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경영학석사 학위논문

Decomposing the Book-to-Market

장부가치 대 시장가치 요인의 분해분석

2018년 2월

서울대학교 대학원
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Abstract

Decomposing the Book-to-Market

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We explore the relation between book-to-market and stock returns by decomposing the ratio into balance sheet subcomponents: retained earnings, contributed capital and accumulated other comprehensive income. Taking account of the explicitly different natures of these subcomponents, we propose that they potentially contain independent information about stock returns. In 2001 to 2016 Korean stock market, we find that book-to-market as a whole predicts the cross-section of stock returns better than its subcomponents. Retained earnings-to-market has a positive relation with stock returns. Contributed capital-to-market and accumulated other comprehensive income-to-market do not seem to provide unique and valuable information about stock returns. Of the three subcomponents, only retained earnings-to-market subsumes (partially) book-to-market's return predictability. Lastly, both book-to-market and retained earnings-to-market fail to significantly absorb the return predictability of earnings-to-price.

Keywords: Book-to-market, Retained earnings, Contributed capital, Accumulated other comprehensive income, earnings-to-price, Value premium, Mispricing

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I. Introduction

The book-to-market ratio has been one of the major factors used in asset pricing models since the 90' s. Yet, what drives the stock return predictability of book-to-market ratio remains unsettled. We explore the relation between book-to-market and stock returns by decomposing the ratio into balance sheet subcomponents.

The book value of equity consists of retained earnings and contributed capital, and a minor part called accumulated other comprehensive income. These subcomponents are expected to have different roles in explaining the stock returns. As a result, we include the book-to-market and the three subcomponents deflated by the market equity in our tests. Following the methodology and idea used in Ball et al. (2017), we explore the different relation between the three subfactors and returns in Korean stock market. Earlier research on Korean stock market has shown the significantly positive relation between book-to-market and stock returns. Lee, Lee, Ok (2008) and Shin, Lee (2005) shows that such relation clearly exists in both the KOSPI and KOSDAQ market. However, the decomposition method in approaching the book-to-market premium has not been used in any previous research on Korean stock market.

Retained earnings is accumulated net income less accumulated past dividends since the birth of a firm. This

measure is expected to have significant role in explaining stock returns since it reflects net income, but with substantially reduced noise (Ball et al., 2017). Accounting effects widen the distance between reported net income and the truly informative portion of net income (Novy-Marx, 2013). Since the noise in accounting accruals tend to reverse through time, accounting effects even out through accumulation. Therefore, one can consider retained earnings-to-market to be a measure that embeds the information contained in earnings-to-price, but with the accounting effects largely alleviated.

Another major part of the book value of equity is the contributed capital, which comprises accumulated value of total stocks issued less that of stocks repurchased. There have been numerous studies documenting the relation between net issuance and stock returns. Daniel and Titman (2006) shows that the net issuance measure forecasts future stock returns. Boudry et al. (2013)'s finding also adds strength to the net issuance anomaly, showing that firms with positive (negative) net stock issuance have lower (higher) future stock returns. In addition, Fama and French (2008) argue that firms tend to issue stocks when they predict the shortage of future cash flows, and repurchase stocks when they have excess cash flows. This finding adds strength to the view that contributed capital would be a significant stock-return predictor.

Accumulated other comprehensive income is gains or losses not recorded in the income statement. It includes unrealized net income from investments, pension funds, foreign currency translation adjustments and so forth. It is generally viewed as transitory items that do not hold significant ability to predict either future cash flow or stock returns. However, recent studies have shown that accumulated other comprehensive income is value-relevant and has strong ability in forecasting future net income (Jones and Smith, 2011). Although accumulated other comprehensive income comprises only a small percentage of the total book equity, it is a factor that should not be rashly ignored.

Taking account of the explicitly different natures of the three book-to-market subcomponents, we propose that they each contain independent information about the market values. The main test results in 2001–2016 Korean stock market are as follow. Most importantly, we find that book-to-market as a whole predicts the cross-section of stock returns better than its subcomponents. Its predictability remains statistically significant even with the inclusion of other subcomponents. Retained earnings-to-market has a positive relation with stock returns. On the other hand, contributed capital-to-market does not seem to serve any role other than reflecting the gap between book-to-market and retained earnings-to-market. Accumulated capital-to-market is always insignificant with the inclusion of

book-to-market. Of the three subcomponents, only retained earnings-to-market subsumes (partially) book-to-market's return predictability. Lastly, both book-to-market and retained earnings-to-market fail to significantly absorb the return predictability of earnings-to-price.

II. Data, variables and summary statistics

A. The data and methodology

Our sample consists of stocks listed on the KOSPI and KOSDAQ market over 1985–2016. Our primary sample period is 2001–2016, and we additionally examine pre-2001 KOSPI market. The number of firms included in our sample is 2296 over the total sample period. We obtain accounting and returns data from Fnguide. For some of our tests, we additionally use Korean Fair Trade Commission (KFTC)'s OPNI database to classify firms into chaebol and non-chaebol firms. Following Fama and French, we exclude financial firms (1993) and firms with negative book value of equity (2008). We exclude stocks other than ordinary common shares, and require firms to have December fiscal month. In computing the market return and the risk-free rate, the KOSPI and KOSDAQ indices and 364 MSB (Monetary Stabilization Bonds) rate were used accordingly. We use adjusted stock price to compute monthly stock returns.

We subdivide the book value of equity into three balance sheet components: contributed capital, retained earnings, and accumulated other comprehensive income. Our definition of the three book equity subcomponents and the according accounting elements is as follow:

Book value of equity (BE) =

Contributed capital (CC)

+ Retained earnings (RE)

+ Accumulated other comprehensive income (AOCI)

Contributed capital =

Common stock + Capital surplus – Treasury Stock

Retained earnings = Retained earnings – AOCI

Accumulated other comprehensive income = AOCI

K-IFRS standards require the accumulated other comprehensive income to be included in retained earnings. However, we factor out accumulated other comprehensive income from retained earnings and treat it as the third component of the book value of equity. The three subcomponents are then deflated by the December market equity to be used along with book-to-market. To ensure that fiscal year-end accounting information is available to the public before the stock returns to be explained, we give at least three-month gap between the

two. We assume that financial data of the firms with December fiscal month become public by the end of the next-year March.

In our Fama–MacBeth (1973) regression on monthly stock returns, accounting variables take the natural logarithm form when their values are higher than 0. In addition, the according indicator variables are used to indicate values less than or equal to 0. The control variables include market equity, previous one-month return, and previous one-year return. Previous one-year return is computed using adjusted prices lagged two and thirteen months. All control variables are recomputed every month. Following Ball et al. (2017), we exclude stocks with market value of equity below the 20th percentile. We require firms to have non-missing data on current monthly return, previous one-year return, market value of equity, and book-to-market ratio. In addition to the size (market equity) filter, we exclude the stocks in the lowest and highest percentile based on book-to-market and the control variables mentioned above. In portfolio tests and spanning regression, we rebalance portfolios every end of March.

B. Subcomponents of Book value of Equity

As shown in the previous formula, we define the three subcomponents of the book value of equity to be contributed capital, retained earnings, and accumulated other comprehensive

income. Contributed capital is the sum of common stock and capital surplus subtracted by treasury stock. Common stock is the par (nominal) value of total stocks issued. When a stock is issued at a premium, the capital raised in excess of par value is recorded as the capital surplus (paid-in surplus). Treasury stock is the value of stocks kept in a firm's own treasury. It can come from the stocks repurchased by a firm, or those unissued during the initial public offering. When a firm repurchases its stocks but not retire them, the repurchase cost is recorded as a negative value. Firms generally do not retire the repurchased stock so that they can later reissue the stocks on the market. In short, the contributed capital is the accumulated value of total stocks issued less that of repurchased stocks.

Retained earnings is the accumulated net income less the accumulated distributed dividends since the establishment of a firm. It can later be used by the firm to fund the growth of its own business, pay off debt, or to pay dividends. Positive (negative) net income increases (decreases) the retained earnings. In addition to dividend distribution, stock repurchase also decreases the retained earnings. When a firm repurchases its own stock at a price higher than the par value, or reissue the repurchased stock at a price lower than the repurchase price, the resulting loss reduces the retained earnings.

Accumulated other comprehensive income is a component that usually comprises a very small portion of the total book value of equity. It measures the accumulated net amount of unrealized gains and losses. These gains and losses mainly originate from transitory price shocks to assets such as marketable securities, cash flow hedging instruments, pension plans or from foreign currency translation gains or losses. These unrealized loss and gains are moved to the earnings section of the balance sheet when they are actually realized.

Considering that accumulated other comprehensive income generally comes from unordinary transactions and unusual business operations, we factor out AOCI from retained earnings. Due to their significantly different characteristics, retained earnings and accumulated other comprehensive income are expected to provide different information about stock returns. In addition, some previous studies have shown that earnings excluding comprehensive income better predicts future stock returns than those including comprehensive income (Dhaliwal, Subramanyam and Trezevant, 1999). We believe that treating accumulated other comprehensive income and retained earnings as two different subfactors would provide additional insight into our research.

To summarize briefly, the book value of equity changes due to net stock issuance, net earnings retention, and transient

gains and losses unrelated to a firm's normal business operation. Each of these components drastically differs from one another in their nature and therefore would potentially embed unique information about stock returns.

C. Summary Statistics

Table 1 shows the summary statistics for the book-to-market equity and its three subcomponents for the KOSPI and KOSDAQ market. Panel A presents the time-series averages. The mean of book-to-market for KOSPI stocks is 1.43. Of the book-to-market, contributed capital-to-market is the largest component with a mean of 1.06. Retained earnings-to-market follows with a mean of 0.31, and accumulated other comprehensive income-to-market is the smallest component with a mean of 0.07. For the KOSDAQ market, the means of book-to-market and contributed capital are much lower (1.01 and 0.65) than those in the KOSPI market. The average of retained earnings-to-market is 0.34, and AOCI-to-market takes up a very small portion of BE/ME (mean=0.02).

Table 1: Summary Statistics and correlations for book value of equity and its subcomponents

Panel A presents the characteristics of the book-to-market and its subcomponents. Panel B presents the characteristics of the book equity subcomponents scaled by the total value of book equity. Panel C presents the Fama-French portfolio's characteristics of the variables presented in Panel B. Panel D presents the correlations among book-to-market and its subcomponents. Firms with fiscal month other than December are excluded. Firms without data on market value of equity, book-to-market, current stock price, previous one-month return and previous one-year return are excluded from the data. All accounting factors are measured in December of each year. In panels B, C, and D, firms with negative book value of equity are excluded. In addition, firms with one or more subcomponents comprising more than 200% or less than -100% of the total book equity are excluded. Stocks with market value of equity below the 20th percentile are also excluded. Our sample data is 2001 to 2011 KOSPI and KOSDAQ stocks.

Panel A: Characteristics of the book-to-market and its subcomponents

Ratio	Mean	SD	Quintiles				
			1 (low)	2	3	4	5 (high)
KOSPI							
Book value of equity/ ME	1.43	0.61	-0.42	0.87	1.33	1.93	3.44
Retained earnings/ ME	0.31	0.72	-1.91	0.21	0.51	0.88	1.85
Contributed capital/ ME	1.06	0.65	0.15	0.41	0.71	1.15	2.87
AOCI/ ME	0.07	0.06	-0.06	0.00	0.00	0.03	0.35
KOSDAQ							
Book value of equity/ ME	1.01	0.26	0.22	0.57	0.86	1.23	2.14
Retained earnings/ ME	0.34	0.11	-0.61	0.11	0.32	0.59	1.29
Contributed capital/ ME	0.65	0.20	0.15	0.31	0.47	0.71	1.59
AOCI/ ME	0.02	0.03	-0.03	0.00	0.00	0.01	0.11

Panel B: Characteristics of the book equity subcomponents deflated by the total book value of equity (%)

Component	Mean	SD	Quintiles				
			1 low	2	3	4	5 high
KOSPI							
Retained earnings/BE	43.35	11.24	-11.31	30.28	49.30	65.14	83.21
Contributed capital/BE	52.72	11.37	15.38	32.57	47.51	65.40	102.77
AOCI/BE	3.93	3.53	-2.55	-0.04	0.38	2.42	19.52
KOSDAQ							
Retained earnings/BE	37.83	5.39	-22.65	25.98	45.53	60.57	79.60
Contributed capital/BE	60.61	5.92	20.03	38.36	53.21	72.09	119.35
AOCI/BE	1.56	1.81	-2.04	-0.10	0.03	0.50	9.41

Panel C: Fama–French portfolios and the book equity subcomponents deflated by the total book value of equity (%)

Size	BE/ME	RE/BE		CC/BE		AOCI/BE	
		Mean	Median	Mean	Median	Mean	Median
KOSPI							
Small	Growth (1)	47.17	40.99	50.40	53.50	2.43	1.40
	Neutral (2)	40.36	35.57	55.07	52.52	4.56	3.26
	Value (3)	16.19	16.77	79.34	79.18	4.47	4.64
Big	Growth (4)	44.37	43.83	52.23	53.38	3.40	2.47
	Neutral (5)	48.88	48.30	47.16	46.51	3.97	3.10
	Value (6)	47.82	42.44	47.15	46.89	5.03	3.60
KOSDAQ							
Small	Growth (1)	50.73	49.02	47.71	49.32	1.56	1.32
	Neutral (2)	35.46	36.84	62.40	61.46	2.14	2.34
	Value (3)	6.77	5.98	91.08	90.27	2.15	0.98
Big	Growth (4)	49.66	53.19	49.31	45.88	1.03	0.22
	Neutral (5)	42.61	44.13	56.05	54.37	1.34	1.00
	Value (6)	29.35	27.89	69.30	68.40	1.36	0.82

PANEL D: Correlations among book-to-market and its subcomponents

	Pearson correlation					Spearman correlation			
	BE/ME	RE/ME	CC/ME	AOCI/ME		BE/ME	RE/ME	CC/ME	AOCI/ME
KOSPI									
BE/ME	1				BE/ME	1			
RE/ME	0.54	1			RE/ME	0.59	1		
CC/ME	0.79	-0.08	1		CC/ME	0.68	-0.05	1	
AOCI/ME	0.08	-0.22	0.09	1	AOCI/ME	0.04	-0.10	0.01	1
KOSDAQ									
BE/ME	1				BE/ME	1			
RE/ME	0.69	1			RE/ME	0.69	1		
CC/ME	0.65	-0.08	1		CC/ME	0.58	-0.07	1	
AOCI/ME	0.06	-0.11	0.02	1	AOCI/ME	-0.02	-0.05	-0.04	1

Panel B shows the distributions of the subcomponents scaled by the book value of equity. Firms with one or more subcomponents comprising more than 200% or less than -100% of the total book equity are excluded. For both the KOSPI and the KOSDAQ market, contributed capital is the largest, retained earnings is the next largest, and AOCI is the smallest component of the total book value of equity. The gap between average RE/BE and CC/BE is larger in the KOSDAQ market (37.83% and 60.61%) than in the KOSPI market (43.35% and 52.72%). In addition, the mean of AOCI/BE is smaller in the KOSDAQ market (1.56%) than in the KOSPI market (3.93%).

Next, we sort stocks into 2 x 3 size by book-to-market portfolios. Panel C presents the means and medians of the components scaled by the book equity for each portfolio. In the small KOSPI portfolios, RE/BE drastically increases and CC/BE decreases as BE/ME increases. In other words, small value firms tend to have lower RE/BE and higher CC/ME than small growth firms. The similar but stronger trend is present in the KOSDAQ market for both the small and large portfolios. In addition, big firms generally have higher RE/BE and AOCI/BE, and smaller CC/BE than small firms. In both markets, AOCI/BE is generally higher in undervalued firms than in overvalued firms.

Panel D shows the correlation between the book equity and the three subcomponents deflated by the market value of equity. In the KOSPI market, CC/ME is more highly correlated with BE/ME (0.79) than RE/ME is (0.54). The correlation between RE/ME and CC/ME is nearly 0 with a value of -0.08 . In the KOSDAQ market, CC/ME and RE/ME's correlations with BE/ME are almost even (0.65 and 0.69). In addition, RE/ME and CC/ME have almost zero correlation (-0.08). In both the markets, AOCI/ME's correlations with BE/ME and CC/ME are close to zero, while its correlation with RE/ME is weakly negative. The overall low correlations between the three book-to-market subcomponents suggest that each subcomponent potentially hold unique information about stock returns. Such idea

enhances the need to study the predictability of each subcomponent separately.

III. Fama–Macbeth cross sectional Regression

We run Fama–MacBeth(1973) cross sectional regressions on monthly stock returns. We take logarithms of the market value of equity and all accounting variables. Control variables include market equity(size), and previous returns. Previous one–year return is computed using two and thirteen month lagged adjusted price. The market equity and all control variables are recomputed every month. We follow the size filter of Ball et al. (2017), and exclude stocks at the bottom 20th percentile of the market value of equity. Furthermore, we winsorize all accounting variables at the 1% and 99% levels. We also require firms to have non–missing data on current monthly return, previous one–year return, market value of equity, and book–to–market. Lastly, indicator variables are used to indicate stocks with negative values of the accounting variables.

A. The book-to-market and its subcomponents

Table 2 presents the Fama-Macbeth regression results. The results in the KOSPI market are as follow. Consistent with previous studies reporting the book-to-market's return predictability, column 1 shows book-to-market to be statistically significant (coefficient of 0.007 with a t-value of 4.04). Column 2 shows that retained earnings-to-market is also statistically significant (coefficient of 0.003 with a t-value of 3.69), but its t-value is slightly lower than that of book-to-market. In column 3, we include both book-to-market and retained earnings-to-market into the regression model. We find that book-to-market and retained earnings-to-market are partially subsumed by each other. However, while book-to-market remains statistically significant (t-value of 2.50), retained earnings-to-market's t-value significantly decreases to 1.56.

Columns 4 and 5 report the regression results of contributed capital-to-market. On its own, CC/ME is statistically insignificant with a t-value of 1.05, but along with book-to-market, its coefficient turns to a significantly negative value (0.001 with a t-value of -2.73). On the other hand, the t-value of book-to-market increases to 4.43. Such drastic change is due to the simple mathematical relationship between the factors. Since AOCI's share of the total book value of equity is small, CC/ME is essentially the difference between BE/ME and

RE/ME. Column 6 shows that accumulated other comprehensive income is always statistically insignificant, regardless of book-to-market's inclusion (t-value of 0.33 and -0.69). Lastly, columns 8 through 11 presents the interaction among the three subfactors of BE/ME. We find that while retained earnings-to-market remains statistically significant at all times, AOCI/ME is always insignificant and contributed capital is significant only when RE/ME is included. Considering that CC/ME has t-values ranging from negative to positive values with the inclusion of other factors, we can suggest that the unique information embedded in contributed capital is not worthwhile when explaining the stock returns. Therefore, we can conclude that RE/ME is the only subcomponent capable of predicting return, even though its ability substantially weakens with BE/ME's presence.

Table 2: Fama Macbeth cross-sectional regressions

This table shows average of slopes and t-values from Fama-Macbeth regression on monthly stock returns. The regression is estimated monthly. Panel A shows the results when book-to-market and the three subcomponents are used as explanatory variables. Panel B shows the result when book-to-market, retained earnings-to-market, and earnings-to-price are used as explanatory variables. Financial firms are excluded from the data. Stocks with negative book value of equity are excluded. Stocks without market equity, prior one month return, prior one year return, retained earnings, and contributed capital are excluded. Stocks with market value of equity below the 20th percentile are excluded. we winsorize all variables at the 1% and 99% levels. We delete stocks with fiscal month other than December. The control variables include market equity, previous one-month return, and previous one-year return. Explanatory variables other than annual accounting variables are recomputed every month. The market value of equity and all accounting variables take the log form when their values are larger than 0. Indicator variables are used to indicate negative value of the accounting variables. Our sample data is 2001 to 2016 KOSPI and KOSDAQ stocks.

Panel A: Book-to-market and its three subcomponents

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
						KOSPI					
log(ME)	0.002 (1.59)	0.001 (0.81)	0.002 (1.35)	0.001 (0.50)	0.002 (1.36)	0.000 (0.34)	0.002 (1.51)	0.001 (1.07)	0.001 (0.83)	0.000 (0.43)	0.001 (1.03)
r1,1	0.018 (0.96)	0.016 (0.86)	0.019 (1.00)	0.016 (0.85)	0.019 (1.00)	0.014 (0.78)	0.018 (0.98)	0.018 (0.97)	0.016 (0.89)	0.016 (0.87)	0.019 (1.00)
r12,2	0.008 (1.37)	0.007 (1.27)	0.009 (1.54)	0.008 (1.25)	0.009 (1.49)	0.007 (1.12)	0.009 (1.42)	0.009 (1.50)	0.008 (1.35)	0.008 (1.31)	0.009 (1.56)
log(BE/ME)	0.007 (4.04)		0.006 (2.50)		0.010 (4.43)		0.007 (4.03)				
log(RE/ME)		0.003 (3.69)	0.001 (1.56)					0.003 (3.58)	0.003 (3.62)		0.003 (3.50)
log(CC/ME)				0.001 (1.05)	-0.003 (-2.73)			0.002 (1.79)		0.001 (1.05)	0.002 (1.81)
log(AOCI/ME)						0.000 (0.33)	0.000 (-0.69)		0.000 (1.39)	0.000 (-0.36)	0.000 (0.72)
Indicator Variables											
RE ≤ 0		-0.014 (-5.09)	-0.012 (-3.65)					-0.016 (-5.74)	-0.014 (-5.49)		-0.016 (-6.07)
CC ≤ 0				-0.011 (-1.47)	-0.008 (-1.20)			-0.014 (-1.97)		-0.011 (-1.45)	-0.015 (-1.92)
AOCI ≤ 0						-0.002 (-1.57)	-0.002 (-1.51)		-0.003 (-2.72)	-0.002 (-1.63)	-0.004 (-2.85)
Avg. Adj. R ²	0.014	0.013	0.014	0.012	0.014	0.011	0.014	0.014	0.013	0.012	0.014

Table 2 Panel A continued

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	KOSDAQ										
log(ME)	-0.002 (-1.36)	-0.005 (-2.58)	-0.003 (-1.66)	-0.008 (-4.15)	-0.004 (-2.06)	-0.007 (-4.43)	-0.003 (-1.45)	-0.004 (-2.13)	-0.005 (-2.81)	-0.008 (-4.35)	-0.004 (-2.28)
r1,1	0.028 (1.39)	0.027 (1.34)	0.029 (1.43)	0.022 (1.08)	0.029 (1.39)	0.022 (1.08)	0.028 (1.38)	0.028 (1.38)	0.027 (1.33)	0.022 (1.06)	0.028 (1.37)
r12,2	0.013 (3.33)	0.013 (3.35)	0.014 (3.44)	0.010 (2.69)	0.013 (3.41)	0.010 (2.69)	0.013 (3.29)	0.013 (3.37)	0.013 (3.31)	0.010 (2.62)	0.013 (3.32)
log(BE/ME)	0.013 (5.10)		0.007 (3.30)		0.018 (4.71)		0.013 (5.05)				
log(RE/ME)		0.006 (4.26)	0.004 (3.31)					0.006 (4.20)	0.006 (4.24)		0.006 (4.17)
log(CC/ME)				-0.001 (-0.67)	-0.008 (-3.22)			0.002 (1.50)		-0.001 (-0.73)	0.002 (1.39)
log(AOCI/ME)						-0.001 (-2.11)	-0.001 (-1.52)		-0.001 (-1.80)	-0.001 (-2.10)	-0.001 (-1.89)
Indicator Variables											
RE \leq 0		-0.024 (-3.98)	-0.019 (-3.10)					-0.025 (-4.32)	-0.024 (-3.98)		-0.025 (-4.30)
CC \leq 0				0.021 (2.35)	0.030 (3.15)			0.011 (1.20)		0.021 (2.44)	0.011 (1.23)
AOCI \leq 0						0.003 (2.61)	0.001 (0.55)		0.002 (1.56)	0.004 (2.52)	0.002 (1.16)
Avg. Adj. R ²	0.013	0.014	0.015	0.011	0.014	0.010	0.013	0.014	0.014	0.011	0.014

Panel B: Earnings-to-price, book-to-market, and retained earnings-to-market

Regressor	(1)	(2)	(3)
		KOSPI	
log(ME)	0.001 (0.70)	0.002 (1.71)	0.001 (0.91)
r1,1	0.017 (0.89)	0.020 (1.09)	0.018 (0.96)
r12,2	0.009 (1.48)	0.011 (1.80)	0.009 (1.57)
log(BE/ME)		0.007 (3.64)	
log(RE/ME)			0.002 (2.65)
log(E/P)	0.003 (3.94)	0.003 (3.44)	0.003 (3.55)
Indicator Variables			
RE \leq 0			-0.008 (-3.13)
EP \leq 0	-0.018 (-5.78)	-0.017 (-5.46)	-0.015 (-5.22)
Avg. Adj. R ²	0.014	0.016	0.014
		KOSDAQ	
log(ME)	-0.006 (-3.87)	-0.004 (-2.18)	-0.006 (-3.17)
r1,1	0.026 (1.29)	0.030 (1.44)	0.028 (1.37)
r12,2	0.013 (3.44)	0.014 (3.61)	0.014 (3.57)
log(BE/ME)		0.008 (4.21)	
log(RE/ME)			0.003 (3.35)
log(E/P)	0.005 (5.19)	0.004 (4.84)	0.004 (5.29)
Indicator Variables			
RE \leq 0			-0.011 (-2.70)
EP \leq 0	-0.030 (-4.97)	-0.026 (-4.79)	-0.023 (-5.18)
Avg. Adj. R ²	0.016	0.017	0.016

The regression result of the KOSDAQ market somewhat differs. Columns 1 and 2 report that t -values of book-to-market and retained earnings-to-market are higher in the KOSDAQ market (5.10 and 4.26) than in the KOSPI market. When the two ratios are together included in the regression, the t -values of both BE/ME and RE/ME go down, but stay in the significant level (t -values of 3.30 and 3.31). Furthermore, columns 3 through 11 show that retained earnings-to-market is always statistically significant and dominant among other subcomponents. Consistent with the result in the KOSPI market, contributed capital-to-market seem to serve no significant role other than being the difference between BE/ME and RE/ME. On the other hand, accumulated other comprehensive income-to-market negatively predicts stock return, with a t -value of -2.11 when alone. However, its predictability becomes insignificant with the inclusion of book-to-market.

B. Earnings-to-Price

Next, we introduce earnings-to-price in our regression model. As mentioned in the introduction, retained earnings-to-market reflects earnings-to-price, but with much alleviated accounting noise (Ball et al, 2017). We try to compare the predictability of RE/ME and E/P, with and without BE/ME's presence. One crucial difference between the two ratios

is that while E/P contains the most recent net income, RE/ME reflects the net income accumulated since a firm's establishment. Panel B presents the results. In the KOSPI market, earnings-to-price is statistically significant by itself (coefficient of 0.003 and t-value of 3.94). Furthermore, its return predictability remains almost unaltered even when BE/ME or RE/ME is added into the model. However, it fails to subsume either BE/ME (coefficient of 0.07, t-values of 3.64) or RE/ME (coefficient of 0.002, t-values of 2.65).

Similar results appear in the KOSDAQ market. All of BE/ME, RE/ME and E/P are statistically significant predictors of stock returns, and E/P is not subsumed by other two factors. Furthermore, unlike the result in the KOSPI market, E/P is more significant than either BE/ME (t-values of 4.84 vs 4.21), or RE/ME (t-values of 5.29 vs 3.35). Contrary to our belief, earnings-to-price turns out to surpass RE/ME in predicting the stock returns.

To summarize, we find that book-to-market as a whole is the strongest return predictor. Although its t-value decreases with the inclusion of RE/ME, it remains to be significant. Retained earnings-to-market also has a positive relation with stock return, but its predictability is partially subsumed by book-to-market. Contributed capital-to-market and accumulated other comprehensive income-to-market do not seem to contain

valuable information about stock returns. Lastly, both RE/ME and BE/ME fail to significantly absorb earnings-to-price ratio.

IV. Portfolio Tests

In this section, we construct quintile portfolios based on book-to-market, retained earnings-to-market, and contributed capital-to-market. We then observe value-weighted monthly excess return, CAPM alphas and their t-values for each portfolio. In constructing the portfolios, trims used in the previous Fama-Macbeth regression no longer apply. The portfolios are rebalanced every end of March and held for the following one year. The result is presented in table 3.

In the KOSPI market, the average excess returns of BE/ME, RE/ME and CC/ME generally increase across the quintile portfolios. Yet, the increasing pattern is clear only in BE/ME and RE/ME portfolios. In addition, the excess return difference between highest and lowest quintiles is larger for BE/ME (0.85) than for RE/ME (0.68). On the other hand, the gap between HML (high minus low) CC/ME portfolios (0.43) is relatively small. Similar patterns hold in the CAPM alpha result. The increasing pattern is most evident for book-to-market, with HML difference of 1.32. For RE/ME and CC/ME, the increasing

Table 3: Returns on quintile portfolios sorted by book-to-market and its subcomponents

This table presents value-weighted average monthly excess returns and CAPM alphas for portfolios sorted based on book-to-market, retained earnings-to-market, and contributed capital-to-market. According t-values are presented on the right side of the table. We form the portfolios by sorting stocks into quintiles based on KSE, or KOSPI breakpoints at the end of each March. The portfolios are rebalanced every end of March and held for one year. Firms with fiscal month other than December are excluded. The return and alpha values are in percentage. 364 MSB rate was used as the risk-free rate. KOSPI and KOSDAQ index returns were used accordingly as the market return. Our sample data is 2001 to 2016 KOSPI and KOSDAQ stocks.

Quintile	Book-to-market component			Book-to-market component		
	Total	Retained earnings	Contributed Capital	Total	Retained earnings	Contributed Capital
KOSPI						
	Excess Returns			t-values		
1(low)	-0.47	-0.45	-0.21	-5.49	-4.76	-2.70
2	-0.05	-0.19	-0.24	-0.56	-2.45	-2.77
3	0.29	-0.13	0.14	3.54	-1.60	1.71
4	0.08	0.15	0.39	1.07	2.16	4.24
5(high)	0.38	0.23	0.22	4.61	2.87	2.39
	CAPM alphas			t-values		
1(low)	-0.65	-0.61	-0.31	-3.65	-2.40	-1.77
2	-0.19	-0.24	-0.39	-0.94	-1.33	-1.92
3	0.07	-0.35	0.13	0.28	-1.62	0.55
4	0.10	0.00	0.13	0.33	0.00	0.47
5(high)	0.67	0.39	0.28	2.06	1.36	0.94
KOSDAQ						
	Excess Returns			t-values		
1(low)	-0.90	-0.97	-0.56	-9.50	-9.27	-5.68
2	-0.40	-0.70	-1.01	-4.29	-7.00	-10.21
3	-0.23	-0.28	-0.46	-2.32	-3.01	-4.68
4	0.15	0.16	-0.03	1.48	1.73	-0.30
5(high)	0.20	0.29	-0.24	2.02	3.12	-2.20

Table 3 continued

Quintile	Book-to-market component			Book-to-market component		
	Total	Retained earnings	Contributed Capital	Total	Retained earnings	Contributed Capital
	CAPM alphas			t-values		
1(low)	-0.96	-1.09	-0.62	-4.93	-5.07	-3.24
2	-0.49	-0.63	-0.95	-2.79	-3.31	-4.77
3	-0.19	-0.18	-0.14	-1.01	-0.95	-0.71
4	0.33	0.28	-0.04	1.67	1.30	-0.23
5(high)	0.57	0.62	0.08	2.38	2.77	0.36

pattern shows but less clearly. The HML difference of RE/ME portfolios is 1.00, while that of CC/ME is 0.59.

In the KOSDAQ market, the average excess returns once again clearly increase across BE/ME and RE/ME portfolios. We observe no clear pattern in the CC/ME portfolios. Unlike the result in the KOSPI market, the HML portfolio's excess return difference is larger for RE/ME (1.26) than for BE/ME (1.10). The CAPM alphas of the three ratios show similar patterns. The increasing pattern across portfolios is evident only for BE/ME and RE/ME. The HML portfolio differences of BE/ME and RE/ME turn out to be 1.53 and 1.71. We can conclude that the general findings conforms to our Fama-Macbeth regression results.

V. Mimicking factors and Spanning regressions

In this section, we construct mimicking factors based on size, market index, BE/ME, RE/ME, CC/ME and E/P. We then perform spanning regressions to see if an accounting mimicking factor is captured by other mimicking factors. These factors are constructed using the 2x3 portfolio methodology in Fama–French (2015). We first sort stocks into 2 size groups (small and big) based on the market capitalization breakpoint. Then, using the 30th and 70th percentiles as the breakpoints, we sort stocks into 3 groups based on each accounting ratio. An accounting mimicking factor is constructed by subtracting the average return of the two lowest portfolios from that of the two highest portfolios. Then, we run spanning regressions on the monthly return of one factor, using those of other factors as independent variables.

Table 4 presents the results. Panel A shows the summary statistics for the mimicking factors. In the KOSPI market, the average monthly return of HML_{BE} is the largest among all accounting ratios (a mean of 0.012 and t-value of 4.61). HML_{RE} and E/P have similar means (0.009 and 0.008) and t-values (4.03 and 3.92). The average return of HML_{CC} is the smallest (mean of 0.006 and t-value of 2.40). In the KOSDAQ

market, HML_{BE} and HML_{RE} have similar means (both 0.013) and t-values (5.58 and 5.46). The mean of E/P is 0.012 with a t-value of 4.20. As in the KOSPI market, the mean of HML_{CC} is the smallest, (0.005) with a t-value of 2.85.

Panel B presents the Pearson correlations between the mimicking factors. Results show that HML_{RE} and HML_{CC} are positively related to HML_{BE} in the KOSPI and KOSDAQ market. In KOSPI market, HML_{RE} and HML_{CC} have similar correlations with HML_{BE} (0.722 and 0.677). On the other hand, HML_{BE} 's correlation with HML_{RE} is considerably higher than with HML_{CC} (0.748 and 0.467) in the KOSDAQ market. In both markets, E/P factor's correlations with HML_{BE} and HML_{RE} are around 0.45 and 0.50. Lastly, HML_{CC} and HML_{RE} have relatively low correlation which does not exceed 0.3 in both markets.

The spanning regression result is presented in Panel C. In the KOSPI market, HML_{BE} is not fully explained by either HML_{RE} or HML_{CC} . As shown in columns 1 and 2, its intercept remains statistically significant with t-values of 2.65 and 3.77. Columns 3 and 4 show that the intercept of HML_{RE} is insignificant (t-value of 1.27) with HML_{RE} 's inclusion, but strongly significant (t-value of 3.01) with HML_{CC} 's inclusion. In addition, the average intercepts of HML_{CC} turn out to be insignificant (t-values of -0.76 and 1.370) in regressions 5 and 6. Lastly, we observe that E/P factor has positive and significant

intercepts with HML_{BE} , HML_{RE} , or HML_{CC} included. In the KOSDAQ market, the intercept of HML_{BE} barely remains significant with the inclusion of HML_{RE} (t-value of 1.61), while HML_{RE} 's intercept remains fairly significant with the inclusion of either HML_{BE} or HML_{CC} (t-values of 2.55 and 4.79). HML_{CC} is captured by both HML_{BE} and HML_{RE} (t-value of -0.26 and 1.23). In addition, HML_{CC} fails to capture HML_{BE} , HML_{RE} , or E/P factor (intercept t-values of 5.06, 4.79 and 4.02). The intercept of E/P factor is always significant with HML_{BE} or HML_{RE} included in the regression model (t-values of 2.08 and 1.56).

Due to the absence of parametric assumptions in our Fama–Macbeth regression, the spanning regression results slightly differ from previous test results. However, the overall result conforms with our findings in the Fama–Macbeth regression. In both markets, the information contained in HML_{BE} remains useful even with other subcomponents included. In addition, we find that information embedded in HML_{BE} overlaps more with those offered by HML_{RE} rather than HML_{CC} . Lastly, E/P also sustains its value. The information contained in E/P factor is captured neither by HML_{BE} , HML_{RE} nor HML_{CC} . On the other hand, HML_{CC} does not seem to contain any crucial information beyond those offered by HML_{BE} or HML_{RE} . The value of the information contained in HML_{RE} is significantly decreased by HML_{BE} 's presence only in the KOSPI market.

Table 4: Mimicking factors and the spanning regressions

Panel A presents the average monthly returns and standard deviations of the mimicking factors. Panel B presents the Spearman correlation among the factors. Panel C presents the spanning regression results in percentage. The mimicking factors are constructed using the 2x3 portfolio methodology in Fama–French (2015). The dependent variable is the monthly returns of the mimicking factors formed on various accounting variables. Independent variables are the monthly returns of factor portfolios other than that used as dependent factor. Firms with fiscal month other than December are excluded. Our sample data is 2001 to 2016 KOSPI and KOSDAQ stocks.

Panel A: Average returns and standard deviations

Factor	Factor					
	MKT	SMB	HML	HMLRE	HMLCC	E/P
	KOSPI					
Avg. monthly return	0.005	-0.002	0.012	0.009	0.006	0.008
Standard deviation	0.058	0.034	0.035	0.035	0.031	0.029
t-value	1.08	-0.63	4.61	4.03	2.40	3.92
	KOSDAQ					
Avg. monthly return	-0.003	0.006	0.013	0.013	0.005	0.012
Standard deviation	0.075	0.031	0.033	0.033	0.027	0.038
t-value	-0.63	2.46	5.58	5.46	2.85	4.20

Panel B: Pearson Correlations

Factor	Factor					
	MKT	SMB	HML	HMLRE	HMLCC	E/P
	KOSPI					
MKT	1.000					
SMB	-0.129	1.000				
HML	-0.131	0.147	1.000			
HMLRE	-0.413	0.015	0.722	1.000		
HMLCC	0.196	0.241	0.677	0.300	1.000	
E/P	-0.242	-0.048	0.450	0.527	0.207	1.000
	KOSDAQ					
MKT	1.000					
SMB	-0.213	1.000				
HML	-0.355	0.142	1.000			
HMLRE	-0.366	0.257	0.748	1.000		
HMLCC	-0.117	0.223	0.467	0.254	1.000	
E/P	-0.338	0.106	0.451	0.583	0.078	1.000

Panel C: Spanning regressions (%)

Regressor	Dependent Variables								
	HML		HMLRE		HMLCC		E/P		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
KOSPI									
Intercept	0.005 (2.65)	0.007 (3.77)	0.002 (1.27)	0.006 (3.01)	-0.001 (-0.76)	0.003 (1.37)	0.004 (2.18)	0.006 (3.07)	0.006 (3.04)
MKT	0.137 (4.33)	-0.175 (-5.61)	-0.206 (-7.68)	-0.315 (-8.52)	0.163 (6.45)	0.225 (6.35)	-0.099 (-3.20)	-0.019 (-0.58)	-0.159 (-4.68)
SMB	0.172 (3.49)	-0.070 (-1.31)	-0.135 (-2.94)	-0.159 (-2.50)	0.161 (3.71)	0.261 (4.73)	-0.116 (-2.18)	-0.051 (-0.98)	-0.136 (-2.32)
HML			0.691 (15.73)		0.595 (14.34)		0.355 (6.97)		
HMLRE	0.814 (15.73)					0.406 (7.03)		0.412 (7.58)	
HMLCC		0.869 (14.34)		0.504 (7.03)					0.287 (4.36)
N	192	192	192	192	192	192	192	192	192
Avg. Adj. R ²	57.2%	52.7%	63.2%	33.1%	56.5%	28.3%	24.2%	26.9%	13.6%
KOSDAQ									
Intercept	0.003 (1.61)	0.010 (5.06)	0.004 (2.55)	0.010 (4.79)	0.000 (-0.26)	0.002 (1.23)	0.005 (2.08)	0.004 (1.56)	0.011 (4.02)
MKT	-0.046 (-2.03)	-0.135 (-5.04)	-0.039 (-1.78)	-0.137 (-4.73)	0.032 (1.32)	-0.002 (-0.06)	-0.104 (-2.98)	-0.079 (-2.47)	-0.168 (-4.73)
SMB	-0.076 (-1.47)	-0.033 (-0.50)	0.148 (2.95)	0.151 (2.13)	0.154 (2.78)	0.145 (2.34)	0.008 (0.11)	-0.085 (-1.15)	0.027 (0.31)
HML			0.697 (13.96)		0.393 (7.10)		0.435 (5.48)		
HMLRE	0.722 (13.96)					0.171 (2.76)		0.631 (8.54)	
HMLCC		0.530 (7.10)		0.223 (2.76)					0.046 (0.47)
N	192	192	192	192	192	192	192	192	192
Avg. Adj. R ²	56.1%	30.0%	57.9%	18.5%	23.9%	7.6%	22.3%	34.8%	10.2%

VI. Chaebol firms and retained earnings

One unique feature of Korean stock market is the presence of business groups called chaebols. A chaebol is a large conglomerate run by an owner (usually a single family), whose power over the group tends to surpass legal authority. Although the owner family generally have low ownership right in each member firm, they can control the firms through complicate interlocking ownership (Claessens et al., 2000). Such discrepancy in cash flow rights and voting rights can cause agency problems between the owner of the group and other investors. For example, the owner can expropriate other minority investors by tunneling resources or through intercompany transactions (Johnson et al., 2000). Furthermore, such value-destroying activity is more likely to take place when available cash to pocket increases (Jensen, 1986, Ferreira and Vilela, 2004). As a result, we introduce chaebol indicator into our main regression. We try to see if retained earning's predictability is hindered by the chaebol group firms. In addition to $\log(\text{RE}/\text{ME})$, $\log(\text{RE}/\text{ME})$ *chaebol indicator variable is used as an independent factor. Columns 2,3,8,9 and 11 of table 2 are repeated with $\log(\text{RE}/\text{ME})$ *chaebol indicator variable additionally included.

Table 5 presents the results. As predicted, we find that $\log(\text{RE}/\text{ME})$ * chaebol dummy has negative relations with stock

returns in both markets. In the KOSDAQ market, $\log(\text{RE}/\text{ME}) * \text{chaebol}$ dummy is statistically significant in all regressions (t-values around -3.70). In addition, including this indicator variable generally increases the t-values of $\log(\text{RE}/\text{ME})$. On the other hand, in the KOSPI market, $\log(\text{RE}/\text{ME}) * \text{chaebol}$ dummy turns out to be statistically insignificant, and its inclusion does not significantly affect $\log(\text{RE}/\text{ME})$. Although introducing the chaebol dummy makes little change to the our main findings, we obtain the implication that investors react negatively to a chaebol firm's increase in retained earnings.

Table 5: Fama–MacBeth Regressions with Chaebol indicator variable

This table shows average of slopes and t-values from Fama–MacBeth regression on monthly stock returns. The regression is estimated monthly. Financial firms are excluded from the data. Stocks with negative book value of equity are excluded. Stocks without market equity, prior one month return, prior one year return, retained earnings, and contributed capital are excluded. Stocks with market value of equity below the 20th percentile are excluded. we winsorize all variables at the 1% and 99% levels. We delete stocks with fiscal month other than December. The control variables include market equity, previous one-month return, and previous one-year return. Explanatory variables other than annual accounting variables are recomputed every month. The market value of equity and all accounting variables take the log form when their values are larger than 0. Indicator variables are used to indicate negative value of the accounting variables. Chaebol dummy is used to indicate chaebol firms. Our sample data is 2001 to 2016 KOSPI and KOSDAQ stocks.

Regressor	(1)	(2)	(3)	(4)	(5)	(6)
				KOSPI		
$\log(\text{BE}/\text{ME})$		0.005 (2.56)				
$\log(\text{RE}/\text{ME})$	0.003 (3.08)	0.001 (1.76)	0.003 (2.98)	0.003 (3.02)	0.003 (2.93)	0.002 (2.27)
$\log(\text{RE}/\text{ME}) * \text{Chaebol dummy}$	-0.001 (-0.77)	-0.001 (-0.43)	-0.001 (-0.57)	-0.001 (-0.78)	-0.001 (-0.59)	-0.001 (-0.94)
$\log(\text{CC}/\text{ME})$			0.002 (1.78)		0.002 (1.80)	

Table 5 continued

Regressor	(1)	(2)	(3)	(4)	(5)	(6)
log(AOCI/ME)				0.000 (1.16)	0.000 (0.51)	
log(E/P)						0.003 (3.61)
Indicator Variables						
RE \leq 0	-0.014 (-5.08)	-0.012 (-3.73)	-0.016 (-5.74)	-0.014 (-5.45)	-0.016 (-6.07)	-0.008 (-3.07)
CC \leq 0			-0.014 (-1.96)		-0.014 (-1.92)	
AOCI \leq 0				-0.003 (-2.66)	-0.004 (-2.81)	
EP \leq 0						-0.015 (-5.13)
Avg. Adj. R ²	0.013	0.015	0.014	0.013	0.014	0.015
KOSDAQ						
log(BE/ME)		0.006 (3.16)				
log(RE/ME)	0.006 (4.41)	0.004 (3.51)	0.006 (4.33)	0.006 (4.40)	0.006 (4.30)	0.003 (3.57)
log(RE/ME)*Chaebol dummy	-0.007 (-3.74)	-0.007 (-3.60)	-0.007 (-3.78)	-0.007 (-3.81)	-0.007 (-3.85)	-0.007 (-4.03)
log(CC/ME)			0.002 (1.35)		0.002 (1.25)	
log(AOCI/ME)				-0.001 (-2.81)	-0.001 (-2.92)	
log(E/P)						0.004 (5.31)
Indicator Variables						
RE \leq 0	-0.023 (-3.96)	-0.019 (-3.11)	-0.025 (-4.28)	-0.023 (-3.96)	-0.025 (-4.28)	-0.011 (-2.63)
CC \leq 0			0.011 (1.26)		0.011 (1.29)	
AOCI \leq 0				0.002 (1.43)	0.002 (1.06)	
EP \leq 0						-0.023 (-5.16)
Avg. Adj. R ²	0.014	0.015	0.015	0.014	0.014	0.016

VII. Result for different sample period

In this section, we additionally run Fama–Macbeth regressions on the pre–2001 KOSPI stock returns. In unreported results, we find that the pre–2001 market has some unique characteristics. First, the time series average of book–to–market is much lower (0.72) than the result in the post–2001 KOSPI market. Also, RE/ME has a negative mean value (–0.61) and CC/ME has a mean of 1.32. Of the total book value, contributed capital approximately partakes 70 percent, retained earnings 30 percent and accumulated other comprehensive income only 1 percent.

As can be seen in panel A of table 6, the regression results also slightly differ for the two time periods. We find that book–to–market is barely significant, with a t–value of 1.70. Retained earnings by itself has a relatively high t–value (2.45). When both BE/ME and RE/ME are included in the model, BE/ME loses its power (coefficient of 0.003 and t–value of 0.85) but RE/ME remains statistically significant (coefficient of 0.003 and t–value of 1.71). Columns 4 through 11 show that both CC/ME and AOCI/ME are statistically insignificant in all regressions. Of all ratios, only retained earnings–to–market survives, and is powerful enough to subsume the information embedded in book–to–market.

Table 6: Fama Macbeth regressions: pre-2001 market

This table shows average of slopes and t-values from Fama-MacBeth regression on monthly stock returns. The regression is estimated monthly. Panel A shows the results when book-to-market and the three subcomponents are used as explanatory variables. Panel B shows the result when book-to-market, retained earnings-to-market, and earnings-to-price are used as explanatory variables. Financial firms are excluded from the data. Stocks with negative book value of equity are excluded. Stocks without market equity, prior one month return, prior one year return, retained earnings, and contributed capital are excluded. Stocks with market value of equity below the 20th percentile are excluded. we winsorize all variables at the 1% and 99% levels. We delete stocks with fiscal month other than December. The control variables include market equity, previous one-month return, and previous one-year return (unreported). Explanatory variables other than annual accounting variables are recomputed every month. The market value of equity and all accounting variables take the log form when their values are larger than 0. Indicator variables are used to indicate negative value of the accounting variables. Our sample data is 1984 to 2000 KOSPI and KOSDAQ stocks.

Panel A: Book-to-market and its three subcomponents

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
log(BE/ME)	0.006 (1.70)		0.003 (0.85)		0.013 (2.28)		0.006 (1.70)				
log(RE/ME)		0.004 (2.45)	0.003 (1.71)					0.003 (2.38)	0.003 (2.32)		0.003 (2.29)
log(CC/ME)				0.000 (-0.09)	-0.007 (-1.40)			0.000 (0.09)		0.000 (-0.13)	0.000 (0.08)
log(AOCI/ME)						0.000 (0.09)	0.000 (0.10)		0.000 (0.32)	0.000 (-0.05)	0.000 (0.16)

Table 6 continued

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Indicator Variables											
RE \leq 0		-0.010 (-1.35)	-0.010 (-1.21)					-0.011 (-1.66)	-0.010 (-1.37)		-0.012 (-1.69)
CC \leq 0				-0.002 (-1.00)	-0.003 (-1.00)			-0.004 (-1.00)		-0.002 (-1.00)	-0.004 (-1.00)
AOCI \leq 0						0.000 (-0.01)	-0.001 (-0.31)		-0.001 (-0.13)	-0.001 (-0.14)	-0.001 (-0.27)
Avg. Adj. R sq.	0.034	0.034	0.036	0.036	0.039	0.032	0.035	0.038	0.034	0.036	0.038

Panel B: Earnings-to-price, book-to-market, and retained earnings-to-market

Regressor	(1)	(2)	(3)
log(BE/ME)		0.006 (1.78)	
log(RE/ME)			0.002 (2.01)
log(E/P)	0.002 (2.05)	0.002 (2.03)	0.002 (1.89)
Indicator Variables			
RE \leq 0			-0.005 (-0.86)
EP \leq 0		-0.010 (-1.44)	-0.009 (-1.66)
Avg. Adj. R sq.		0.035	0.036

Panel B presents the results when E/P, RE/ME and BE/ME are used as explanatory variables. Earnings-to-price remains statistically significant even with BE/ME or RE/ME included. Yet, it fails to subsume either BE/ME (t-values of 2.03 vs 1.78) or RE/ME (t-values of 1.89 vs 2.01). As in our post-2001 test results, BE/ME and RE/ME partially subsume each other and the two factors fails to capture E/P ratio. In addition, we find that RE/ME succeeds in capturing BE/ME in the pre-2001 market.

VIII. Conclusion

The book-to-market is one of the fundamental factors to be included in asset pricing models. The stock return predictability of this factor has been well-accepted by numerous studies, but there are endless disputes about the true driving force of the value premium. Ball et al. (2017), provides additional insight into the literature by giving a close attention to each accounting subfactors of the book-to-market. The paper finds that return predictability of book-to-market stems entirely from retained earnings-to-market, and that retained earnings-to-market wholly subsume earnings-to-price.

Yet, our test results in the Korean stock market does not conform to his findings. We find that book-to-market as a

whole predicts the cross-section of stock returns the best. It outperforms all of its subcomponents and is significant in all regressions. Of the three subcomponents, only retained earnings-to-market seems to contain valuable information about the market equity. In addition, it succeeds in partially subsuming book-to-market. However, its positive relation with stock returns is also significantly subsumed by book-to-market (especially in the KOSPI market). Contributed capital-to-market does not seem to serve any role other than reflecting the gap between book-to-market and retained earnings-to-market. Accumulated capital-to-market is always insignificant with the inclusion of book-to-market. In addition, our prediction that retained earnings-to-market would significantly subsume earnings-to-price is unsupported by the test results.

We also include chaebol indicator variable in our tests to consider the potential relationship between retained earnings and tunneling activities in chaebol firms. Despite the fact that such inclusion does not change our main results, we find that retained earnings-to-market in chaebol firm has a strong, negative relation with stock returns. When we additionally test the pre-2001 KOSPI market, we once again find book-to-market and retained earnings-to-market subsuming each other. Yet, what differs from the results of the post-2001 market is that retained earnings-to-market subsumes book-to-market enough to make its predictability insignificant.

Overall, we draw the following conclusion from our findings. Book-to-market's predictive power partially derives from retained earnings-to-market. Although the other two components turn out to hold little value, book-to-market as a whole is the strongest return predictor in the post-2001 Korean stock market. Lastly, book-to-market, retained earnings-to-market, and earnings-to-price all seem to contain unique information about the stock returns.

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국문초록

본 연구에서는 장부가치 대 시장가치 비율을 재무상대표의 구성요소들로 분해하여 살펴봄으로써 한국 주식시장에서 장부가치 대 시장가치 비율과 주식 수익률 간의 관계를 규명하고자 하였다. 장부가치는 크게 이익잉여금과 납입자본금, 기타포괄손익누계액으로 나누어 생각해 볼 수 있다. 이 세 가지 구성 요소들은 목적에 따라 각각 상이한 성격을 가지고 있으며, 따라서 주식 수익률을 설명하는 데 상호 독립적인 정보를 포함한다고 생각하는 것이 합리적이다. 실제로 2001~2016년 기간 동안 한국 주식시장에서 시장가치 대 장부가치 비율이 개별 하위 요소들보다 횡단면수익률을 더 잘 예측하는 변수임을 관찰할 수 있었다. 또한 이익잉여금 대 시장가치 비율은 주식수익률과 양의 상관관계가 있음을 발견했다. 반면, 납입자본금 대 시장가치, 기타포괄손익누계액 대 시장가치 비율은 주가수익률을 예측하는데 유의미한 정보를 제공하지 않았다. 세 가지 하위 요소 재무비율 중 오직 이익잉여금 대 시장가치 비율만이 (부분적으로) 장부가치 대 시장가치 비율의 주가수익률 예측력을 흡수하는 것으로 나타났다. 마지막으로, 시장가치 대 장부가치 비율과 이익잉여금 대 장부가치 비율 모두 수익주가비율(E/P)의 주가수익예측력을 유의하게 설명하지 못함을 알 수 있었다.

주요어; 장부가치 대 시장가치, 이익잉여금, 납입자본금,
기타포괄손익누계액, 수익주가비율(E/P ratio), 가치프리미엄

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