DO MATURE FIRMS HAVE MORE EARNINGS INFORMATIVENESS? EVIDENCE FROM TAIWAN

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Abstract- Previous studies have demonstrated that higher levels of individual trading are more subject to decision biases, thereby causing market mispricing and inefficiency. This study examines how the Taiwan stock exchange market, which is characteristic of higher levels of individual trading, prices earnings information across different life cycle stages. Our findings indicate that earnings persistence and value relevance are conditional on the life cycle. In addition, we examine the market valuation consequences of the life cycle stage, finding that positive future excess returns are earned for mature and shakeout firms. Our findings indicate that a profitable trading strategy is possible when the market does not fully recognize the fundamental life cycle information embodied in the financial statements in Taiwan.

Index Terms- life cycle; earnings quality; market mispricing; trading strategy.

I. INTRODUCTION

Corporate life cycle refers to the stage of organizational development and evolution in a firm. Managers encounter varying strategic objectives, investment plans, or financial strategies adapted to address changes in different life cycle stages (Kazanjiand & Drazin, 1989; Selling & Stickney, 1989). Beginning with Anthony and Ramesh (1992), a line of empirical study has identified the corporate life cycle as an important economic determinant of the value relevance of financial reporting. (Anthony & Ramesh, 1992; Black, 1998; Jenkins et al., 2004; Xu, 2007). However, the extant findings following Anthony and Ramesh (1992), who classified the life cycle stage by using a univariate procedure, may result in misclassification and lower economic explanation power for the life cycle effect (Dickinson, 2011). It is our understanding that the power of the test of the life cycle effect on value relevance can depend on the ability to appropriately classify firms' years into life cycle stages. More importantly, a simple sort on univariate measures makes a distributional assumption of uniformity that is not supported by economic theory.

This study extends the work of Dickinson (2011) by exploring cash flow patterns as a proxy for the life cycle stage that is supported by economic theory and better explains future profitability. We focus on better understanding the effect of the firm's life cycle stage on earnings informativeness for two reasons. First, in terms of equity valuation, prior literature has showed that earnings persistence and earnings relevance are important evaluation tools (Chen et al., 2014; Dichev & Tang, 2009; Gil-Alana & Peláez, 2008; Ohlson, 1995; Schipper & Vincen, 2003; Wang, 2014). Knowing how the life cycle stage impacts earnings contents can improve the interpretation and meaning of individual corporate profitability (Selling & Stickney, 1989). We believe an examination of comparative earnings informativeness may reveal improved utility for analysts interested in equity valuation for firms in the context of different life cycle stages. Second, based on market efficiency hypotheses, investors could potentially undervalue firms if they do not fully recognize the valuation implications of a life cycle. Therefore, a profitable trading strategy is possible if the market does not fully recognize the fundamental life cycle information embodied in financial statements.

The Taiwan Stock Market, which is the world's 12th largest financial market by capitalization, presents a very special investing environment in terms of composition. Barber et al. (2009) show that individual investors account for approximately 90% of the trading volume, while each group of institutional investors (including corporations, dealers, foreigners, and mutual funds) accounts for approximately 2- 4% of the Taiwan stock market. The high levels of individual trading in Taiwan provide an ideal context to examine the valuation implications of a life cycle because individual investors are more subject to decision biases, causing marketing mispricing and inefficiency (Daniel et al., 2002; Teng & Liu, 2013).We investigate how earnings informativeness (including earnings persistence and earnings relevance) varies in the life cycle stage in the Taiwan Stock Market. Our findings show that (1) the incremental effects of earnings persistence and relevance occur in the growth, maturity, and shakeout stages. Furthermore, the stage of maturity offers the best earnings information content. (2) A profitable trading strategy is possible by forming a long buy-and-hold portfolio of mature or shakeout stage firms. Investors could obtain excess one-year returns from 7.55% to 8.96% by maintaining an investment portfolio of buy-and-hold stocks in the maturity stage.

The contributions of this study are as follows. First, we present a more comprehensive and better understanding of the change of earnings information content across different life cycle stages. We show

that earnings persistence and relevance are not homogeneous in each life cycle stage. Second, we show that a profitable trading strategy is possible by forming a long buy-and-hold portfolio of mature or shakeout firms. This finding indicates that the market does not efficiently use life cycle information contained in Taiwan Stock Market financial statements. Third, we adopt a basic cash flow pattern to capture the form of a firm's life cycle would allow investors, creditors, auditors, analysts, regulators and researchers to reduce life cycle homogeneity bias in a low cost way in Taiwan.

II. LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES

Gort and Klepper (1982) define five life cycle stages, including (1) introduction (2) growth (3) maturity (4) shakeout and (5) decline. During the introduction and growth phases, a firm's focus is on establishing its brand identity and market share (Spence 1977, 1979, 1981). During the period of maturity, as competition becomes more intense, the emphasis shifts to reducing costs through improved capacity scale and a more efficient process for R&D spending. During the decline phase, firms exit the industry as sales decline and profit opportunities diminish (Selling & Stickney, 1989). Kazanjiand and Drazin (1989) show that a firm's sales growth rate gradually decreases as its life cycle evolves. Dickinson (2011) argues that profitability is maximized in maturity according to economic theory, indicating that mature firms that focus on research and development, advertising, and capacity growth should see a higher profit margin as a result.

Persistent earnings are sustainable and are considered to be of higher quality as they provide a more accurate input for discounted cash flow (DCF) valuation. In addition, when earnings are more persistent, they are more value relevant for valuation. To develop expectations for earnings persistence across life cycle stages, we draw on studies related to life cycle and earnings quality. Jenkins et al. (2004) indicate that firms in the introduction and growth phases are characterized by high levels of investment in capital expenditures and a focus on sales growth. Black (1998) and Aharony et al. (2006) identify sales and cash flows as more value relevant than earnings in the introduction and growth stage. As the market evaluates firms based on sales and cash flows, it follows that earnings persistence and relevance is lower for firms in the introduction and growth stages. During the maturity stage, firms focus on cost minimization (Jenkins et al. 2004) and profitability (Black 1998; Jenkins et al. 2004). Dickinson (2011) finds that the maturity stage is associated with the highest level of earnings persistence in the maturity stage. During shakeout or decline stage, firms focus on recovery or survival. Miller and Friesen (1984) and Black (1998) indicate that declining firms face low profit margins and low earnings. In other words, investors focus on cash flows as a signal of future profitability. Earnings persistence would be expected to be lower than mature firms because earnings are uncertain in the stage.

Following life cycle theory, earnings figures gradually increase up to the maturity stage and then start to decrease in the shakeout stage. Based on prior studies related to life cycle and earnings quality, we anticipate that earnings persistence differs across life cycle stages. Specifically, we expect that earnings persistence could be relatively greater in the maturity stage when firms concentrate on cost reduction and improved capacity utilization. Therefore, our first hypothesis is as follows:

Hypothesis 1: Earnings persistence is conditional on life cycle.

Hypothesis 1a: Earnings persistence is relatively greater in the maturity stage.

Earnings measures have been most widely used to evaluate firms' organizational health. Ohlson (1995) argues that the value of a firm's equity can be expressed as a function of its earnings and book value. Empirically, Collins et al. (1997) find that firms' earnings are significantly related to market value from 1953 to 1993. Kim and Kross (2005) further noted that the explanatory power of earnings to stock prices was significantly but merely 5.7% from 1992 to 2000. Black (1998) indicated that earnings response coefficients differ in different life cycle stages. Jenkins et al. (2004) stated that the correlation of stock price with profitability and sales capability differs in each firm life cycle stage.

Based on prior studies, it is reasonable to expect that the life cycle effect could offer an incremental explanation in terms of earnings value relevance in the valuation model. If it is the case, earnings value relevance, which is conditional on life cycle stage, may have an effect on the incremental explanatory power in valuation if the life cycle effect is considered. To test this intuition, our second hypothesis is:

Hypothesis 2: Earnings value relevance is conditional on life cycle.

Previous studies have suggested that it is possible to earn profitable returns by using earnings persistence information to form a buy-and-hold portfolio strategy (Dechow & Ge, 2006; Sloan, 1996; Xie, 2001; Li, 2011). For instance, Sloan (1996) showed that firms with fewer accruals outperform those with more accruals as the earnings persistence of the cash flow component is greater than that of the accrual component. Dickinson (2011) finds that mature firms earn positive and significant annual excess returns of 1.6%, indicating that investors do not fully appreciate the persistent profitability of the maturity stage.

Based on our hypotheses 1 and 2, considering that earnings persistence and value relevance differ in each corporate life cycle stage, we expect that a

profitable trading strategy is possible if the market does not fully recognize the life cycle information embodied in the financial statements. Therefore, our third hypothesis is:

Hypothesis 3: A long buy-and-hold portfolio of mature firms would earn more excess returns than a portfolio of other stage firms, other things being equal.

III. SAMPLE AND METHODOLOGY

A. Sample Selection

We start our sample selection process by using the Taiwan Economic Journal (TEJ) database, which provides us with the companies listed in the Taiwan Stock Exchange Corporation (TSE). We collect listed firms on the TSE from 1991 to 2012 and exclude observations that did not follow the accounting calendar year and those with missing financial data. A total of 12,703 observations were used in our analysis.

B. Data Description

In Panel A of Table 1, the average and median earnings per share (EPS) are 1.397 and 1.056, respectively; the average stock price per share (P) and book value per share (BV) are 27.934 and 16.170, respectively, where the averageBHAR1 and BHAR2 are 0.005 and −0.001, respectively. Panel B shows that the correlation coefficients of earnings and book value to stock price are significantly positive at 0.725 and 0.678, respectively, with the former being greater than the latter. The correlations between earnings and both excess returns variables (BHAR1 and BHAR2) are positive. However, the correlation between variable BHAR1 and earnings is not statistically significant.

Insert Table 1 about here

Table 2 summarizes the firm life cycle data collected based on Table 1. Most of the observed values are found in the maturity stage— accounting for 38.97% of the total samples—followed by the growth stage. The average earnings in each firm life cycle stage is the highest (1.937) in the maturity stage, followed by the growth stage (1.710), the introduction stage (0.403), the shakeout stage (0.890), and the decline stage (−0.184). This indicates that earnings figures first increase and then decrease as the firm life cycle evolves, which is consistent with Dickinson's finding (2011).

Insert Table 2 about here

C. Earnings Persistence Model

Based on the earnings persistence model defined in previous studies (Dichev & Tang, 2009; Ohlson, 1995; Sloan, 1996), earnings follow a linear time series sequence in which earnings on date (t + 1) depend upon earnings on date (t).

$$EPS_{it+1} = \alpha_0 + \alpha_1 \times EPS_{it} + \varepsilon_{it} \quad (1)$$

where EPS denotes earnings per share, which is measured by income from continuing operationsdeflated by the number of shares outstanding. The variables i and t denote firm and year, respectively.

In formula (1), parameter value α_1 represents the earnings persistence coefficient, which measures the recurrence extent of current earnings levels in future periods. The greater the value of this parameter, the greater the earnings persistence.

To incorporate the firm life cycle in the earnings persistence model estimation, we extended formula (1) and constructed formula (2) as follows:

$$EPS_{it+1} = \beta_0 + \beta_1 \times EPS_{it} + \sum_{\tau=1}^{4} \beta_{0\tau} D_{\tau,it} + \sum_{\tau=1}^{4} \beta_{1\tau} D_{\tau,it} \times EPS_{it} + \varepsilon_{it} \quad (2)$$

where $\sum_{\tau=1}^{4} D_{\tau}$ is the dummy variable for stage τ of firm life cycle. $\tau = 1, 2, 3, 4$ denote the introduction, growth, maturity, and shakeout stages, respectively. In formula (2), β_1 refers to the earnings persistence in the decline stage. β_{11} refers to the incremental effect of earnings persistence in the introduction stage, β_{12} in the growth stage, β_{13} in the maturity stage, and β_{14} in the shakeout stage.

D. Earnings Relevance Model

Book value and earnings relevance are tested based on the model proposed by Collins et al. (1997) as shown in formula (3):

$$P_{it} = \gamma_0 + \gamma_1 BV_{it} + \gamma_2 EPS_{it} + \varepsilon_{it} \quad (3)$$

where P denotes price per share. BV denotes book value per share.

Previous studies suggest book value and earnings are important variables involved in corporate valuation. The relationships between stock price and these two variables: γ_1 and γ_2, are expected to be positive.

Similar to the empirical steps in the earnings persistence model, corporate life cycle is incorporated in formula (3) to observe the changes in earnings relevance in different life cycle stages. We formulate the earnings relevance model with life cycle effect as follows:

$$P_{it} = \lambda_0 + \lambda_1 BV_{it} + \lambda_2 EPS_{it} + \sum_{\tau=1}^{4} \lambda_{0\tau} D_{\tau,it} + \sum_{\tau=1}^{4} \lambda_{1\tau} D_{\tau,it} \times BV_{it} + \sum_{\tau=1}^{4} \lambda_{2\tau} D_{\tau,it} \times EPS_{it} + \varepsilon_{it} \quad (4)$$

In formula (4), earnings relevance in the decline stage is λ_2. The incremental effect of earnings relevance in each life cycle stage is expressed as the parameter $\sum_{\tau=1}^{4} \lambda_{2\tau}$, with the values λ_{21}, which refers to incremental earnings relevance in the introduction stage, λ_{22} in the growth stage, λ_{23} in the maturity stage, and λ_{24} in the shakeout stage.

E. Portfolio and Excess Return Model

Considering that earnings persistence and value relevance differ in each life cycle stage, we expect that profitable trading strategies are possible if the market does not fully recognize the life cycle information embodied in the financial statements. We examine whether excess returns may occur across life cycle stages with the model proposed by Taso, Lien, and Liu (2010).

$$BHAR_{it+1} = \pi_0 + \sum_{\tau=1}^{4} \pi_\tau D_\tau + \varepsilon_{it} \quad (5)$$

where $BHAR$ denotes buy-and-hold excess returns for each firm computed as the firm's buy-and-hold 12-month return minus the buy-and-hold 12-month return of an equally weighted benchmark portfolio.

In formula (5), π_0 denotes the rate of excess return for holding stocks of a firm in the decline stage. The parameter π_1 refers to the rate of excess return for holding stocks of a firm in the introduction stage, π_2 in the growth stage, π_3 in the maturity stage, and π_4 in the shakeout stage, respectively. We predicted that the excess returns (π_3) are significantly positive for portfolios involving buying stocks of firms in the maturity stage.

IV. EMPIRICAL RESULTS

F. Earnings Persistence

The empirical results for the earnings persistence estimation model are presented in Table 3. Model (1) shows that the average earnings persistence of the study sample is 0.820. We further compare the incremental effects of earnings persistence in different life cycle stages. The empirical results of model (2) show that compared with the effect of earnings persistence in the decline stage, the incremental effects in the growth, maturity, and shakeout stages are all significantly positive at 0.238, 0.418, and 0.243, respectively. However, the incremental effect in the introduction stage is not statistically significant. Overall, the finding shows that the earnings persistence is conditional on life cycle. It is important to know earnings persistence in the maturity stage has the greatest incremental effect for earnings persistence, indicating that this stage offers the best earnings information.

Insert Table 3 about here

G. Earnings Relevance

The empirical results of the earnings value relevance in each life cycle stage are presented in Table 4. Model (3) shows that the correlations of stock price with book value and earnings are 1.260 and 5.266, respectively. Both parameter values are significantly positive, indicating the book value and earnings information are both value relevant to price. In addition, the empirical results presented in model (4) show that the incremental effects in the growth, maturity, and shakeout stages are significantly positive at 5.022, 5.507, and 2.706, respectively. Only the incremental effect in the introduction stage does not achieve statistical significance. Overall, our finding shows that earnings value relevance differs in each life cycle stage with the highest value being observed in the maturity stage and lowest value in the decline stage.

Insert Table 4 about here

H. Investment Portfolios

Table 5 shows the results of excess returns for a one-year buy-and-hold portfolio in which stocks of firms are bought in eachlife cycle stage. The value of excess returns in maturity stage is 0.089 and 0.075 measured by BHAR1 and BHAR2, respectively. Both results are significantly positive, showing that a "buy-and-hold" maturity stage portfolio for one year can generate 7.55% to 8.96% in excess returns. In addition, a "buy-and-hold" shakeout stage portfolio for one year can generate 5.72% to 8.64% in excess returns. Overall, out findings indicate that investors do not fully appreciate the persistent profitability of the maturity and shakeout stage.

Insert Table 5 about here

CONCLUSIONS

Prior literature has shown that earnings persistence and earnings relevance are important evaluation tools (Chen et al., 2014; Dichev & Tang, 2009; Gil-Alana & Peláez, 2008; Ohlson, 1995; Schipper & Vincen, 2003; Wang, 2014). We believe that knowing how life cycle stage affects earnings contents would create a better understanding of how capital markets use life cycle information embodied in the financial statements.

In this study, we provide empirical evidence in the Taiwanese setting, which is characteristic of a higher level of individual trading to examine the valuation implications in each life cycle stage. Our findings show that earnings persistence and value relevance are conditional on life cycle. As a result, the earnings measure in the maturity stage has the greatest incremental effect on earnings persistence and value relevance, indicating that this stage offers the best informativeness. Furthermore, we examine the market valuation consequences of a life cycle stage, finding that positive future excess returns are earned for mature andshakeoutfirms. The results indicate that investors can engage in a profitable trading strategy based on firm life cycle stage. We suggest that further study could apply our examination of the comparative earnings informativeness in each life cycle stage in other emerging markets.

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Table 1. Descriptive statistics and correlation coefficients

Panel A: Descriptive statistics

Variables	Mean	Sd	Median	p25	p75
P	27.935	28.481	18.900	10.550	34.300
BV	16.170	7.480	14.630	12.030	18.470
EPS	1.398	2.654	1.057	0.086	2.479
BHAR1	0.005	0.548	-0.104	-0.353	0.230
BHAR2	-0.001	0.538	-0.100	-0.344	0.213

Panel B: Pearson correlation coefficients

	P	BV	EPS	BHAR1	BHAR2
P	1				
BV	0.679***	1			
EPS	0.725***	0.708***	1		
BHAR1	-0.075***	0.028***	0.014	1	
BHAR2	-0.021**	0.034***	0.057***	0.979***	1

Note: ***, **, * indicates significance at the 0.01, 0.05 and 0.1 level respectively.

Table 2.Results of the firm life cycle stages

Firm life cycle stages	n	%	EPS mean
Introduction	1,657	13.04%	0.404
Growth	3,544	27.90%	1.711
Maturity	4,950	38.97%	1.937
Shakeout	1,770	13.93%	0.890
Decline	782	6.16%	-0.185
Total	12,703	100.00%	1.398

Note: All variables are winsorized at the 1st and 99th percentiles to mitigate the influence of extreme values.

Table 3. Regression results of earnings persistence

	Model (1)		Model (2)	
	Coeff.	t-stat	Coeff.	t-stat
Intercept	0.198	1.42	0.005	0.03
EPS	0.820***	16.52	0.523***	14.88
D_1			-0.067	-0.86
D_2			0.151	1.31
D_3			0.162	1.03
D_4			0.320**	2.14
D_1×EPS			0.151	2.03
D_2×EPS			0.238***	3.82
D_3×EPS			0.418***	4.63
D_4×EPS			0.243***	4.65
Adj. R^2	0.437		0.450	
n	12,703		12,703	

Note: t-stat is computed by firm–year cluster adjusting standard error of mean (Petersen, 2009).***, **, * indicates significance at the 0.01, 0.05 and 0.1 level respectively.

Table 4. Regression results of earnings relevance

	Model (3)		Model (4)	
	Coeff.	t-stat	Coeff.	t-stat
Intercept	0.187	0.10	-0.122	-0.08
BV	1.261***	6.67	1.391***	6.45
EPS	5.266***	13.29	1.451***	5.14
D_1			1.334	0.44
D_2			-1.424	-0.74
D_3			-0.388	-0.23
D_4			2.033	1.11
D_1×BV			0.052	0.20
D_2×BV			-0.086	-0.63
D_3×BV			-0.348***	-2.68
D_4×BV			-0.323**	-2.08
D_1×EPS			1.035	1.63
D_2×EPS			5.022***	6.71
D_3×EPS			5.507***	10.03
D_4×EPS			2.707***	4.24
Adj. R^2	0.581		0.609	
n	12,703		12,703	

Note: t-stat is computed by firm–year cluster adjusting standard error of mean (Petersen, 2009).***, **, * indicates significance at the 0.01, 0.05 and 0.1 level respectively.

Table 5. Regression results of excess return of investment portfolio

Model (5)				
	BHAR1		BHAR2	
	Coeff.	t-stat	Coeff.	t-stat
Intercept	-0.051	-0.52	-0.043	-0.47
D_1	-0.022	-0.53	-0.030	-0.72
D_2	0.044	1.01	0.032	0.77
D_3	0.090**	2.21	0.076**	2.11
D_4	0.086***	3.46	0.057***	2.69
Adj. R^2	0.005		0.004	
n	12,703		12,703	

Note: t-stat is computed by firm–year cluster adjusting standard error of mean (Petersen, 2009).***, **, * indicates significance at the 0.01, 0.05 and 0.1 level respectively.

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