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The Effect of Business Cycle on the Value Relevance of Accounting Information: Evidence from Korean Firms

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ABSTRACT

This study provides further evidence on the determinants of the value relevance of accounting information. Specifically, we examine whether the time-series variations of the value relevance of accounting information varies with business cycle. Business cycle is classified into two stages: *expansion* and *recession*. The value relevance of accounting information is measured by the regression coefficients of both earnings (earnings response coefficients: ERC) and book value of equity (book value response coefficients: BVRC), and the explanatory power (R^2) of both earnings and equity book value on stock prices. Using a sample of firms listed in the Korean Stock Exchange during 30 year period from 1980 (164 firms) to 2009 (604 firms), we found the following results. First, both ERC and BVRC are higher in expansion than in recession stages. Second, total explanatory power of accounting information is higher in expansions than in recessions. Third, incremental explanatory power of earnings is higher in expansions than in recessions. Overall, these results show that business cycle has systematic impacts on the value relevance of accounting information in Korea.

Key Words: business cycles, value relevance, ERC, BVRC
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1. INTRODUCTION

The purpose of this study is to investigate if business cycle is an additional contributing factor to the time-series variation of the value relevance of accounting information. In particular, we examine whether the value relevance of earnings and equity book value ('book value' from this on) is systematically different between expansions and recessions.

We use two different but complementary approaches to measure differences in the value relevance of earnings between 'expansion' and 'recession'. First, we compare the regression coefficients of earnings and book value in expansion with those in recessions, similar to Barth et al. (1998). Second, we compare the incremental explanatory power (R^2) of earnings and book value with those in recessions (Barth et al (1998) and Collins et al. (1997)).

Using a sample of 11,305 firm-year observations over thirty-year period (1980-2009), we find that response coefficients of earnings and book value are higher in expansions than in recessions. We find that the incremental explanatory power of earnings is higher in expansions than in recessions, while the incremental explanatory power of book values is lower in expansions than in recessions. But R^2 of earnings and book values is higher in expansions than in recessions. In sum, results from this study suggest that the value information of accounting information is higher in expansions than in recessions. These results are robust across different model specifications and testing methods.

The remainder of this paper is organized as follows. First, hypotheses developments are discussed. Then, sample selections and measurements of variables are described. The empirical tests and their results are followed. In the final section, conclusions are addressed

2. HYPOTHESIS DEVELOPMENT

Since the seminal work by Ball and Brown (1968), numerous researchers have examined the roles of accounting information for equity valuation, and provided evidence on strong relationship between accounting numbers and stock prices. For example, earnings for US firms explain, on average, 59 percent of stock prices (Collins, Maydew and Weiss (1997)) and US book values explain 68 percent (Collins et al. (1997) of market prices.

Given this well-documented value relevance of earnings and equity book value, several studies have investigated cross-sectional variations in value relevance and their determinants. For example, empirical studies show that book value of equity is more value relevant than earnings for the firms with negative earnings (Hayn(1995); Collins, Pincus and Xie (1999)), extreme return-on-equity (Penman (1998), low return on equity (Burgstahler and Dichev(1997)), deteriorating financial health (Barth, Beaver and Landsman (1998), low earnings persistence (Ou and Sepe (2002), and higher financial leverage (Dhaliwal and Reynolds (1994), Kwak, Jin and Lee (2007), Lee and Huh (2010)).

However, only a few studies have examined *time-series* variations in value relevance and their determinants. For example, Collins, Maydew and Weiss (1997) and

Francis and Schipper (1999) find the evidence of changes in the value relevance of earnings and book value of equity over time, and Johnson (1999) reports the empirical results showing that business cycle is a determinant of time-series variations in earnings response coefficients.

This study examines business cycle as additional factor affecting the time-series variation in the value relevance of earnings and book value of equity. As a measure of macro-economic conditions, business cycle would cause earnings and book value to play differential roles in pricing its equity for the following reasons.

First, 'expansion' stage can be characterized by higher growth rates and investment opportunities for the firms. This implies that earnings in 'expansion' period would become more persistent than those in 'recession' period. Second, financing opportunities in 'expansion' stage may be limited due to the increased demand for investments. This would lead to high cost of capital for outside financing. Thus, the firms should rely more on internal financing. This implies that earnings in 'expansion' period would become more important than those in 'recession' period. Hence, earnings are expected to be more value relevant in 'expansion' stages than in 'recession' stages. Therefore, a testable hypothesis would be

Hypothesis 1: Value relevance of earnings is higher in expansions than in recessions

Regarding the value relevance of book value, since it has been observed that there are more accounting manipulations in recessions than in expansions, quality of accounting information would be lower in recessions than in expansions. Although the value relevance of book value is higher than that of earnings in recessions as addressed in the previous section, the value relevance of book value would be lower in recessions than in expansions dues to lower quality of accounting information in recessions than expansions. Thus another testable hypothesis would be

Hypothesis 2: Value relevance of equity book value is higher in expansions than in recessions

3. SAMPLE SELECTION AND RESEARCH METHOD

3.1 Sample selection

Our sample consists of the firms listed in the Korean Stock Exchange. To be included in the sample, the firm must satisfy the following criteria: (1) each firm must have relevant financial data (earnings, equity book value, number of shares outstanding and year-end stock price) available over thirty year period (1980-2009); (2) each firm should have fiscal year ending in December throughout the study period; (3) firms in the banking industry are excluded. The sample consists of different number of firms each year, ranging from 164 firms in 1980 to 602 firms in 2009. There are 11,305 firm-year observations in the sample.

Classification of business cycle into either 'expansion' or 'recession' for a given year over the study period is based on the annual report, "Business Cycle Index", published by the Korean Bureau of Statistics. Table 1 shows the yearly classification of

business cycle for thirty-year period. There are 21 ‘expansion’ stages and 9 ‘recession’ stages. This shows the fact that Korean economy has been growing during the study period.

<Table 1>
Yearly Classification of Business Cycles

Year	Stage[1]	Year	Stage
1980	Expansion	1995	Expansion
1981	Expansion	1996	Recession
1982	Expansion	1997	Recession
1983	Expansion	1998	Expansion
1984	Recession	1999	Expansion
1985	Expansion	2000	Recession
1986	Expansion	2001	Expansion
1987	Expansion	2002	Expansion
1988	Recession	2003	Recession
1989	Expansion	2004	Recession
1990	Expansion	2005	Expansion
1991	Expansion	2006	Expansion
1992	Recession	2007	Expansion
1993	Expansion	2008	Recession
1994	Expansion	2009	Expansion

[1] “Business Cycle Index”, published by the Korean Bureau of Statistics.

3.2. Research Method

The value relevance of accounting information can be defined as the ability of financial statements to summarize information that affects firm value (Collins et al. (1997); Francis and Schipper (1999)). Although financial statements provide lots of value relevant information, earnings and book value of equity have been considered as two key measures. Following the valuation model developed by Ohlson (1995) and subsequent empirical studies, we operationalize the value relevance of earnings and book value by estimating the following regression model:

$$P_{it} = a_0 + a_1 EPS_{it} + a_2 BV_{it} + \varepsilon_{it} \quad (1)$$

Where, P_{it} = the price of stock for firm i at the end of year t;
EPS_{it} = the earnings per share of firm i during the year t;
BV_{it} = the book value per share for firm i at the end of year t.

As our metrics to measure the value relevance of earnings and book value, we use both the coefficient estimates ($\hat{a}_1$ and $\hat{a}_2$) and explanatory power (R^2) of regression model (1). We estimate the model (1) for the period of expansions and recessions, separately. Regression coefficients, $\hat{a}_1$ and $\hat{a}_2$, can be interpreted as the weight of earnings and book value in pricing equity, respectively. Alternatively, they are called 'earnings response coefficient' and 'book value response coefficient'. Using this metric of value relevance, we can state our hypotheses as:

Hypothesis 1: $\hat{a}_1$ ('expansion' stages) > $\hat{a}_1$ ('recession' stages)

Hypothesis 2: $\hat{a}_2$ ('expansion' stages) > $\hat{a}_2$ ('recession' stages)

When explanatory power (R^2) is used to measure value relevance of earnings and book value, we have to obtain the *incremental* explanatory power (R^2) of earnings and book value by estimating the following two equations:

$$P_{it} = b_0 + b_1 BV_{it} + \varepsilon_{it} \quad (2)$$

and

$$P_{it} = c_0 + c_1 EPS_{it} + \varepsilon_{it} \quad (3)$$

The *incremental* explanatory power (R^2) of earnings and book value can be defined as:

Incremental R^2 of EPS = R^2 of Model (1) – R^2 of Model (2);
Incremental R^2 of BV = R^2 of Model (1) – R^2 of Model (3).

Again, using this metric of value relevance, we can state our hypotheses as:

Hypothesis 1: Incremental R^2 of EPS in expansions > Incremental R^2 of EPS in recessions

Hypothesis 2: Incremental R^2 of BV in expansions > Incremental R^2 of BV in recessions

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 2 provides descriptive statistics for selected variables of the sample firms. Also reported are Wilcoxon rank test statistics for the differences in these variables between 'expansion' stages and 'recession' stages. Selected variables include stock price (P), earnings per share (EPS), book value of equity per share (BV), profitability as measured by return on equity (ROE) and return on asset (ROA).

Average ROE (ROA) is 5.44% (2.90%) in 'expansion' period and 3.80% (2.33%) in 'recession' period, and the difference is statistically significant (at $\alpha<0.001$). As expected, 'expansion' stages also exhibit larger P and EPS than 'recession' stages.

<Table 2>
Descriptive Statistics of Selected Variables

Variables	Expansion			Recession			Wilcoxon z-statistics
	Mean	Std Dev	Median	Mean	Std Dev	Median	
P [1)]	15.542	28.235	7.020	11.995	20.859	5.355	9.238***
EPS [2)]	1.673	3.555	0.964	1.484	3.604	0.811	4.916***
BV [3)]	23.454	29.544	15.342	23.922	28.988	15.991	1.250
ROE [4)]	5.440	43.006	7.340	3.801	25.106	5.925	6.902***
ROA [5)]	2.903	8.497	2.760	2.338	9.036	2.340	4.895***

1) Price per common share at the end of fiscal year end (1,000 won).
2) Earnings per share (1,000 won).
3) Book value of equity per share (1,000 won).
4) Return on equity (%).
5) Return on asset (%).

*** Significant at $\alpha<0.01$; ** Significant $\alpha<0.05$; * Significant $\alpha<0.10$;

4.2 Results of Comparing Valuation Coefficients

Table 3 presents the results of comparing the value relevance of earnings and book

value, as measured by the coefficients from regression model. The regression coefficient of EPS and that of BV are positive in expansions as well as recessions as predicted. They are statistically significant (at $\alpha<0.001$) in both expansions and recessions. But the regression coefficient of EPS in expansions is 2.717, while that in recessions is only 1.667. As an attempt to test the significance of the differences in ERCs between expansions and recessions, we estimate the following pooled cross-sectional and time-series model which includes a dummy variable, D_{it}, which takes a value one if the observation belongs to the year of expansions or zero otherwise:

$$P_{it} = b_0 + b_1 D_{it} + b_2 EPS_{it} + b_3 EPS_{it} * D_{it} + b_4 BV_{it} + \varepsilon_{it} \quad (4)$$

In this model, the coefficients, b_3, represent the differences in ERCs between expansions and recessions. Last column of Table 3 presents the results of estimating the above model. Significantly positive value (1.386) of coefficient b_3 indicates that EPS has larger effect on equity price in expansions than in recessions, supporting Hypothesis 1. This result is consistent with those of Johnson (1999).

<Table 3>
Coefficients from Regressions of Stock Price Over Earnings and Equity Book Value

$$P_{it} = b_0 + b_1 D_{it} + b_2 EPS_{it} + b_3 EPS_{it} * D_{it} + b_4 BV_{it} + \varepsilon_{it}$$

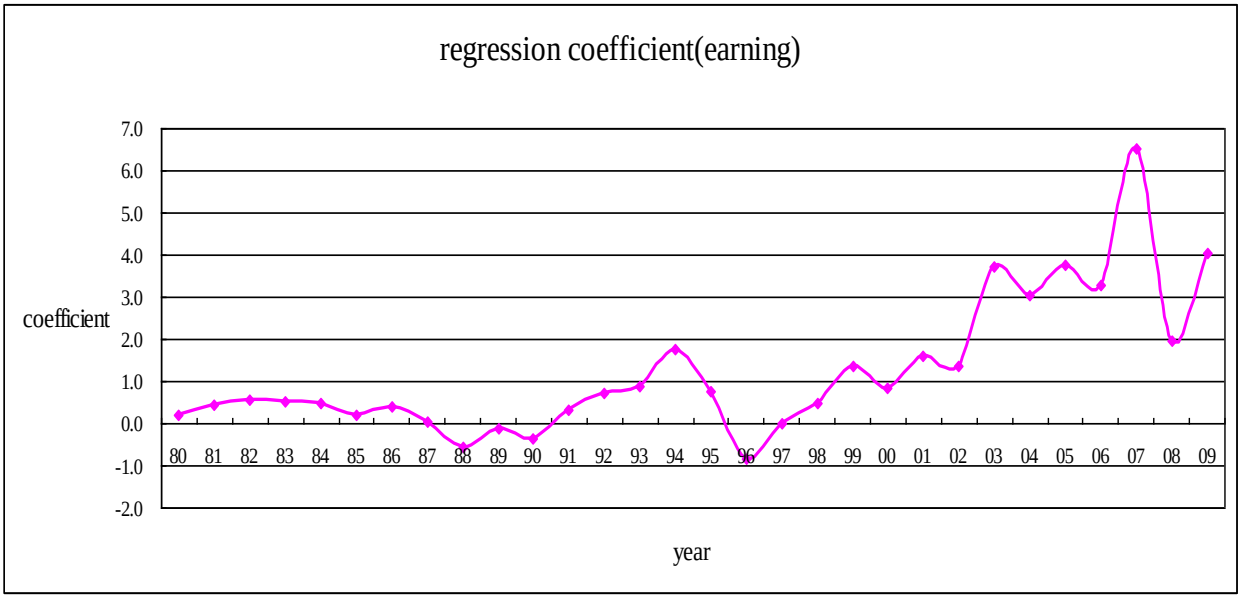
	Expected sign	Expansion	Recession	Pooled Sample
Intercept	?	2313.941 (7.210)***	2445.365 (6.980)***	1586.008 (4.160)***
D	?			1115.916 (2.540)**
EPS	+	2.717 (31.490)***	1.667 (18.660)***	1.451 (14.890)***
*EPS*D*	+			1.386 (12.330)***
BV	+	0.370 (35.650)***	0.296 (26.620)***	0.345 (43.970)***
Adj. R^2 (%)		41.91	38.05	41.21

1) D_{it} is a dummy variable which takes a value of one if the firm i in year t belongs to the years of expansions or zero otherwise.

*** Significant at $\alpha<0.01$; ** Significant $\alpha<0.05$; * Significant $\alpha<0.10$;

These results are reinforced by year to year changes of earnings response coefficients presented in <Figure 1>.

<Figure 1>
Value Relevance of Earnings



As an additional approach to test our hypotheses, we estimate the following regression model which includes additional variable, $BV*D_{it}$, in order to compare the differences in BVRC between expansions and recessions:

$$P_{it} = b_0 + b_1 D_{it} + b_2 EPS_{it} + b_3 EPS_{it} * D_{it} + b_4 BV_{it} + b_5 BV_{it} * D_{it} + \varepsilon_{it} \quad (5)$$

In this model, the coefficients, b_3 and b_5, represent the differences in ERCs and BVRCs, respectively, between expansions and recessions.

Table 4 presents the results of estimating the above model separately for expansions and recessions, as well as for the pooled sample. Results on ERC are the same as in Table 3 and hence support Hypothesis 1. As for BV, the coefficient b_5 is positive and statistically significant, indicating that BV has larger effect on equity price in expansions than in recessions, supporting Hypothesis 2. These results are reinforced by year by year changes of book value response coefficients presented in <Figure 2>.

Overall, these results lend strong support to our hypotheses. Our findings are also consistent with the notion that investors will place more weight on accounting information (earnings as well as book value of equity) in valuing equity in expansions than in recessions due to higher quality of accounting information in expansions than in recessions.

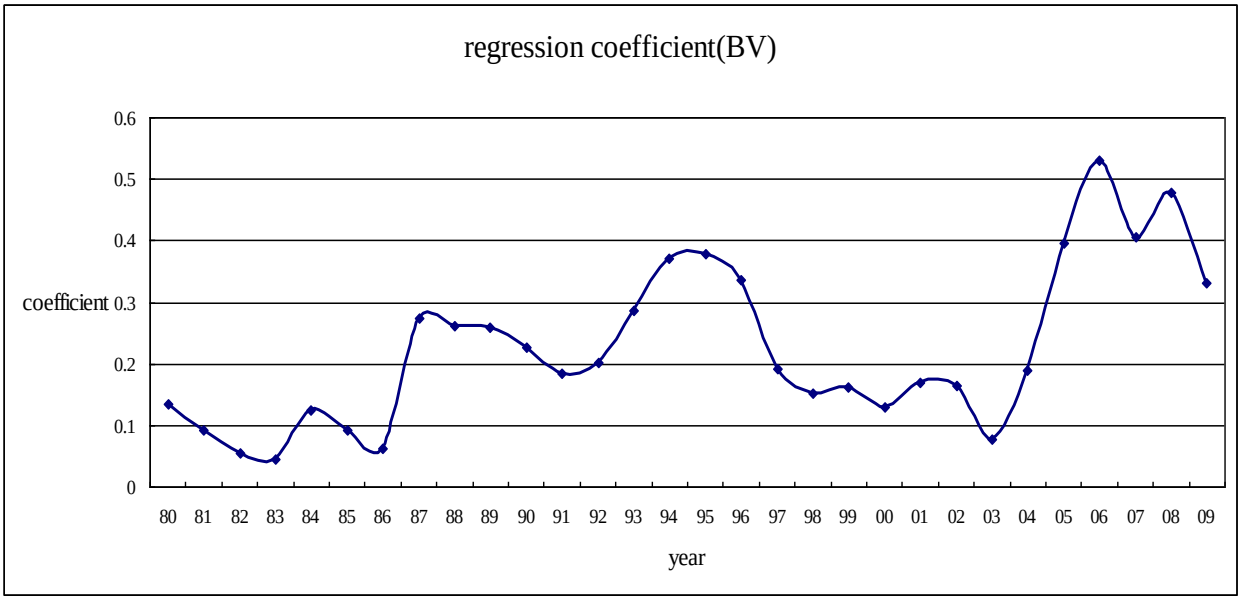
<Table 4>
Coefficients from Regressions of Stock Price on Earnings and Equity Book Value

$$P_{it} = b_0 + b_1 D_{it} + b_2 EPS_{it} + b_3 EPS_{it} * D_{it} + b_4 BV_{it} + b_5 BV_{it} * D_{it} + \varepsilon_t$$

	Expected sign	Expansion	Recession	Pooled Sample
Intercept	?	2313.941 (7.210)***	2445.365 (6.980)***	2445.365 (5.740)***
D	?			-131.424 (0.250)
EPS	+	2.717 (31.490)***	1.667 (18.660)***	1.667 (15.350)***
*EPS*D*	+			1.050 (7.780)***
BV	+	0.370 (35.650)***	0.296 (26.620)***	0.296 (21.900)***
*BV*D*	+			0.074 (4.480)***
Adj. R^2 (%)		41.91	38.05	41.31

1) D_{it} is a dummy variable which takes a value of one if the firm i in year t belongs to the years of expansions or zero otherwise.
*** Significant at α<0.01; ** Significant α<0.05; * Significant α<0.10;

<Figure 2>
Value Relevance of Book Value



4.3 Results of Comparing Explanatory Powers

Table 5 presents the results of comparing the explanatory powers of earnings and book value between expansions and recessions. The total R^2 indicates that earnings and book value jointly explain 41.9% of stock price changes in expansions, while they explain only 38.1% of stock price changes in recessions, which indicates that accounting information such as earnings and book value is more value relevant in expansions than in recessions, supporting both Hypotheses 1 and 2. These results are reinforced by year to year changes in R^2 presented in <Figure 3>.

It is also found that incremental R^2 of EPS is higher in expansions than recessions (7.8% versus 5.8%). This indicates that in expansions, earnings alone accounts for 18.7% (0.078/0.419) of total explanatory power provided by both earnings and book value, while earnings alone accounts for only 15.3% (0.058/0.381) of total R^2 in recessions, supporting Hypothesis 1. However, incremental R^2 of BV is smaller in expansions (10.1%) than in recessions (11.9%), not supporting Hypothesis 2.

Overall, these results suggest that value relevance of accounting information is higher in expansions than in recessions.

<Table 5>

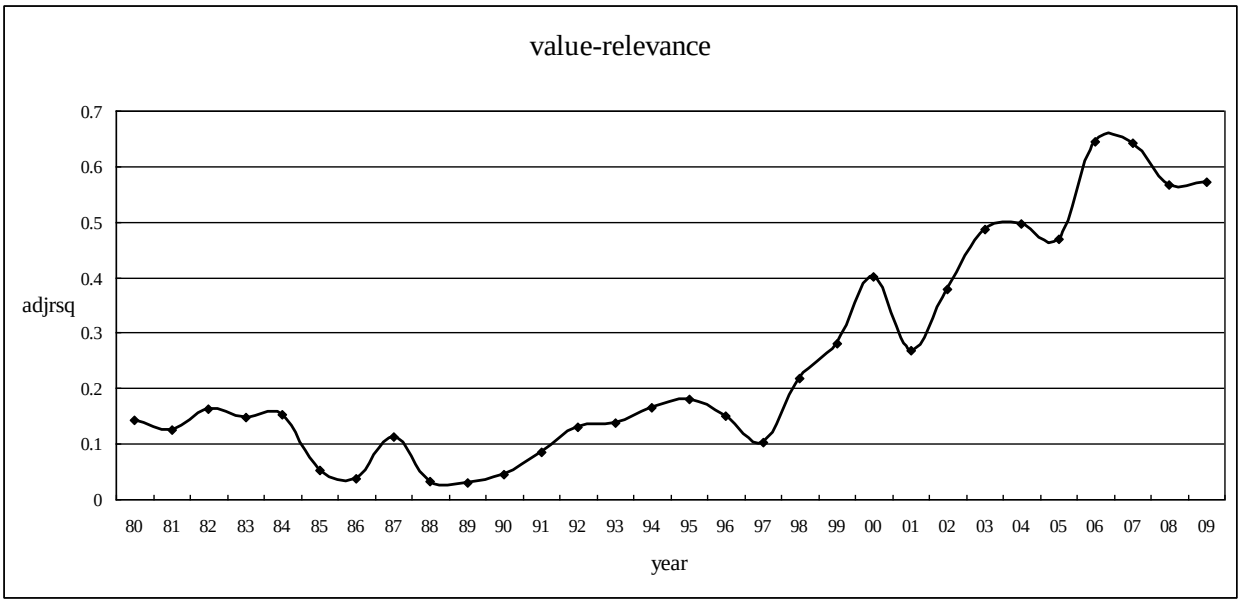
Explanatory Powers (R^2) from the Regressions of Stock Prices on Earnings and Book Value

$$P_{it} = a_0 + a_1 EPS_{it} + a_2 BV_{it} + \varepsilon_t$$

Classification of R-squares [1)]	Expansion		Recession		Differences in R^2
	R^2	% of Total	R^2	% of Total	
Total	0.419	100.0	0.381	100	0.039
EPS incremental	0.078	18.7	0.058	15.3	0.020
BV incremental	0.101	24.0	0.119	31.2	-0.018
Common	0.240	57.3	0.204	53.5	0.037

1) Each R-square measure is obtained from the following models:
Model 1: $P_{it} = \alpha_0 + \alpha_1 EPS_{it} + \alpha_2 BV_{it} + \varepsilon_{it}$
Model 2: $P_{it} = \alpha_0 + \alpha_1 EPS_{it} + \varepsilon_{it}$
Model 3: $P_{it} = \alpha_0 + \alpha_1 BV_{it} + \varepsilon_{it}$
Total R^2 = R^2 of Model 1.
Incremental R^2 of EPS = R^2 of Model 1 – R^2 of Model 3.
Incremental R^2 of BV = R^2 of Model 1 – R^2 of Model 2.
Common R^2 = Total R^2 – Incremental R^2 of EPS – Incremental R^2 of BV.

<Figure 3>
Value Relevance of Accounting Information Measured by R^2 of Earnings and Equity Book Value



4. CONCLUSIONS

This study investigates business cycle as an additional contributing factor to the time-series variation in the value relevance of accounting. In particular, we examine whether the value relevance of earnings and equity book value is systematically different between expansions and recessions. We hypothesize that value relevance of earnings and book value are higher in expansions than in recessions.

In general, our empirical results using a sample of 11,305 firm-year observations over thirty-year period (1980-2009) indicate that value relevance of both earnings and equity book value is higher in expansions than in recessions. Specifically, we find that both earnings response coefficients (ERC) and book value response coefficients (BVRC) are higher in expansions than in recessions. We also find that total explanatory power of earnings and book value of equity and incremental explanatory power of earnings are larger in expansions than in recessions. Overall, these results suggest that value relevance of accounting information is higher in expansions than in recessions.

REFERENCES

Ball, R. and P. Brown, "An Empirical Evaluation of Accounting Income Numbers," Journal of Accounting Research (1968), pp.159-178.

Barth, M. E., W. Beaver and W. Landsman, "Relative Valuation Roles of Equity Book Value and Net Income as a Function of Financial Health," Journal of Accounting and Economics (1998), pp.1-34.

Burgstahler, D. and I. Dichev, "Earnings, Adaptation and Equity Value," The Accounting Review (1997), pp.187-216.

Collins, D. W., E. L. Maydew and I. S. Weiss, "Changes in the Value-relevance of Earnings and Book Values over the Past Forty Years," Journal of Accounting and Economics (1997), pp.39-67.

Collins, D. W., M. Pincus and H. Xie, "Equity Valuation and Negative Earnings: The Role of Book Value of Equity," The Accounting Review (1999), pp.29-61.

Dhaliwal, D. and S. Reynolds, "The Effect of the Default Risk of debt on the Earnings Response Coefficient," The Accounting Review (1994), pp. 412-419.

Francis, J. and K. Schipper, "Have Financial Statements Lost Their Relevance?," Journal of Accounting Research (1999), pp.319-352.

Hayn, C., "The Information Content of Losses," Journal of Accounting and Economics (1995), pp. 125-153.

Kwak, Y., J. Jin and K. Lee, "The Effect of Changes in Financial Leverage on the Relation between Earnings and Stock Returns: Evidence from Korean Firms," Journal of the Academy of Finance (2007), pp. 139-151.

Lee, K. and S. Huh, "Firm's Financial Leverage and Its Impact on Differential Roles of Earnings and Book Value for Equity Valuation," Pan-Pacific Journal of Business Research (2010), Vol, 1, No. 1, pp. 66-28.

Ohlson, J., "Earnings, Book Values and Dividends in Equity Valuation," Contemporary Accounting Research (1995), pp. 661-687.

Ou, J. and J. Sepe, "Analysts Earnings Forecasts and the Roles of Earnings and Book Value in Equity Valuation," Journal of Business Finance & Accounting (2002), pp. 287-316.

Penman, S., "Combining Earnings and Book Value in Equity Valuation," Contemporary Accounting Research (1998), pp. 291-324.