accounting data users.

Nevertheless, these theoretical developments and empirical studies demonstrate that the earnings/returns relationships in the U.S. are still exploited in making inferences from observed relationships in Taiwan, but with several adjustments with the market characteristics.

During the past few years, several market-based accounting research have been conducted with a special focus on the returns/earnings relationship. The following are the common features discussed:

A. Market-Based Variables:

The following regression model is the most common in testing the returns/earnings relationship in Taiwan:

$$\underline{\text{Model 1}}.\ CAR_t = \alpha_1 + \beta_1 EARNING_t + \varepsilon_1 \qquad (1)$$

where CAR is a measure of annual abnormal returns; EARNINGS is the unexpected earnings assumed to follow a random walk generating process; α_1 is the intercept, and β_1 is the earnings response coefficient; ε_1 is the independent white noise with $N(0,\sigma^2)$.

The market model (one parameter model) seems to be given to examine the abnormal performance of the market in most of previous studies. However, the

Capital Asset Pricing Model (CAPM) or the market model is not the sole candidate for the U.S. studies. Many researchers matched the control firms to the sample by size, risk ratting, or industry classification and compared the difference in actual returns between the controlled group and the sample under study. In addition, some studies used other pricing models such as the Black-Schole's option pricing model and the arbitrage pricing model to examine the market's abnormal performance.

The study argues that the returns/earnings relationship presented above would be sensitive to the estimation of market-based variable: CAR. The market model may not be the best methodology to exhibit the abnormal performance of Taiwan's stock market. The size adjusted and risk adjusted models are both examined.[1] The null hypothesis of the test is:

H_0: Adjusted R^2 (the market model) = Adjusted R^2 (the size adjusted model)

= Adjusted R^2 (the risk adjusted model)

B. Measurement Period:

Ball and Brown (1968) examined the returns/earnings relationship by using monthly returns for a full year. The following studies, depending on the issue under examination, used different lengths of period in testing the market's reaction to accounting information. Lev (1990) summarized the ERC studies in the U.S. during the last two decades and found the window of each study varied from two days to a year.

The main argument for trade-off between using narrow versus wide windows is:

1. A short window would not have the risk to include information other than earnings announcement.

2. However, a short window may mislead the real market reaction to the accounting information if there is a prior-announcement information leakage, which is called pre-announcement drift; or there may be a post-announcement

1. Due to the lack of a clear industrial classification and no option market in Taiwan, the industrial adjusted, the option pricing and the arbitrage pricing models are not applicable in Taiwan.

drift, due to the information sometimes may not be known until a later time.

Chu (1994) examined the price behavior of the Taiwan stock market and focusses on the effect of the price limit to the stock returns. The study concluded that the daily, two-day, and weekly returns in Taiwan are not following random walk mainly due to the price limit. Only monthly returns are said to be a random walk. The implication of the study to the returns/earnings research is the window selection. A short window may not reflect all information reaction to the market due to the price limit.

The study applies an event study method to test the earnings announcement effect in Taiwan. The abnormal performance of the market before and after the announcement of yearly earnings are presented. Any pre-announcement or post-announcement drift with different lengths of window is examined to test the sensitivity of window selection.

The null hypotheses are as follows:

$$H_0: CAR_{-30\ to\ -1} = CAR_{-10\ to\ -1} = CAR_{-1\ to\ 1}$$

$$H_0: CAR_{0\ to\ 29} = CAR_{0\ to\ 9} = CAR_{-1\ to\ 1}$$

C. Operating Income versus Nonoperating Income:

Most valuation models suggest that unexpected earnings in current period should affect security prices because they revise perceptive of the potential future dividends or earnings. Thus, a positive response coefficient is expected. "ERC" is assumed to be a function of interest rates, risk and persistence (growth rate). Higher persistence is hypothesized to induce a higher ERC while higher interest rate or risk is hypothesized to be associated with a lower ERC.[2] Information availability is negatively related to the magnitude of ERC but reporting quality is positively related to the ERC.

Ronen and Sadan (1981) provides evidence that the market reacts more to the permanent than to the transitory components of earnings. The persistence of

2. Easton and Zimijewski (1989), as well as Collins and Kathari (1989) argued that ERC is a function of risk, interest rate and growth rate.

nonoperating income is not expected to be as high as the operating income. Thus, the information content of unexpected operating income is expected to be relatively stronger than that of nonoperating income.

Based on the above arguments, ERC would be sensitive to the selection of measurement variables for the unexpected earnings and the source of the unexpected income. ERC would be higher for the unexpected operating income, but would not be significant for the unexpected non-operating income.

Most of the studies done in Taiwan selected reported net income as the explanatory variable. Chu (1991) examined the information content of accounting data and found that components of earnings, especially the non-operating income, are very important variables to present the returns/earnings relationship. This study also argued that the importance of the non-operating income is due either to the income manipulation or to the wrong definition of non-operating income in Taiwan. During the last decade, the booming stock and real estate markets have induced many corporations to involve in stock investments or land developments. The returns from the above investments are classified as the non-operating income according to their incorporating article, but in fact are the major income source of these corporations. The net income, combined operating and non-operating income, may mislead the actual market reaction to the accounting data.

The following models are also applied to investigate the non-operating income effect in Taiwan.

Model 2: $CAR = a_0 + a_1 \text{ OPERATING INCOME} + \varepsilon_2$ (2)

Model 3: $CAR = b_0 + b_1 \text{ NONOPERATING INCOME} + \varepsilon_3$ (3)

Model 4: $CAR = c_0 + c_1 \text{ OPERATING INCOME} + c_2 \text{ NONOPERATING INCOME} + \varepsilon_4$ (4)

where CAR is a measure of annual abnormal returns; OPERATING INCOME is the unexpected reported operating income assumed to follow a random walk generating process; NONOPERATING INCOME is the unexpected reported nonoperating income assumed to follow a random walk generating process; a_0 b_0 or c_0 is the intercept, and a_1, b_1 or c_1 is the response coefficient; ε_2, ε_3 or ε_4 is the white noise with $N(0,\sigma^2)$.

In Model 1, the ERC is expected to be positive and a function of risk, growth rate,

interest rate, information precision and reporting quality. Hence, either unexpected operating income or unexpected non-operating income is positively related to total earnings and expected to be positively associated with stock returns.

However, the coefficient of operating income should be higher than that of non-operating income theoretically. If non-operating income is an important piece of information to the market, the R^2 of Model 4 should be larger than the R^2s of Models 1, 2, and 3.

The null hypotheses are:

H_0: $a_1 = b_1 = c_1$

H_0: Four models' R^2s are the same

D. Generating Model:

Most of the returns/earnings studies in Taiwan assumed that earnings numbers follow a year-to-year random occurrence, and did not adjust them for managers' accounting manipulation or for economical growths.

Chu (1991) applied a random walk with five percent growth to test the returns/earnings relationship and found that the results are generally unaffected. The response coefficients and the R^2s of above models are all similar to those of the random walk model.

Financial analysts' and time-series forecasting models, which are quite popular in the U.S. studies, have never been used in Taiwan due to the lack of data. The returns/earnings relationship may better be presented in the future, if other sophisticated models are applicable. This study would still apply only the random walk generating model for the accounting data.

III. METHODOLOGY

A. Data and Sample Selection:

Two classes of data are of interest in this study; the accounting data and the stock returns. Data are collected from the Securities and Exchange Commission (Taiwan) and the Taiwan Stock Exchange, which are computerized in the database of The Taiwan Economic Journal.

Samples for testing the returns/earnings association satisfy the following criteria:

1. December fiscal year-end.

2. Availability of accounting earnings and components of earnings.

3. Availability of daily returns to estimate cumulative abnormal returns and calculate the beta. The beta and the abnormal returns are estimated by the market model, size adjusted model or risk adjusted model using all available observations (with a minimum of 36 observations) over a 60 days that ends in December of the preceding year.

The test period is from 1988 to 1992. The first selection criterion is included to ensure comparable return accumulation periods for all firms. Other selection criteria ensure the availability of data. There are 88 to 159 companies in Taiwan's stock market satisfy these criteria depending on the year.

B. Variables:

Cumulative Abnormal Returns:

Daily returns including dividends and equal-weighted market returns are used to calculate the beta and to estimate the market model's abnormal returns for each firm. Abnormal returns are accumulated for the period over the year contemporaneous with the earnings report.

For abnormal performance under the risk adjusted model, the daily abnormal returns is calculated as the follows:

Each company is assigned to one of the ten portfolios based on its size which is decided by its market value prior to the testing period. The return of each portfolio is assumed to be the expected returns for all firms in the portfolio.

The procedures of the risk adjusted model are similar to those of size adjusted model, except the ten portfolios are formed by prior periods' beta.

Accounting Data:

Income before extraordinary items is selected as the accounting earnings. Reported operating income and non-operating income are also selected for Models 2, 3 and 4. The change in the earnings from the previous year is applied, which assumes a random-walk generating process for accounting earnings.

Since the study is based on cross-sectional comparisons of the firms, it is

important to scale the unexpected earnings of each year by the same measure of size to minimize heteroskedasticity in the data. The market value of equity at the beginning of the year is used as a deflator, as suggested by Christie (1987), and Easton and Zimijewski (1989).

Separate annual cross-sectional regressions are used to test the association between returns and earnings for the period from 1988 to 1992. A pooled regression with all years' data is applied to represent the average coefficient of returns on earnings for the period. Fama and MacBeth's (1973) average method is also applied to estimate the mean coefficient.

Earnings Announcement:

To examine the market reaction to the earnings announcement. Twenty five earnings announcements are randomly selected from the database. The announcement date (always the meeting of board of directors) is chosen as the event date.

Market Reaction to the Announcement:

Windows varied from 60 days to 2 days are chosen to test the sensitivity to the length of window of the presentation of market reaction to each earnings announcement. The sixty days' window includes 30 days both before and after the announcement date.

IV. EMPIRICAL RESULTS

A. Market Based Variables:

The regression results with ERC, t Statistics, F statistics and R^2 are presented in Table 1 for three measurement methods.

Table 1 indicates that the R^2s of the market model range from 0.07% to 14.03%, with a mean equal to 7.29%. The R^2 of the pooled regression is 6.24%. This result is still within the range of previous studies in the U.S. and Taiwan. The R^2s of the size adjusted model, however, are within the range of 8.24% to 29.70% and with a 15.53% mean value. The pooled result is 13.57%. Similarly, the R^2s of risk adjusted model stay within the range from 4.44% to 29.61% and with a 12.48% mean value. The R^2 of the pooled sample is 10.38%. The lowest R^2 of the market model, relative to the size as well as risk adjusted models, reveals the different levels of association

between returns and earnings and demonstrates the differential association between market returns and accounting information under the three different measurement methods of market's abnormal performance. It also reflects that using the market model to measure the market's abnormal performance may bias the results due to the size effect or the risk effect.

Table 1 Market-Based Variable: Returns/Earnings Association (Model 1)

Statistic	1988	1989	1990	1991	1992	ALL
F value:						
Market Model	11.69	3.28	1.08	23.03	14.54	40.06
Size Adjusted	37.44	19.13	11.58	13.13	28.28	93.19
Risk Adjusted	37.18	5.37	15.31	12.26	16.86	68.97
# of firm	87	95	111	136	159	588
R square:						
Market Model	11.06%	3.41%	0.07%	14.03%	7.89%	6.24%
Size Adjusted	29.76%	16.17%	8.77%	8.24%	14.73%	13.57%
Risk Adjusted	29.61%	4.44%	11.51%	7.70%	9.13%	10.38%
Intercept:						
(t value)						
Market Model	4.43	53.75	-23.85	21.83	-20.15	4.40
	(0.97)	(8.50)	(-3.87)	(5.56)	(-7.53)	(1.91)
Size Adjusted	-5.72	4.19	7.83	-6.47	1.17	-0.39
	(-1.83)	(1.41)	(3.09)	(-2.98)	(0.79)	(-0.37)
Risk Adjusted	-5.92	4.24	8.09	-5.77	1.03	-0.29
	(-1.86)	(1.04)	(3.02)	(-2.75)	(0.68)	(-0.26)
E.R.C.:						
(t value)						
Market Model	1.72	3.18	3.59	4.17	3.69	3.13
	(3.42)	(1.81)	(1.04)	(4.80)	(3.81)	(6.33)
Size Adjusted	2.10	3.62	4.84	1.74	2.87	2.16
	(6.12)	(4.37)	(3.40)	(3.62)	(5.32)	(9.65)
Risk Adjusted	2.13	2.63	5.88	1.63	2.23	2.03
	(6.10)	(2.32)	(3.91)	(3.50)	(4.11)	(8.31)

The earnings response coefficients and their t statistics are also provided in Table 1 for three methods. The pooled earnings response coefficient of Taiwan's market is approximately 3.13 with a t statistic of 6.33 which is significant enough to reject the null hypothesis. Using Fama and MacBeth's (1973) average coefficient method[3], the ERC is equal to 3.27 with a significant t value. The relative larger ERC comparing to that of the U.S. may indicate that the high growth rate of Taiwan's economy. According to Easton and Zimijewski (1989), ERC is positively related to growth rate. If Taiwan's stock market is treated as a whole, the high economic growth rate is expected to have a larger ERC.[4] Consistent with the accounting theory, unexpected earnings in Taiwan always have a positive coefficient. When using the size adjusted model or the risk adjusted model, the ERCs are equal to 2.16 and 2.03 respectively and have significant t values. The yearly regression results also reinforces the returns/earnings association, especially when using the size adjusted and risk adjusted models.

B. Net Income or Operating Income:

Table 2 presents the results when accounting earnings is replaced by operating income, which represents the normal operating results. Based on the theoretical expectation, operating income should be the main part of the net income and be significantly associated with market returns. The results, however, show that the R^2s of five years and pooled sample all decrease a lot comparing with Model 1. The pooled sample presents very low R^2s for all three measurement methods. Nevertheless, the ERCs under three methods are all positive and statistically significant. The phenomenon of relative low R^2s for Model 2 reflects that the operating income is not the sole information to represent the abnormal performance of the market. Non-operating income may also play a significant role as an explanatory variable for the market performance.

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[3]. Fama and MacBeth argued that the average coefficient method is superior to the pooled regression for avoiding bias.

[4]. Chu (1995) found that yearly ERCs in Taiwan are sensitive to the growth rate. The fast growth of Taiwan's economy may also enhance the large ERC.

Table 2. Information Content of Operating Income (Model 2)

Statistic	1988	1989	1990	1991	1992	All
F value:						
Market Mode	2.10	0.17	0.12	15.76	13.38	7.86
Size Adjusted	6.15	1.08	1.22	15.60	40.00	32.63
Risk Adjusted	7.01	0.92	2.55	12.70	25.65	27.24
# of firm	87	95	111	136	159	588
R square:						
Market Model	1.26%	-0.89%	-0.80%	9.86%	7.27%	1.16%
Size Adjusted	5.65%	0.09%	0.20%	9.76%	19.39%	5.11%
Risk Adjusted	6.53%	-0.08%	1.39%	7.97%	13.50%	4.28%
Intercept: **(t value)**						
Market Model	6.73 (1.39)	52.98 (7.89)	-25.97 (-4.47)	23.33 (5.87)	-19.06 (-6.92)	5.30 (2.24)
Size Adjusted	-2.87 (-0.79)	5.24 (1.54)	4.61 (1.85)	-6.21 (-2.92)	2.41 (1.63)	0.34 (0.31)
Risk Adjusted	-2.96 (-0.81)	5.47 (1.25)	4.12 (1.56)	-5.43 (-2.62)	2.10 (1.39)	0.41 (0.34)
E.R.C. (Operating Income): **(t value)**						
Market Model	1.38 (1.45)	-0.98 (-0.42)	-1.49 (-0.35)	4.79 (3.97)	5.19 (3.66)	2.21 (2.80)
Size Adjusted	1.77 (2.48)	1.23 (1.04)	2.00 (1.10)	2.56 (3.95)	4.78 (6.25)	2.08 (5.71)
Risk Adjusted	1.92 (2.64)	1.47 (0.96)	3.09 (1.60)	2.24 (3.56)	3.93 (5.07)	2.05 (5.22)

C. Information Content of Non-operating Income:

Results of Model 2 indicate that operating income in Taiwan is not the sole major information for reported earnings. Based on accounting theory, operating income and non-operating income are two major components of earnings before extra-ordinaries. The low relationship between returns/operating-income may imply the importance of the complementary role of non-operating income.

Model 3 examines the information content of non-operating income assuming it is the only explanatory variable. The results are shown in Table 3. Both the average R^2 of the yearly regression and the R^2 of pooled sample are larger than those of Model 2 for operating income under all three methods. This phenomenon indicates that non-operating income in Taiwan has information content to the market. The statistically significant non-zero response coefficient for non-operating income also reflects that market users explain the unexpected non-operating income as not random but repeatable. Non-operating income tends to include major sources of income for companies in Taiwan. This violation of accounting definition for non-operating income may be resulted from the artificial definition for operating/non-operating incomes in Taiwan. The diversification as well as the fast booming of stock and real estate markets in Taiwan motivate entrepreneurs in Taiwan to take parts in those money games and the results are shown under non-operating income. On the other hand, the users also view the information from non-operating income as an important data.

The results of yearly regression also present an interesting trend for Models 2 and 3. The R^2s and ERCs of Model 2 are larger in 1991 and 1992, which also present an increasing trend. However, the R^2s and ERCs of Model 3 present a reverse result: a decreasing trend. This phenomenon may indicate that either the market is gradually maturing or the possible income manipulation from non-operating sources is due to the boom and recession of Taiwan's stock and real estate markets in the testing period.

Table 3. Information Content of Non-operating Income (Model 3)

Statistic	1988	1989	1990	1991	1992	All
F value:						
Market Model0	8.03	4.87	3.06	5.41	2.59	26.72
Size Adjusted	22.68	12.16	10.12	0.93	1.91	42.47
Risk Adjusted	21.27	2.52	10.44	1.34	0.78	29.97
# of firm	87	95	111	136	159	588
R square:						
Market Model	7.56%	3.95%	1.83%	3.17%	1.00%	4.20%
Size Adjusted	20.13%	10.61%	7.66%	-0.05%	0.57%	6.60%
Risk Adjusted	19.07%	1.59%	7.91%	0.25%	-0.14%	4.70%
Intercept:						
(t value)						
Market Model	3.59	50.51	-20.49	25.17	-21.93	3.86
	(0.76)	(7.83)	(-3.12)	(6.18)	(-8.00)	(1.65)
Size Adjusted	-6.70	1.69	9.06	-4.81	-0.16	-0.65
	(-1.99)	(0.53)	(3.31)	(-2.17)	(-0.10)	(-0.60)
Risk Adjusted	-6.85	2.72	9.05	-4.29	0.00	-0.52
	(-1.99)	(0.64)	(3.09)	(-2.03)	(0.00)	(-0.44)
E.R.C. (Non-Operating Income):						
(t value)						
Market Model	1.64	3.94	7.82	2.95	2.07	3.02
	(2.83)	(2.21)	(1.75)	(2.32)	(1.61)	(5.17)
Size Adjusted	1.95	3.06	5.94	0.66	1.03	1.77
	(4.76)	(3.49)	(3.18)	(0.96)	(1.38)	(6.52)
Risk Adjusted	1.94	1.87	6.46	0.77	0.65	1.61
	(4.61)	(1.59)	(3.23)	(1.16)	(0.89)	(5.47)

D. Information Content of Operating and Non-operating Income:

Table 4 provides the results of Model 4 which breaks down earnings into operating and non-operating incomes. The R^2 of the pooled sample is 6.13%, 13.59% and 10.44%, respectively, for three measurement methods. There is little change from the results of Model 1. Nevertheless, the coefficients for both operating and non-operating incomes are statistically significant. The coefficients also show an increasing trend for operating income and a decreasing trend for non-operating income. This outcome enforces the above mentioned argument regarding the complementary roles of both resources.

Table 4. Information Content of Operating And Non-Operating Income (Model 4)

Statistic	1988	1989	1990	1991	1992	All
F value:						
Market Model	5.78	2.48	1.51	12.09	8.71	20.15
Size Adjusted	18.50	9.78	6.93	8.68	21.90	47.16
Risk Adjusted	18.41	2.66	8.41	7.48	13.77	35.22
# of firm	87	95	111	136	159	588
R square:						
Market Model	10.01%	3.06%	0.92%	14.11%	8.89%	6.13%
Size Adjusted	28.92%	15.75%	9.73%	10.22%	20.92%	13.59%
Risk Adjusted	28.82%	3.40%	11.88%	8.75%	13.91%	10.44%
Intercept:						
(t value)						
Market Model	4.38	51.06	-20.49	21.67	-19.16	4.29
	(0.93)	(7.62)	(-3.11)	(5.52)	(-7.02)	(1.85)
Size Adjusted	-5.70	3.47	9.281	-6.64	2.35	-0.28
	(-1.79)	(1.10)	(3.43)	(-3.09)	(1.60)	(-0.27)
Risk Adjusted	-5.78	4.27	9.35	-5.90	2.06	-0.16
	(-1.78)	(0.99)	(3.26)	(-2.83)	(1.37)	(-0.14)
Coefficient of Operating Income:						
(t value)						
Market Model	1.67	0.94	0.04	5.02	5.39	2.81
	(1.82)	(0.38)	(0.08)	(4.25)	(3.82)	(3.61)
Size Adjusted	2.11	3.02	3.30	2.61	4.89	2.44
	(3.39)	(2.58)	(1.87)	(4.04)	(6.43)	(6.96)
Risk Adjusted	2.26	2.67	4.54	2.31	4.00	2.38
	(3.56)	(1.66)	(2.43)	(3.67)	(5.16)	(6.21)
Coefficient of Nonoperating Income.:						
(t value)						
Market Model	1.74	4.21	7.83	3.30	2.41	3.30
	(3.04)	(2.18)	(1.70)	(2.76)	(1.95)	(5.66)
Size Adjusted	2.09	3.89	6.68	0.85	1.34	2.01
	(5.37)	(4.28)	(3.54)	(1.30)	(2.01)	(7.65)
Risk Adjusted	2.08	2.26	7.48	0.93	0.90	1.85
	(5.26)	(2.09)	(3.74)	(1.47)	(1.33)	(6.43)

Table5. Window Length

Panel A: Daily Abnormal Returns:*

All Announcement				Good News Group				Bad News Group			
Pre		Post		Pre		Post		Pre		Post	
-30	0.267	0	0.026	-30	0.902	0	0.500	-30	-0.420	0	-0.488
-29	0.798	1	-0.033	-29	0.910	1	0.058	-29	0.676	1	-0.132
-28	-0.393	2	-0.427	-28	-0.434	2	0.169	-28	-0.348	2	-1.072
-27	0.453	3	0.326	-27	1.339	3	0.698	-27	-0.507	3	-0.076
-26	0.602	4	0.350	-26	0.315	4	0.554	-26	0.912	4	0.129
-25	-0.013	5	0.865	-25	0.268	5	1.071	-25	-0.318	5	0.643
-24	0.088	6	0.517	-24	0.605	6	1.364	-24	-0.472	6	-0.401
-23	-0.114	7	0.343	-23	-0.284	7	-0.183	-23	0.071	7	-0.517
-22	-0.214	8	0.024	-22	0.085	8	0.789	-22	-0.539	8	-0.805
-21	-0.179	9	0.981	-21	-0.433	9	1.364	-21	0.096	9	0.565
-20	-0.369	10	1.217	-20	-0.690	10	1.170	-20	-0.021	10	1.268
-19	0.147	11	0.002	-19	0.712	11	0.084	-19	-0.464	11	-0.086
-18	0.585	12	-0.215	-18	0.005	12	-0.469	-18	1.214	12	0.061
-17	-0.119	13	-0.019	-17	-0.259	13	0.987	-17	0.033	13	-1.109
-16	-0.422	14	0.901	-16	0.028	14	1.222	-16	-0.909	14	-0.552
-15	0.101	15	0.180	-15	1.389	15	0.362	-15	-1.294	15	-0.017
-14	0.199	16	-0.716	-14	0.553	16	-0.571	-14	-0.184	16	-0.873
-13	0.437	17	-0.506	-13	0.447	17	0.242	-13	0.427	17	-1.317
-12	-0.117	18	0.266	-12	0.112	18	0.220	-12	-0.365	18	0.316
-11	-0.066	19	-0.158	-11	-0.213	19	-0.788	-11	0.093	19	0.524
-10	-0.042	20	-0.638	-10	1.453	20	-0.075	-10	-1.662	20	-1.248
-9	-0.182	21	0.139	-9	-0.303	21	-0.402	-9	-0.052	21	0.725
-8	-0.147	22	-0.323	-8	-0.095	22	-0.285	-8	-0.203	22	-0.365
-7	0.757	23	-0.419	-7	1.009	23	-0.421	-7	0.483	23	-0.417
-6	0.293	24	-0.548	-6	0.972	24	-0.302	-6	-0.443	24	-0.814
-5	-0.108	25	-0.095	-5	-0.229	25	-0.343	-5	0.023	25	0.175
-4	-0.483	26	0.005	-4	-0.617	26	0.108	-4	-0.339	26	-0.108
-3	0.664	27	-0.331	-3	1.223	27	-0.980	-3	0.017	27	0.372
-2	0.673	28	-0.871	-2	1.256	28	-1.011	-2	0.042	28	-0.719
-1	-0.244	29	-0.304	-1	0.714	29	-0.151	-1	-1.282	29	-0.470

Table 5. Window Length (continued)

Panel B. Summary of Cumulative Abnormal Returns for Different Windows:

	All	Good News	Bad News
$CAR_{-30..29}$	2.685	15.721	-11.437
$CAR_{-30..-1}$	3.076	10.025	4.982
$CAR_{0..29}$	-0.146	4.982	-5.702
$CAR_{-10..9}$	1.337	4.455	-2.041
$CAR_{-10..-1}$	2.286	6.383	-2.153
$CAR_{0..9}$	3.378	11.552	-5.476
$CAR_{-1..1}$	0.455	2.470	-1.728

*There are totally 25 announcements included. For reference, thirteen announcements are good news (positive unexpected earnings), and twelve announcements are bad news. The CARs for good (bad) news are significantly positive (negative).

E. Window Length:

Table 5 presents the average abnormal performance before and after the earnings announcement date for testing sample. A statistically significant abnormal performance on thirty days prior to and after the earnings announcement date is found. The result shows that a pre-announcement drift may start from thirty days before the announcement date. There is also a significant post-announcement drift in Taiwan for the unexpected earnings. The results suggest that using a short window, i.e. -10 to 9 or -1 to 0, may not reflect the market response to accounting data fully. In the other words, a long window is strongly recommended.

V. CONCLUSION

This study reconsiders the returns/earnings relationship in Taiwan. Four issues are addressed. The first is the choice of market-based variable for market's abnormal performance. The differences among the market model, risk-adjusted model and size adjusted model in measuring the market's abnormal performance, Cumulative

Abnormal Returns (CAR), are investigated by using Taiwan's stock market data. Secondly, the length of the measurement period, "window" for market performance, is discussed and examined followed by the returns/earnings issue. The third one is to study the differences between accounting net income and operating income in order to capture better market response to accounting data. The last issue is focussing on the market characteristics, i.e. role of non-operating income in Taiwan to the returns/earnings studies.

The above mentioned issues are examined with the empirical data from the Taiwan stock market. The results indicate that the returns/earnings test is sensitive to the choice of measurement of abnormal performance. Choice of the market model may not apprehend a superior returns/earnings relationship than the size-adjusted or risk-adjusted model does. An obvious early market reaction and significant post-announcement drift manifest the importance of the window choice. Long window is strongly recommended in Taiwan. The study also suggests that the price limit in Taiwan may deter the market reaction to the accounting information. It reinforces the using of long window for the returns/earnings studies.

The study also shows that the returns/earnings relationship is sensitive to the choice of net income or operating income as the explanatory variable for market's abnormal performance. Besides, non-operating income which is theoretically less important plays a prominent role in the returns/earnings relationship. The phenomenon can be explained by the unclear definition of non-operating income in Taiwan.

The study concludes that the market-based accounting research should be refined before applying to any market. Simulating a developed methodology may not present an accurate result in every market.

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台灣盈餘資訊內涵研究之檢討

朱立倫*

摘要

本研究針對台灣目前之會計實證研究中有關資訊內涵部份作一系列的檢討。透過各項研究方法及變數之控制，以期探討在台灣特有之環境體系下市場報酬率與會計盈餘的關聯性。
實證結果顯示:

1. 市場報酬率與會計盈餘之關聯性，明顯地受到異常報酬率預估模式的影響，市場模式運用的結果明顯遜於規模效應及風險調整模式。

2. 台灣股票市場存在明顯宣告前後的異常反應，較長的衡量期間較能顯出市場對會計資訊之反應。

3. 漲跌幅限制影響了市場對資訊反應之速度，因此使用較長之衡量期間較能展現出市場對非預期盈餘之反應。

4. 市場報酬率與會計盈餘的關聯性會受到選用預測變數的影響，會計淨利與營業所得分別顯示不同的報酬率與盈餘之關聯性。

5. 非營業所得，理論上雖然較不重要，但在台灣卻明顯地影響到市場之表現，其原因可能是非營業所得之定義不夠明確的影響。

本研究建議未來之報酬率與盈餘之關聯性及相關之實證研究，應考慮不同之預測模式，並對其研究方法之選用、變數之選擇，以及市場特性等加以考慮調整，以期能較為正確地顯現研究之結果。

關鍵字: 盈餘、報酬、資訊、內涵、盈餘反應係數

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