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The Value Relevance And Relative Impact Of Gains And Losses On Valuations Of Derivatives

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Abstract

This study empirically analyzes non-financial securities listed companies from 2011 to 2014 to investigate the firm value relevance of derivative gains and losses and the relative impact of fair value and cash flow hedging derivative gains and losses, Based on the Ohlson (1995, 2001) model, I find that the firm value relevance of the offsetting amounts of fair value hedge gains and losses in the income statement and cash flow hedge gains and losses in the statement of financial position is significant. I also find that fair value hedge gains have a positive impact on firm value and fair value hedge losses have a negative impact on firm value. However, cash flow hedge gains and losses are not significant, contrary to previous studies. Finally, to measure the relative impact, I simultaneously estimate the fair value hedge gains and losses in the income statement and the cash flow hedge gains and losses in the statement of financial position. I find that the cash flow hedge gains and losses are more relevant to firm value than expected. I believe that more rigorous analysis is needed to clarify this issue.

Keywords: *Value relevance, Fair value hedge, Cash flow hedge, Gains and losses on valuation of derivatives*

INTRODUCTION

The purpose of this paper is t[1]o investigate the value relevance of hedging derivative gains and losses, i.e., fair value hedging derivative gains and losses and cash flow hedging derivative gains and losses, and to determine whether fair value hedging derivative gains and losses or cash flow hedging derivative gains and losses are more relevant to firm value.

Hedging is the use of off-balance-sheet instruments such as forwards, futures, options, and swaps to mitigate the impact of uncertainty in the business environment on firm value, or the adoption of off-balance-sheet strategies such as relocating domestic production overseas and financing in foreign currencies to reduce the volatility of firm value (Nance et all 1993). As corporate risk has increased, hedging activities through derivatives have increased. A derivative is a financial instrument or other contract whose value fluctuates with changes in an underlying variable, such as an interest rate or foreign exchange rate, that requires no net investment at inception or a lesser net investment than other types of contracts that are expected to be similarly affected by changes in market factors, and that is settled in the future. The economic substance of derivatives is difficult to grasp due to their diversity and complexity of structure, and their utilization has a great impact on various stakeholders such as financial institutions and companies. This can be easily seen in the KIKO case, the derivatives transaction between SK Global and JP Morgan, and the subprime economic crisis in the United States. Despite the increasing understanding and importance of derivatives, there is still a lack of research on the impact of derivatives on capital markets.

The accounting for these derivatives is based on the principle that, in accordance with the international trend, the accounting for domestic derivatives is mandatory to recognize the rights and obligations arising from the contract as assets and liabilities in the financial statements, and the fair value of the obligations and rights arising is recorded separately by derivative in the statement of financial position and income statement. In addition,

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derivatives are classified as hedging instruments or trading instruments depending on the purpose of the transaction, and hedging instruments are classified as fair value hedges or cash flow hedges depending on the target, and the valuation gains and losses are treated differently. For trading purposes, gains and losses on derivatives are recognized in profit or loss, while gains and losses on derivatives designated as hedging instruments are subject to a separate accounting method, i.e., special accounting, for each type of hedge.

Specifically, fair value hedge accounting refers to the symmetrical recognition of changes in the fair value of a hedged item in the same accounting period as changes in the fair value of the hedging instrument, such as a derivative, so that changes in the fair value of the hedged item due to a specific risk are offset against changes in the fair value of the hedging instrument. The hedged item's gain or loss is recognized in profit or loss in the same accounting period as the hedging instrument's gain or loss. Cash flow hedge accounting, on the other hand, refers to the recognition of the ineffective portion of the gain or loss on a derivative instrument designated to reduce the risk of changes in the future cash flows of a forecasted transaction caused by a specific risk in profit or loss, and the effective portion in accumulated other comprehensive income, and then, depending on the type of forecasted transaction, it is recognized in profit or loss in the fiscal year in which the forecasted transaction affects profit or loss, or is deducted from the carrying amount of the related asset or liability when the forecasted transaction occurs. However, since the requirements for the application of hedging and the procedures for evaluating hedge effectiveness are not easy and require expertise in derivatives, and international accounting standards do not provide detailed application guidelines or interpretations for hedge effectiveness evaluation in addition to accounting standards for derivatives, there are many difficulties in practical application, and there is great room for it to be utilized as a means of profit adjustment. (Im and Nam 2011).

The inherent complexity of derivatives and the lack of accounting standards may lead to unreliability of derivatives-related information despite their significant impact on the capital markets for trading purposes and as hedging instruments. Therefore, this study aims to investigate the value relevance of hedging derivative gains and losses, i.e., fair value hedging derivative gains and losses and cash flow hedging derivative gains and losses, and to determine whether fair value hedging derivative gains and losses or cash flow hedging derivative gains and losses are more relevant to firm value.

II. Literature review and hypotheses establishment

Ohlson (1995, 2001) derived the stock price as a function of book value, earnings, and other information, linking accounting information to firm value, and the study of the value relevance of accounting information began in earnest. In particular, they increased the explanatory power of the model by utilizing the book value of equity. In order to overcome the limitations of Ohlson's (1995) model, Feltham and Ohlson (1995) derived a valuation model by dividing the source activities of corporate profits into financial activities and operating activities, and unlike Ohlson (1995), they expected to overcome the conservatism of accounting information by calculating excess profits by using expected profits on operating income and operating assets. Bernard (1995) calculated intrinsic value using accounting profit and book value in Feltham & Ohlson’s research model and compared it.

with traditional valuation methods to empirically analyze which model explains stock prices better. In domestic studies utilizing the above models, Lee and Oh (2004) studied the appropriateness of valuation models according to company characteristics, and Baek and Jeon (2003) studied the value relevance of research intangible assets.

Choi and Ahn (2002) and Song, Kim, and Oh (2005) partially investigated the relevance of derivatives valuation gains and losses to firm value as a component of comprehensive income. Ban and Kim (2004) analyzed the determinants of hedging demand using derivatives rather than value relevance to analyze the economic factors of risk hedging, and Lee and Shin (2013) empirically analyzed the difference in profit response coefficients,

information asymmetry, and reduced cost of equity for firms listed on the organic securities market from 2000 to 2010. Im and Nam (2011) analyzed the value relevance of derivative valuation gains and losses using the income statement and accumulated other comprehensive income (loss), focusing on data from 2000 to 2007, and found that the offsetting amounts of all derivative valuation gains and losses were positively related to firm value, the offsetting amounts of cash flow valuation gains and losses on the balance sheet were positively related to firm value, and the offsetting amounts of fair value valuation gains and losses on the income statement were not positively related to firm value. The previous studies are mainly focused on the period before the financial crisis (2008) caused by derivatives, and the studies after the financial crisis do not directly investigate the value relevance of accounting information in financial statements. This study aims to investigate the value relevance of derivative gains and losses using the income statement and accumulated other comprehensive income (loss) for the period 2011-2014, which reflects the impact of the financial crisis, and is differentiated from previous studies by considering both fair value hedging derivatives and cash flow hedging derivatives to determine the value relevance and whether there is a relative difference in value relevance between the two, i.e., the difference in information quality. To this end, we set the following hypotheses: (1) We examine whether valuation gains and losses related to derivatives for hedging are related to firm value, and (2) if so, whether they are the same for fixed-value hedges and cash flow hedges. In addition, we examine whether (3) mark-to-market gains and losses on fair value hedges are more relevant to firm value than mark-to-market gains and losses on cash flow hedges.

III. Study design and sampling

3.1 Research Model

To test the research hypothesis on the relevance of hedge derivative mark-to-market information to firm value, this study adapts the model of Im and Nam (2011), which uses a hedge derivative mark-to-market model that is a variant of Ohlson's (1995, 2001) mark-to-market model. Ohlson's (1995) model is as follows.

Pt = BVt + a1Xt + a2vt --- (1)

Pt: Market value of equity at time t,
BVt: Book value of equity at time t
Xt: Excess profit in period t (t-1 to t),
VT: Information other than excess profits

This definition suggests that the market value of equity is determined by book value adjusted for current performance as measured by excess earnings and information other than excess earnings that controls the forecast of future profitability. Including the unobservable A2VT in the error term, we derive the empirical model as follows.

Pt = b0 + b1BVt + b2Xt + b3Dt +et --- (2)
Dt: Dividend at time t, et is the error term

The information about the gain or loss on a hedging derivative is divided into fair value hedge gain or loss and cash flow hedge gain or loss depending on the purpose of the hedging instrument. The fair value hedge gain or loss is added to profit or loss, while the cash flow hedge gain or loss is a component of accumulated other comprehensive income in the statement of financial position. Therefore, to test the relevance of hedge derivative gain or loss information to enterprise value, we first divide it into two parts. To do so, we derive the following model from equation (2). First, we separate Xt and BVt as follows.

Xt = XtB + (IDGt - IDLt) ---(3)
BVt = BVtB + (BDGt - BDLt) ----(4)

Where IDGt and IDLt represent gains and losses on fair value derivatives, and BDGt and BDLt represent gains and losses on cash flow hedges. XtB is a line item created to separate fair value derivative gains and losses and BVtB is a line item created to separate cash flow hedge derivative gains and losses, i.e., Xt includes fair value derivative gains and losses and BVt includes cash flow hedge derivative gains and losses. Using equations (3) and (4), we can reformulate equation (2) as follows.

Pt = b0 + b1BVtB + b2XtB + b3TDGLt + b4Dt + et --- (5)

Where TDGLt denotes (IDGt - IDLt)+ (BDGt - BDLt), which is the total derivatives valuation gain or loss. To reflect Collins et all's (1999) finding that the relationship between accounting earnings and stock price is qualitatively different when accounting earnings are negative than when accounting earnings are positive, and to isolate the temporary from the permanent, we add NXt, which is defined asymptotically only when accounting earnings are negative, because investors typically view negative accounting earnings as temporary, we get the following equation.

Pt = b0 + b1BVtB + b2XtB + b3NXtB + b4 TDGLt + b5Dt + et --- (6)

where NXt is XtB if XtB is zero and zero otherwise. Equation (6) is used to test hypothesis 1). Utilizing Equation (3) and Equation (2), we get the following expression.

Pt = b0 + b1BVt + b2XtB + b3(IDGt - IDLt) + b4Dt +et --- (7)

Consider the case of a negative accounting profit.

Pt = b0 + b1BVt + b2XtB + b3NXtB+ b4(IDGt - IDLt) + b5Dt +et --- (8)

Equation (8) is used to verify Hypothesis 2). Similarly, utilizing equation (2) and equation (4), we obtain the following expression.

Pt = b0 + b1BVtB + b2Xt + b3(BDGt - BDLt) + b4Dt +et --- (9)

Consider the case of a negative accounting profit.

Pt = b0 + b1BVtB + b2Xt + b3NXt+ b4(BDGt - BDLt) + b5Dt +et --- (10)

Equation (10) is also used to verify Hypothesis 2).

Also, if we separate TDGLt in equation (6) as (IDGt - IDLt)+ (BDGt - BDLt), we get the expression

Pt = b0 + b1BVtB + b2XtB + b3NXtB + b4(IDGt - IDLt)+ b5(BDGt - BDLt) + b6Dt + et
---------- (11)

We use this expression to test hypothesis (3).

3.2 Sampling

The sample was selected as follows This study was conducted on companies listed on securities from 2011 to 2014 that meet the following conditions. In addition, the financial industry was excluded from the analysis to maintain consistency in the data because the nature of its business is different from that of manufacturing companies, and the accounting standards and accounting subdivision system are different, and the nature of its business is such that derivatives are mainly used to target operating income rather than for risk hedging purposes (Lee & Shin 2013).

1) A company that can obtain the necessary financial data from KISVALUE of Korea

Credit Evaluation Corporation.
Non-financial companies: 661 companies

2) 643 companies with December fiscal year-end that meet the above conditions

3) An entity that discloses fair value hedge derivative gains and losses or cash flow hedge derivative gains and losses at least once during the period (for which a value is indicated in KIS-Value):

The total number of samples that meet the above conditions is 819, which are 211, 206, 202, and 200 in order of year starting from 2011. During the period (2011-2014), 297 companies disclosed either fair value hedge derivative gains or losses or cash flow hedge derivative gains or losses at least once during the period. This corresponds to 46.2% of the 643 non-financial companies with December financial statements listed in securities during the period, and averages about 30% when separated by year. Specifically, the number of companies disclosing fair value/cash flow hedge derivative gains and losses in the period is shown in Table 1.

<Table 1> Number of companies disclosing fair value/cash flow hedging derivative gains and losses during the period

	Income Statement		Financial Statements	
	Gain on fair value hedges	Fair value hedge valuation losses	Cash flow hedge valuation gain	Cash flow hedge valuation loss
2011	157	153	15	60
2012	130	128	23	45
2013	142	130	21	38
2014	149	147	9	46
Total	578	558	68	189

IV. Empirical Analysis Results

<Table 2> shows the results of the regression model estimated to examine the relevance of offsetting fair value hedge gains and losses on the income statement and cash flow hedge gains and losses on the statement of financial position to firm value. The regression coefficient of BVtB (book value less derivative-related gains and losses), b1, is positive for all years and significant at the 1% and 5% significance levels, except for 2012. This means that book value to market (BVtB) has a significant positive relationship with firm value. The regression coefficient of net income (Xt) minus derivative gains and losses (XtB) is positive at the 1% level of significance, indicating that net income (Xt) minus derivative gains and losses (XtB) is a positive and significant variable in relation to firm value. In terms of the magnitude of the coefficient, the regression coefficient of net income (Xt) minus derivative-related gains and losses (XtB) is larger than the regression coefficient of book value (BVtB) minus derivative-related gains and losses, suggesting that profit information is reflected in enterprise value to a greater extent than book value information. The estimated regression coefficient for NXtB, which is net loss, is negative at the 1% level of significance in all but one year.

The estimated regression coefficient of TDGLt, which represents the offsetting amount of fair value hedge gains and losses and cash flow hedge gains and losses on the statement of financial position, is significant in half of the four periods and significant in all pooled periods. Except for 2012, the coefficient is significantly positive. The offsetting amounts of fair value hedge gains and losses and cash flow hedge gains and losses in the statement of financial position are value related, which supports the first hypothesis. The overall

explanatory power of the model is high as characterized by the Ohlson model.

<Table 2> Hypothesis (1) Verification model analysis results
Pt = b0 + b1BVtB + b2XtB + b3NXtB + b4 TDGLt + b5Dt + et

		Regression Coefficients						F-value	The modified R2	Sample size
		b0	b1	b2	b3	b4	b5			
All	Coefficients	-1.362E+10	0.628	8.802	-19.521	10.608	-6.935	3565.288 ***.	0.956	819
	t-value	-.115	16.364 ***.	32.607 ***.	-5.488 ***.	2.212 **	-3.970 ***.			
2011	Coefficients	-3.356E+11	1.543	5.589	-0.100	5.903	-28.662	694.382 ***.	0.943	211
	t-value	-1.349	15.444	6.842 ***.	-0.008	0.617	-6.602 ***.			
2012	Coefficients	2.472E+11	0.038	12.874	-38.510	-8.263	-7.642	3559.865 ***.	0.989	206
	t-value	1.851 *.	0.568	33.621 ***.	-9.287 ***.	-1.959 *.	-2.926 ***.			
2013	Coefficients	2.141E+11	0.520	6.674	-11.820	48.133	14.430	5371.461 ***.	0.993	202
	t-value	2.179 **B	18.034 ***.	17.257 ***.	-4.686 ***.	7.569 ***.	6.169 ***.			
2014	Coefficients	1.495E+11	0.135	5.547	-17.860	12.305	35.316	1486.556 ***.	0.975	200
	t-value	0.780	2.397 **B	8.497 ***.	-3.555 ***.	1.174	9.192 ***.			

* indicates a significance level of 0.1, ** indicates 0.05, *** indicates 0.01

<Table 3> Hypothesis (2) Verification Model Analysis Results

Pt = b0 + b1BVt + b2XtB + b3NXtB + b4 [IDGt-IDLt] + b5Dt + et

		Regression Coefficients						F-value	The modified R2	Sample size
		b0	b1	b2	b3	**b4**	b5			
All	Coefficients	-8181765673	0.634	8.797	-19.363	**15.432**	-7.240	3582.631 ***.	0.956	819
	t-value	-0.069	16.506 ***.	32.723 ***.	-5.461 ***.	**2.973 ***.**	-4.158 ***.			
2011	Coefficients	-3.305E+11	1.543	5.598	0.117	**8.027**	-28.818	695.211 ***.	0.943	211
	t-value	-1.331	15.480 ***.	6.861 ***.	0.009	**0.823**	-6.635			
2012	Coefficients	2.492E+11	0.027	12.933	-39.361	**-10.950**	-7.546	3576.627 ***.	0.989	206
	t-value	1.823 *.	0.402	33.518 ***.	-9..509 ***.	**-2.189 **B**	-2.919 ***.			
2013	Coefficients	2.366E+11	0.501	6.266	-12.968	**38.095**	10.606	4847.074 ***.	0.992	202
	t-value	2.290 **B	16.393 ***.	19.691 ***.	-4.907 ***.	**5.706 ***.**	4.552 ***.			
2014	Coefficients	1.279E+11	0.140	5.449	-17.045	**4.861**	35.484	1477.366 ***.	0.974	200
	t-value	0.667	2.493 **B	7.756 ***.	-3.380 ***.	**0.424**	8.586 ***.			

* indicates a significance level of 0.1, ** indicates 0.05, *** indicates 0.01

<Table 3> shows the results of the regression model estimated to examine the relevance of fair value hedge gains and losses on the income statement to firm value. The regression coefficient of book value (BVt), b1, has a positive coefficient in all years except period 1 and is significant at the 1% and 5% significance levels. This means that there is a significant positive relationship between book value (BVt) and firm value. The regression coefficient of net income (Xt) minus derivative gains and losses (XtB) is positive at the 1% level of significance, indicating that net income (Xt) minus derivative gains and losses (XtB) is a positive and significant variable in relation to firm value. In terms of the magnitude of the coefficient, the regression coefficient of net income (Xt) minus derivative-related gains and losses (XtB) is larger than the regression coefficient of book value (BVt). Therefore, it can

be said that profit information is reflected in enterprise value to a greater extent than book value information. On the other hand, the estimated regression coefficient of NXtB, which refers to net loss, is negative at the 1% significance level in all periods except one year. The estimated regression coefficient of IDGLt-IDLt, which is the variable of interest, is significant for the entire pooled period except for 2012, when it is significantly negative, indicating that fair value hedge derivative gains and losses are value-related. The overall explanatory power of the model is high as characterized by the Ohlson model, which supports the second hypothesis.

<Table 4> Hypothesis (2)-1 Additional verification model analysis results

Pt = b0 + b1BVt + b2XtB + b3NXtB + b4 IDGt+ b5IDLt + b6Dt + et

		Regression Coefficients							F-value	The modified R2	Sample size
		b0	b1	b2	b3	**b4**	**b5**	b6			
All	Coefficients	-1.374E+11	0.810	8.740	-17.334	**15.644**	**-16.088**	-14.666	1583.476	0.970	295
	t-value	-0.511	12.291 ***	19.405 ***	-3.370 ***	**1.755 ***	**-1.861 ***	-5.233 ***			

* indicates a significance level of 0.1, ** indicates 0.05, *** indicates 0.01

<Table 4> shows the results of the regression model estimated to investigate the relevance of valuation gains and losses of fair value hedging derivatives to enterprise value in the income statement. The regression coefficient of book value (BVt), b1, is positive and significant at the 1% level of significance. The regression coefficient of net income (Xt) minus derivative-related gains and losses (XtB), b2, is also positive at the 1% significance level, indicating that it is significantly related to firm value. In addition, the regression coefficient of net income (XtB), which is net income (Xt) minus derivative-related gains and losses, is larger than the regression coefficient of book value (BVt) in terms of the size of the coefficient, indicating that profit information is reflected in enterprise value to a greater extent than book value information. The estimated regression coefficient of NXtB for net loss, b3, is also negative and significant at the 1% level of significance. The estimated regression coefficients of the **variables of interest,** b4 for fair value hedge gains (IDGLt) and b5 for fair value hedge losses (IDLt), are significantly positive and negative at the 10% significance level, respectively, supporting Hypotheses 2-1 and 2-2. This means that fair value hedge derivative valuation gains and losses are value related.

<Table 5> Hypothesis (2)-2 additional validation model analysis results

Pt = b0 + b1BVtB + b2Xt + b3NXt + b4 [BDGt-BDLt] + b5Dt + et

		Regression Coefficients						F-value	The modified R2	Sample size
		b0	b1	b2	b3	**b4**	b5			
All	Coefficients	-2.419E+10	0.629	8.881	-17.816	**-15.385**	-7.698	3584.106 ***	0.956	819
	t-value	-0.205	16.536 ***	33.216 ***	-5.343 ***	**-1.262**	-4.349 ***			

2011	Coefficients	-3.706E+11	1.553	5.625	-3.196	**-65.521**	-30.470	700.328 ***.	0.943	211
	t-value	-1.499	15.472 ***.	6.918 ***.	-0.280	**-1.152**	-6.668 ***.			
2012	Coefficients	2.189E+11	0.090	12.418	-36.378	**-3.015**	-5.677	3230.373 ***.	0.987	206
	t-value	1.561	1.283	31.940 ***.	-8.499 ***.	**-0.329**	-2.097 **B			
2013	Coefficients	3.032E+11	0.424	6.799	-12.391	**52.515**	10.729	4611.643 ***.	0.992	202
	t-value	2.890 ***.	15.655 ***.	23.316 ***.	-4.862 ***.	**3.413 ***.**	4.260 ***.			
2014	Coefficients	1.520E+11	0.120	5.096	-15.597	**40.892**	38.365	1494.010 ***.	0.974	200
	t-value	0.799	2.097 **B	7.598 ***.	-3.422 ***.	**1.820 *.**	9.175 ***.			

* indicates a significance level of 0.1, ** indicates 0.05, *** indicates 0.01

<Table 5> shows the results of the regression model estimated to examine the relevance of derivative valuation gains and losses for cash flow hedges in other comprehensive income in the statement of financial position to firm value. The regression coefficient of book value less derivative-related gains and losses (BVtB), b1, is positive and mostly significant at the 1% and 5% significance levels. This means that there is a significant relationship between book value (BVt) and firm value. The regression coefficient of net income (Xt), b2, is positive at the 1% level of significance, indicating that it is significantly related to firm value. In terms of the magnitude of the coefficient, the regression coefficient of net income (Xt) is larger than the regression coefficient of book value (BVtB), which indicates that profit information is reflected in firm value to a greater extent than book value information. The estimated regression coefficient of NXt, which refers to net loss, is negative and significant at the 1% level for all periods except one year. The estimated regression coefficients of BDGt-BDLt, the variable of interest, are positive and significant at the 1% and 10% levels in 2013 and 2014, but negative and insignificant in 2011 and 2012 and the period including pooling, so it is difficult to conclude that BDGt is value-relevant.

<Table 6> Hypothesis (2)-3 Verification Model Analysis Results

Pt = b0 + b1BVtB + b2Xt + b3NXt + b4BDGt - b5BDLt + b6Dt + et

	Regression Coefficients							F-value	The modified	Sample size
	b0	b1	b2	b3	**b4**	**b5**	b6			

										R2	
All	Coefficients	1.624 E+12	0.555	12.589	N.A	**-53.548**	**-9.733**	-25.057	45.720 ***.	0.929	18
	t-value	1.390	2.892 **B	3.849 ***.		**-0.698**	**-0.226**	-0.872			

* indicates a significance level of 0.1, ** indicates 0.05, *** indicates 0.01

<Table 6> shows the results of the regression model estimated to investigate the relevance of valuation gains and losses of cash flow hedging derivatives to firm value. The regression coefficient b1 of book value less derivative-related gains and losses (BVtB) is positive and significant at the 5% significance level. The regression coefficient of net income (Xt), b2, also has a positive value at the 1% significance level, indicating that it is a positive and significant variable in relation to enterprise value. The estimated regression coefficient b3 for NXt, which represents net loss, is not significant. The estimated regression coefficient of BDGLt, the gain on cash flow hedging derivatives, and BDLt, the loss on cash flow hedging derivatives, are both negative and insignificant. The results of this hypothesis test are unlikely to be acceptable due to the small sample size.

<Table 7> Hypothesis (3) Verification model analysis results

Pt = b0 + b1BVtB + b2XtB + b3NXt + b4[IDGt-IDLt]+ b5[BDGt-BDLt] + b6Dt + et

		Regression Coefficients							F-value	The modified R2	Sample size
		b0	b1	b2	b3	**b4**	**b5**	b6			
All	Coefficients	-1.162 E+10	0.637	8.822	-19.004	**15.400**	**-16.037**	-7.681	2989.048 ***.	0.956	819
	t-value	-0.099	16.569 ***.	32.758 ***.	-5.348 ***.	**2.968 ***.**	**-1.317**	-4.340 ***.			
2011	Coefficients	-3.550 E+11	1.564	5.545	0.644	**8.386**	**-66.541**	-30.588	580.783 ***.	0.943	211
	t-value	-1.426	15.473 ***.	6.792 ***.	0.051	**0.860**	**-1.166**	-6.671 ***.			
2012	Coefficients	2.434 E+11	0.028	12.930	-39.282	**-10.913**	**-0.852**	-7.580	2965.772 ***.	0.989	206
	t-value	1.821 *.	0.410	33.377 ***.	-9.302 ***.	**-2.170 ****	**-0.097**	-2.901 ***.			
2013	Coefficients	2.170 E+11	0.512	5.562	-11.468	**45.422**	**73.610**	15.837	4539.558 ***.	0.993	202
	t-value	2.224 **B	17.714 ***.	16.774 ***.	-4.566 ***.	**7.022 *****	**5.042 *****	6.506 ***.			

2014	Coefficients	1.541 E+11	0.120	5.132	-17.454	**6.189**	**38.772**	38.191	1243.939 ***.	0.974	200
	t-value	0.805	2.097 **B	7.097 ***.	-3.474 ***.	**0.541**	**1.721 ***	8.671 ***.			

* indicates a significance level of 0.1, ** indicates 0.05, *** indicates 0.01 (two-tailed)

<Table 7> shows the results of the regression model estimated simultaneously to examine the relevance of derivative gains and losses for fair value hedges in the income statement and cash flow hedges in the statement of financial position to firm value. The regression coefficient of BVtB (book value less derivative-related gains and losses), b1, is positive for all years and significant at the 1% and 5% significance levels, except for 2012. This means that book value to market (BVtB) is significantly and positively related to firm value. The regression coefficient of net income (Xt) minus derivative-related gains and losses (XtB), b2, is also positive at the 1% level of significance, indicating that it is significantly related to firm value. In terms of the magnitude of the coefficient, the regression coefficient of net income (Xt) minus derivative-related gains and losses (XtB) is larger than the regression coefficient of book value (BVtB) minus derivative-related gains and losses, indicating that profit information is reflected in enterprise value to a greater extent than book value information. The estimated regression coefficient of NXtB, which represents net loss, b3 is significantly negative at the 1% level in all periods except one year. For the estimated regression coefficients b4 and b5 of the variables of interest, fair value hedge gains and losses and cash flow hedge gains and losses on the statement of financial position, the former is significant in half of the four periods and the latter is significant in all pooled periods. Except for 2012, they are significantly positive. For the latter, gains and losses on derivative instruments for cash flow hedges on the statement of financial position, the two significant years are positive, while the pooling period and the other two years are negative and insignificant. To compare the relative magnitudes, the estimated regression coefficient of gains and losses on derivatives for fair value hedges is 45.422 and the estimated regression coefficient of Gains and losses on derivatives for cash flow hedges is 73.610, indicating that the estimated regression coefficient of gains and losses on derivatives for cash flow hedges is larger than expected. When comparing only the absolute value of the estimated regression coefficient without considering its sign and significance, the sign alone indicates that the estimated coefficient of G&L for cash flow hedges is larger than G&L for fair value hedges for all three periods and pooled data except 2012. However, it is difficult to generalize due to a number of constraints.

V. Conclusion

This paper investigates the value relevance of hedging derivative gains and losses, i.e., gains and losses on derivatives for fair value hedges and gains and losses on derivatives for cash flow hedges and identifies whether gains and losses on fair value hedges or gains and losses on cash flow hedges affect value relevance more. The results of the empirical analysis are as follows.

First, the firm value relevance of offsetting fair value hedge gains and losses in the income statement and cash flow hedge gains and losses in the statement of financial position is significant. Second, the valuation gains of derivatives for fair value hedges are positively related to firm value, while the valuation losses are negatively related to firm value. Third, however, the valuation gains and losses of derivatives for cash flow hedges were found to be insignificant, contrary to previous studies, and in some cases had the opposite sign as expected. Finally, when we simultaneously estimate the gains and losses on derivatives for fair value hedges and the gains and losses on derivatives for cash flow hedges, which are

income statement items to measure their relative impact, we find that the value relevance of derivatives for cash flow hedges is greater than expected.

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