Ⅴ　韓国セッション報告

The Effect of Industry Homogeneity on the Magnitude of Post-Earnings Announcement

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Abstract

This study investigates how industry homogeneity is related to the magnitude of post-earnings announcement drift (hereafter, PEAD). Given that firms in industry with more homogeneous operating cost structure are conducive to spillover of knowledge among investors, we expect that firms in industry with high homogeneity show relatively low magnitude of PEAD in terms of information transfer effect. Using firms listed on Korean Stock Exchange (KSE) between 2005 and 2015, we find the evidence that the magnitude of PEAD is negatively related to the industry homogeneity, indicating that investors are more efficient for firms in highly homogenous industry in which the information is likely to be referred to the peer firms. In addition, we find that the effect of industry homogeneity on the magnitude of PEAD exists mainly for the firms in industry with extremely high homogeneity and is robust to controlling for the effect of industry concentration. Overall, our study contributes to the literature on exploring determinants of the PEAD by linking information transfer effect in homogenous industry to investors' informational efficiency in capital market.

Key words: Industry homogeneity, Information transfer, Post-earnings announcement drift.
JEL classification: M41

1. Introduction

This study investigates the relation between industry homogeneity and the magnitude of post-earnings announcement drift (hereafter, PEAD). PEAD is defined as the phenomenon that stock price continues to drift in direction of unexpected earnings after earnings announcement date (Ball and Brown 1968; Jones and Litzenberger 1970). Since PEAD contradicts the efficient market hypothesis (EMH) which assumes that all available information is perfectly and promptly reflected in stock price, it is regarded as one of the accounting-based market anomalies. Thus, why this phenomenon occurs or which factors influences the magnitude of PEAD have been a critical issue in accounting research.

According to prior studies, PEAD is documented to be mostly concerned with investor's under-reaction to earnings news which incorporates the information on firm's future earnings (Bernard and Thomas 1990; Ball and Bartov 1996). Given that investors' under-reaction to earnings news is mostly attributable to the lack of information on firm specific characteristics, previous researches have been explored determinants of PEAD by focusing on the information environment surrounding individual firms. The findings show that the proxies for information environment such as firm size (Foster et al. 1984), analyst coverage(Zhang 2006), accounting disclosure policy such as conference call (Kimbrough 2005) and Big4 audit firm (Ferguson and Matolcsy 2004) is negatively related to the extent of PEAD. This suggests that the rich environment providing more information about firm specific condition improves investor's efficiency for interpreting earnings information, consequently lowers the magnitude of PEAD.

However, considering the fact that investors are willing to effort to get more information and learn about technical skill on disentangling intrinsic value from released information about target firms, we note that PEAD is affected by also a knowledge spillover effect among investors. The spillover effect of knowledge is mostly documented in the literature on the auditor's incentives to audit specialization, in which audit firms seek to specialize in industries to conducive to knowledge transfer about audit risks and processes across similar clients and achieve lower costs (Gramling and Stone 2001; Cairney and Young 2006; Reichelt and Wang 2010). This means that the audit efficiency improves in information environment in which information is likely to be referred to the other clients. Cairney and Stewart (2015) and Bills et al. (2015) support the argument on the audit efficiency through the spillover effect by showing that auditors lower fees for clients in industry with similar I operations where industry knowledge is more transferable.

In this context, we investigates that the industry homogeneity, defined as the similarity in operating activity within industry (Cairney and Young 2006), is significantly related to post-earnings

announcement drift.(1) We conjecture that the high homogeneity in industry, in which the information is likely to be referred to the peer firms, usually helps investors more efficient in forecasting firm's future performance than less homogeneity in industry. As such, this leads investors to under-react less to earnings information which arrives on earnings announcement date. On the contrary, investors would be more likely to have difficulty with interpreting earnings news of firms with less homogeneity in industry. As a result, they are likely slow to respond to the information implied in earnings news and consequently the stock price also drifts in the same direction of unexpected earnings over several periods after the earnings announcement. Thus, we expect the extent of industry homogeneity to be negatively related to the magnitude of PEAD and hypothesize that the magnitude of PEAD for firms in industry with high homogeneity is lower than for firms in industry with low homogeneity.(2)

To test our hypothesis, we conduct a series of the regression analyses. Using a sample of 8,458 firm-years for KSE-listed firms from 2005 to 2015, we find that the extent of PEAD is lower for firms in highly homogenous industry than those in less homogenous industry, supporting information transfer effect. These results indicate that industry homogeneity mitigates the investors' under-reaction to earnings information, suggesting that market participants are more efficient in information processing for firms in industry with high homogeneity. Further, we find the non-monotonic effect of industry homogeneity on PEAD from the evidence that the negative relation between industry homogeneity and PEAD is more pronounced for firms in industry with relatively high homogeneity. Lastly, we show that the effect of industry homogeneity on PEAD is not significant in post-IFRS adoption period.

Our study contributes to academic researchers as well as practitioners in several ways. First, this study adds to the literature on the determinants of the investor's informational efficiency in capital market by linkage of information environment represented by industry homogeneity and investors' under-reaction to earnings news. Specifically, by connecting the homogeneity in cost structure within same industry to the accounting-based market anomaly (i.e., PEAD), our study sheds light on a determinant which affects the market's informational efficiency. Second, by suggesting the importance of accounting consistency among peer firms with similar operating cost structure, to investors' ability of information processing, our paper provides authorities an opportunity to overhaul the accounting practice and regulation for each industry and to enhance investor informational efficiency. Lastly, we suggest that investors are able to earn more profit by understanding and exploiting industry economic fundamentals implied in different homogeneity among industry in developing their investment strategy.

2. Research Background and Hypothesis Development

2.1 Post Earnings Announcement Drift and Intra-Industry Informational Environment

Post-earnings announcement drift is defined as the phenomenon which stock returns drift continuously for several periods in direction of unexpected earnings following earnings announcement date (Ball and Brown, 1968; Freeman and Tse, 1989). Since this contradicts the efficient market hypothesis which suggest that stock price reflects fully and immediately the public information for future earnings during the earnings announcement period, PEAD is generally understood accounting-based market anomaly. While a large of studies have explained the causes of this phenomenon in perspectives of transaction cost, risk, and methodological problem (Foster et al. 1984; Bushan 1994; Mendenhall, 2004; Ng et al. 2008), the most common explanation is investor's under-reaction to the underlying information in unexpected earnings (Bernard and Thomas 1990; Ball and Bartov 1996; Bartov et al. 2000).

The factors determining the magnitude of PEAD which have discussed in related literature are summarized largely into twofold. The First is earnings quality. To the extent that PEAD is attributable to the investors' ignorance of the property of earnings, investors' under-reaction to more persistent (volatile) earnings results in the higher (lower) magnitude of PEAD (Narayanamoorthy 2006, Cao and Narayanamoorthy 2012). This argument is associated with investor's conservatism in which investors tend to react more efficiently to bad news. Second, the proxies for information environment such as firm size, analyst coverage, accounting disclosure policy and Big4 audit firm is negatively related to the extent of PEAD (Bartov et al. 2000; Bernard and Thomas 1989; Ferguson and Matolcsy 2004; Foster et al. 1984; Kimbrough 2005; Fung and Su 2006; Zhang 2006). This suggests the richer environment of information providing more frequent forecasts by several analysts, high audit quality by big4 audit firms, improves investor's efficiency for interpreting earnings news, consequently lowers the magnitude of PEAD.

2.2 Industry Homogeneity and Hypothesis Development

Conditioning on the fact that firm-specific information incorporates in part industry-wide information, we propose that PEAD is related to the extent of homogeneity in production activity among peer firms within same industry. Prior literature documents that industry fundamentals such as industry-wide accruals are informative about firms' future earnings (Brown and Ball 1967; Hui and Yeung 2013; Hui et al. 2016). Moreover, for firms in industry with good information environment which provides more comparable information to other peer firms, investors are more efficient for forecasting firms' future performance as well

as understanding industry-wide earnings from each firm's earnings.

The stream of research on industry homogeneity has studied mostly the information transfer through knowledge spillover which means that the information of firms within same industry is likely to be referred to the peer firms. Cairney and Young (2006) proposed the operational homogeneity measured as the correlation of each firm's changes in operating expenses within the same industry and examine the relation between audit specialization and industry homogeneity. By extending Cairney and Young (2006), Cairney and Stewart (2015) and Bills et al. (2015) show that auditors are more likely to be specialized in homogeneous industry because the homogeneity in accounting practice helps auditors' knowledge spillover to peer firms and efficient audit procedure. Moreover, Peterson et al. (2015) find the evidence that accounting consistency over firms within industry is positively related to stock return synchronicity with market return. These results imply that firms with homogenous industry in terms of accounting practice are likely to be exposed to information transfer to other peer firms. In other words, homogeneity in cost structure among peer firms lessens the information asymmetry in the market and enhances investors' ability of understanding firms' future performance.

Taken together, it is possible that high homogeneity with respect to operating expenses in industry represents the better condition for sharing information with peer firms. Thus, we expect the higher homogeneity in industry to mitigate incrementally the magnitude of PEAD. Finally, we conjecture that the magnitude of PEAD for firms in industry with higher homogeneity is lower than for firms in industry with low homogeneity and hypothesize as follows.

H: *The magnitude of PEAD is negatively related to the industry homogeneity*.

3. Methodology

3.1 Industry Homogeneity (HOGN)

Industry homogeneity refers to a similarity of the cost structure of firms within same industry. Previous studies viewed industry in which the changes in operating expenses of a firm are more correlated with other firms with operating homogeneity. Accordingly, we measure the proxy of industry homogeneity as an average correlation of all firms within industry for changes in operating expenses (Cairney and Young 2006). Specifically, we calculate the correlation coefficient of the changes in operating expenses of each firm with the other firms in same industry for 5 rolling periods and then take an average of those coefficients by each industry. Equation (1) represents the measure of industry homogeneity (HOGN).

$$HOGN_t = \left[\sum_{k=1}^{n} Corr\left(\Delta OEX_{it}, \Delta OEX_{jt}\right)_k\right] \times \frac{1}{n} \quad (1)$$

where, ΔOEX_t denotes the percentage changes in operating expenses for year t and operating expenses(OEX) is calculated as

(Sales-Operating income+Depreciation).

3.2 Post Earnings Announcement Drift

To test stock price drift subsequent to earnings announcement, we need to measure unexpected earnings at earnings announcement date (UE) and the cumulative abnormal returns (CAR) following earnings announcement date.

We measure standardized unexpected earnings based on the time-series model in which unexpected earnings is the difference between current earnings and four lagged earnings for quarter, scaled by standard deviation of seven-consecutive unexpected earnings for quarter. $SUE_{i,q} = \frac{EPS_{i,q}-EPS_{i,q-4}}{\sigma_{i,q}}$, where $EPS_{i,q}$ =quarterly earnings per share; $EPS_{i,q-4}$=earnings per share in the same quarter in the previous year; and $\sigma_{i,q}$ =standard deviation of unexpected earnings ($EPS_{i,q} - EPS_{i,q-4}$) over the prior eight quarters. Next, CAR is size-adjusted cumulative abnormal returns over the 45 (or 60) trading days starting the day after the earnings announcement (day 0) for quarter t. We form 25 portfolios by sorting on market value at the beginning of the year and then calculate abnormal returns by subtracting portfolio average returns from firm-specific returns.

3.3 Model Specification

To test our hypothesis, we run the regression equation with firm-quarter based variables as follows.

$$CAR = \beta_0 + \beta_1 DSUE + \beta_2 HOGN + \beta_3 DSUE \times HOGN + \beta_4 \ln(MV) + \beta_5 BETA + \beta_6 MTB + \beta_7 MM + \beta_8 \sigma(Ret) + Fixed\ Effect + \varepsilon \quad (2)$$

SUE : Standardized unexpected earnings estimated form time-series model;

HOGN : Industry homogeneity;

ln(MV) : Firm size, measured as the logarithm of market value;

BETA : Firm risk, measure as the firm return's sensitivity to market returns;

MTB : Market to book value ratio, measured as market value divided by total equity;

MM : Momentum returns for previous 12 months;

σ(Ret) : Volatility, measured as the standard deviation of daily returns during prior year;

CAR : Cumulative (size-adjusted) abnormal returns for 45 (or 60)-trading days following earnings announcement date.

Our main variable is the interaction term, DSUE × HOGN . If high homogeneity with respect to operating expenses in industry indicates the better condition for sharing information with peer firms in information transfer perspective, the higher homogeneity in industry to mitigate incrementally the magnitude of PEAD. Thus, β_3 is expected to be significantly negative. To control for firm's systematic risk partially explaining abnormal returns (CAR), we include firm size (ln(MV)), market to book ratio (MTB),

beta (BETA), and momentum returns (MM), suggested by Fama and French (1993) and Carhart (1997) and stock volatility (σ(Ret)) in regression model. Additionally, we control for year fixed effect by including year dummy variables. Panel data has a potential problem of the estimation bias due to cross-sectional correlation and time serial autocorrelation. To address this concern, we test a statistical significance of coefficient using firm-cluster robust-standard error (Petersen 2009).

3.4 Sample

Of firms listed on Korean Stock Exchange (KSE) between 2005 and 2015, we impose the following restrictions: we delete (1) firms with a fiscal year end in non-December, (2) firms that belong to the financial and insurance industries, (3) firms with impairment of capital, and (4) observations with missing stock returns, announcement dates, or other financial variables. We winsorize at 1% of both top and bottom of all variables to alleviate the effect of outliers. The final sample contains 8,458 firm-quarter observations. We retrieve quarterly earnings data, daily stock prices, and other financial variables from the Kis-value II database of NICE Investors Service Co, Ltd. and obtain the earnings announcement dates from the Korean Exchange (KRX).

4. Empirical Analysis Results

4.1 Descriptive Statistics

<Table 1> reports the descriptive statistics for the test variables. Industry homogeneity (HOGN) as a main variable in our study shows the mean (median) value of 0.123 (0.087) and ranges between -0.380 and 0.983. Higher homogeneity in industry denotes higher correlation of the operating cost structure among peer firms. Thus, higher (lower) value of HOGN indicates high (low) similarity in operating activity among peer firms, representing accounting consistency within same industry.

4.2 Correlation Analysis Results

<Table 2> presents the correlation analysis results of test variables, showing the Pearson (Spearman) correlation coefficient on the left (right) of the empty diagonal. The correlation coefficients of unexpected earnings (SUE) and cumulative abnormal returns (CAR) are all positive and significant at 1% level, indicating that stock returns drift in direction of SUE. The industry homogeneity (HOGN) is significantly correlated with cumulative abnormal returns only for 60 trading days following earnings announcement in the results of Spearman, suggesting that the effect of HOGN on the drift in stock returns is unclear. In the next section, we examine more elaborately the relation between the magnitude of PEAD and industry homogeneity (HOGN) by using the regression model analysis.

<Table 1> Descriptive Statistics

Variables	Min	1%	25%	Mean	50%	75%	99%	Max	Std.
SUE	-4.220	-3.677	-0.606	0.059	0.034	0.688	4.171	4.729	1.358
HOGN	-0.389	-0.086	0.042	0.123	0.087	0.161	0.679	0.983	0.137
ln(MV)	23.640	24.210	26.030	27.145	26.811	28.279	30.738	30.738	1.557
BETA	-0.034	0.037	0.494	0.795	0.758	1.073	1.748	1.904	0.400
MTB	0.180	0.193	0.613	1.438	0.959	1.622	8.089	9.384	1.462
MM	-0.644	-0.570	-0.165	0.167	0.041	0.357	2.275	2.547	0.526
σ(Ret)	0.011	0.012	0.020	0.027	0.025	0.032	0.057	0.061	0.009
CAR45	-0.555	-0.379	-0.091	0.006	0.002	0.096	0.404	0.506	0.155
CAR60	-0.542	-0.420	-0.101	0.010	0.003	0.113	0.511	0.650	0.176

Variable Definition:

SUE : Standardized unexpected (quarterly) earnings, estimated by time-series model;

HOGN : Industry homogeneity, measured as the correlation coefficient of change in operating cost among firms within same industry;

ln(MV) : Firm size, measured as the logarithm of market value;

BETA : Firm risk, measured as the firm return's sensitivity to market returns;

MTB : Market to book value ratio, measured as market value divided by total equity;

MM : Momentum returns for previous 12 months;

σ(Ret) : Volatility, measured as the standard deviation of daily returns during prior year

CAR : Cumulative (size-adjusted) abnormal returns by 45 and 60-trading days following earnings announcement

<Table 2> Correlation Matrix

	SUE	HOGN	ln(MV)	BETA	MTB	MM	σ(Ret)	CAR45	CAR60
SUE		-0.028 (0.011)	0.035 (0.001)	-0.023 (0.031)	0.075 (<.001)	0.051 (<.001)	-0.023 (0.035)	0.071 (<.001)	0.081 (<.001)
HOGN	-0.031 (0.004)		0.074 (<.001)	-0.002 (0.843)	-0.077 (<.001)	-0.021 (0.048)	-0.115 (<.001)	-0.010 (0.362)	-0.020 (0.069)
ln(MV)	0.028 (0.010)	0.053 (<.001)		0.300 (<.001)	0.316 (<.001)	0.074 (<.001)	-0.159 (<.001)	0.038 (0.001)	0.044 (<.001)
BETA	-0.023 (0.031)	0.016 (0.144)	0.275 (<.001)		0.041 0.000	-0.116 (<.001)	0.453 (<.001)	0.005 (0.646)	0.009 (0.409)
MTB	0.081 (<.001)	-0.079 (<.001)	0.375 (<.001)	0.085 (<.001)		0.432 (<.001)	0.213 (<.001)	0.050 (<.001)	0.065 (<.001)
MM	0.071 (<.001)	0.014 (0.211)	0.077 (<.001)	-0.165 (<.001)	0.379 (<.001)		0.182 (<.001)	0.030 (0.007)	0.029 (0.007)
σ(Ret)	-0.018 (0.095)	-0.094 (<.001)	-0.134 (<.001)	0.478 (<.001)	0.249 (<.001)	0.093 (<.001)		0.018 (0.091)	0.028 (0.010)
CAR45	0.079 (<.001)	0.000 (0.993)	0.046 (<.001)	0.003 (0.803)	0.061 (<.001)	0.032 (0.003)	0.009 (0.395)		0.850 (<.001)
CAR60	0.093 (<.001)	-0.011 (0.321)	0.050 (<.001)	0.004 (0.682)	0.072 (<.001)	0.037 (0.001)	0.016 (0.146)	0.847 (<.001)	

The Pearson correlation coefficients are indicated on the left of the empty diagonal and Spearman on the right. The figures in parentheses are p-values. The definitions of variables are in <Table 1>.

4.3 Regression Results

To test our hypotheses, we implement the regression model with the cumulative abnormal returns as dependent variable and the interaction term of DSUE and HOGN (DSUE×HOGN) as key independent variables. If the results support information transfer hypothesis, the coefficient of DSUE×HOGN is significantly negative, indicating that higher industry homogeneity is related to the lesser magnitude of PEAD.

<Table 3> shows the result that the coefficient of DSUE×HOGN is significantly negative for the cumulative abnormal returns for both 45-trading days (CAR45) and 60-trading days (CAR60) following earnings announcement, supporting information transfer hypothesis. Specifically, DSUE×HOGN has the negative coefficient of -0.1547 (t-statistic=2.35) on 45-trading days returns and -0.1735 (t-statistic=-2.26) on 60-trading days returns. All inferences are robust to controlling for the variables to affect the cumulative abnormal returns. For the other independent variable, the coefficients of firm size (ln(MV)) and market-to book ratio(MTB) are statistically significant.

4.4 Additional Test

4.4.1 Non-monotonic Effect of Industry Homogeneity on the Magnitude of PEAD

To the extent that the information of firms in industry with low homogeneity tend to reveal more opaque and thus have less conducive to be transferred by information users to the market, it is possible that the incremental effect of industry homogeneity on the magnitude of PEAD exists mainly for the firms in industry with extremely high homogeneity. If the effect of information transfer on equity valuation is asymmetric by the level of industry homogeneity, the magnitude of PEAD is also likely different by the level of industry homogeneity. To validate explicitly this conjecture, we separate industry homogeneity into the high level ($HOGN^{+}$) and low level ($HOGN^{-}$) of variable, respectively, based on the median value of it and then regress the cumulative abnormal returns subsequent to the earnings announcement date on these variables interacted with respect to the unexpected earnings ($\mathrm{DSUE} \times HOGN^{+}$ and $\mathrm{DSUE} \times HOGN^{-}$).

The results of this analysis in <Table 4> indicate that the negative relation between the industry homogeneity and the magnitude of PEAD is effective only in firms in industry with high homogeneity. For both cumulative trading days abnormal returns, the coefficient of $\mathrm{DSUE} \times HOGN^{+}$ is significantly negative but that of $\mathrm{DSUE} \times HOGN^{-}$ is not significant.

<Table 3> Regression Results

	CAR45			CAR60		
	(1)	(2)	(3)	(1)	(2)	(3)
Const.	0.0178	-0.0794	-0.0795	0.0162	-0.1234	-0.1245
	(3.37)***	(-2.31)**	(-2.30)**	(2.64)***	(-3.27)***	(-3.28)***
DSUE	0.0999	0.0771	0.0943	0.1263	0.1005	0.1188
	(6.44)***	(6.05)***	(5.95)***	(6.93)***	(6.80)***	(6.30)***
HOGN	-0.0094		-0.0073	-0.0222		-0.0172
	(-0.84)		(-0.66)	(-1.59)		(-1.27)
DSUE × HOGN	-0.0154		-0.0146	-0.0173		-0.0162
	(-2.35)**		(-2.20)**	(-2.26)**		(-2.07)**
ln(MV)		0.0332	0.0340		0.0446	0.0467
		(2.63)***	(2.71)***		(3.27)***	(3.42)***
BETA		-0.0390	-0.0392		-0.0621	-0.0619
		(-0.69)	(-0.70)		(-0.97)	(-0.98)
MTB		0.0273	0.0236		0.0503	0.0441
		(2.52)**	(2.28)***		(3.93)***	(3.41)***
MM		0.0000	0.0000		0.0000	0.0000
		(1.18)	(1.16)		(0.32)	(0.34)
σ(Ret)		0.8372	0.7304		0.3628	0.3365
		(0.32)	(0.28)		(1.20)	(1.15)
Year Effect	Included	Included	Included	Included	Included	Included
Firm cluster SE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.0093	0.0116	0.0119	0.0102	0.0141	0.0144

The figures in parentheses are t-statistics. All regression models use t-statistics based on robust standard errors clustered at the firm (Peterson 2009) and include year fixed effects. The notation ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively. The definitions of variables are in <Table 1>.

<Table 4> Non-Monotonic Effect of Industry Homogeneity on PEAD

	Dependent Variable= CAR60			
Variables	Coeff.	t-statistic	Coeff.	t-statistic
Const.	0.0180	2.86 ***	-0.1174	-3.07 ***
DSUE	0.1240	6.53 ***	0.1177	5.99 ***
$HOGN^+$	-0.0249	-1.73 *	-0.0187	-1.34
$HOGN^-$	-0.1216	-2.00 **	-0.0925	-1.52
DSUE × $HOGN^+$	-0.0163	-2.09 **	-0.0154	-1.95 *

DSUE × $HOGN^{-}$	-0.0055	-0.16	-0.0096	-0.28	
ln(MV)			0.0044	3.21	**
BETA			-0.0061	-0.95	
MTB			0.0048	3.68	***
MM			0.0015	0.34	
σ(Ret)			0.3579	1.19	
Year Effect	Included		Included		
Firm Cluster SE	Yes		Yes		
R^2	0.0106		0.0140		

The figures in parentheses are t-statistics. All regression models use t-statistics based on robust standard errors clustered at the firm (Peterson 2009) and include year fixed effects. The notation ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively. The definitions of variables are in <Table 1>.

<Table 5> Regression Results: Controlling for Industry Concentration Effect

	Concent. Effect		Controlling for Concent. Effect	
	Dependent Variable= CAR60			
Variables	Coeff.	t-statistic	Coeff.	t-statistic
Const.	-0.1243	-3.29 ***	-0.1194	-3.15 ***
DSUE	0.1064	6.71 ***	0.1273	6.39 ***
HOGN			-0.0180	-1.28
DSUE × HOGN			-0.0173	-2.22 **
HHI	-0.0630	-2.29 **	-0.0416	-1.82 *
DSUE × HHI	-0.1789	-0.91	-0.1837	-1.22
ln(MV)	0.0460	3.37 ***	0.0450	3.32 ***
BETA	-0.0745	-1.17	-0.0638	-1.00
MTB	0.0577	4.27 ***	0.0551	4.08 ***
MM	-0.0003	-0.07	0.0004	0.09
σ(Ret)	0.3789	1.25	0.3440	1.14
Year Effect	Included		Included	
Firm Cluster SE	Yes		Yes	
R^2	0.0149		0.0157	
N	8,433		8,433	

The figures in parentheses are t-statistics. All regression models use t-statistics based on robust standard errors clustered at the firm (Peterson 2009) and include year fixed effects. The notation ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively. HHI denotes Herfindahl-Herschiman index representing the level of industry concentration, which is calculated as sum of square number of each market share for top 3 firms within industry based on the two-digit Korea Standard Industry Classification (KSIC) code. The definitions of variables are in <Table 1>.

<Table 6> Industry Homogeneity, PEAD, and IFRS Adoption

	Pre-IFRS Periods(2005~2010)		Post-IFRS Periods(2011~2015)	
	Dependent Variable= CAR60			
Variables	Coeff.	t-statistic	Coeff.	t-statistic
Const.	0.0013	0.02	-0.1812	-3.11 ***
DSUE	0.1358	5.24 ***	0.0933	3.37 ***
HOGN	0.0164	0.72	-0.0367	-2.43 **
DSUE × HOGN	-0.0307	-2.50 **	0.0017	0.16
ln(MV)	0.0042	0.20	0.0716	3.48 ***
BETA	0.4317	4.19 ***	-0.3532	-4.19 ***
MTB	0.0495	1.96 **	0.0464	2.97 ***
MM	-0.0023	-0.38	0.0019	0.26
σ(Ret)	-0.7440	-1.85 *	0.6652	1.33
Year Effect		Included		Included
Firm Cluster SE		Yes		Yes
R^2		0.0183		0.0219
# of Obs.		4,447		4,041

The figures in parentheses are t-statistics. All regression models use t-statistics based on robust standard errors clustered at the firm (Peterson 2009) and include year fixed effects. The notation ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively. The definitions of variables are in <Table 1>.

4.4.2 Controlling for Industry Concentration Effect

Prior study documents that the magnitude of PEAD is higher for firms in high concentrated industry in which firms release less transparent information to raise entry barriers (Chenga et al. 2013). Industry homogeneity is, as one of proxies for industry structure, associated with industry concentration. To be specific, high homogeneous industry is likely to reveal high competition in product market, that is, to be less concentrated industry. Thus, to capture the effect of industry homogeneity indifferent of industry concentration, we control for industry concentration effect on PEAD by including Herfindalhl-Herschiman index in regression model. The result, as presented in <Table 5>, shows that even after controlling for industry concentration effect, information environment hypothesis holds.

4.4.3 The Effect of the Adoption of IFRS

Since the adoption of IFRS (as of 2011 in Korea) impacts accounting consistency which is a primary concern of IFRS, we can

conjecture there will be the different effect of industry homogeneity on PEAD by two periods of pre- and post- IFRS adoption. If accounting consistency across firms in same industry after IFRS adoption has really improved and consequently the homogeneity changes, the effect of industry homogeneity on PEAD is different by pre- and post- IFRS adoption period. To be specific, IFRS regulation improves the consistency across firms within same industry, by allowing firms to report discretionally accounting information on financial statement which is more suitable for each firm valuation, leading to the weak influence of industry homogeneity on the stock price drift.

<Table 7> Industry Homogeneity, PEAD, and IFRS Adoption

	Pre-IFRS Periods(2005~2010)		Post-IFRS Periods(2011~2015)	
	Dependent Variable= CAR60			
Variabls	Coeff.	t-statistic	Coeff.	t-statistic
Const.	0.0199	0.33	-0.1838	-3.14 ***
DSUE	0.1269	4.97 ***	0.1040	3.30 ***
$HOGN^{+}$	0.0188	0.83	-0.0291	-1.82 *
$HOGN^{-}$	-0.1811	-2.35 **	0.1036	1.16
$DSUE \times HOGN^{+}$	-0.0288	-2.28 **	-0.0009	-0.08
$DSUE \times HOGN^{-}$	0.0099	0.26	-0.0405	-0.54
ln(MV)	-0.0016	-0.07	0.0713	3.45 ***
BETA	0.4305	4.12 ***	-0.3511	-4.16 ***
MTB	0.0473	1.90 **	0.0470	2.98 ***
MM	-0.0023	-0.38	0.0000	0.27
σ(Ret)	-0.7152	-1.78 *	0.6493	1.29
Year Effect		Included		Included
Firm Cluster SE		Yes		Yes
R^2		0.0200		0.0224
# of Obs.		4,447		4,041

The figures in parentheses are t-statistics. All regression models use t-statistics based on robust standard errors clustered at the firm (Peterson 2009) and include year fixed effects. The notation ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively. The definitions of variables are in <Table 1>.

To test our conjecture, we spilt full sample into subsamples by pre- and post-adoption period and test regression model. We suggest this test is relevant to validate the premise of our hypothesis that industry homogeneity represents cross-sectional accounting consistency. <Table 6> shows that our interesting variable is the interaction term,

DSUE×HOGN shows significantly positive coefficients in pre-IRS adoption period (0.1004, t-statistic=4.53 for 45 trading days and 0.1358, t-statistic=5.24 for 60 trading days), but not statistically significant in post-IFRS adoption, indicating the effect of industry homogeneity on PEAD regarding information environment hypothesis exists in the period of pre-IFRS adoption. These results are consistent with our conjecture that the weak effect of industry homogeneity on PEAD due to the improvement of comparability among firms by IFRS regulation.

<Table 7> shows asymmetric effect of industry homogeneity on the magnitude of PEAD only in the regression results for the subsample of pre- IFRS adoption period. The negative relation between industry homogeneity and PEAD reveals only in the period of pre-IFRS adoption.

5. Conclusion

This study examines the impact of industry homogeneity on the magnitude of post-earnings-announcement drift (PEAD). We hypothesize that the industry homogeneity is negatively related to the magnitude of PEAD in information transfer perspective. To test our hypotheses, we implement a series of regression analyses. Using KSE-listed firms from 2005 to 2015, our result shows that the extent of PEAD is lower for firms in homogenous industry than those in less homogenous industry. These results indicate that homogenous industry enhances investor informational efficiency by providing investors more and relevant information with respect to firm valuation via information transfer effect due to accounting consistency among peer firms. Additionally, we show the non-monotonic effect of industry homogeneity on PEAD documenting that the effect of industry homogeneity on PEAD is more pronounced for firms in relatively high homogenous industry. Lastly, we show the effect of industry homogeneity on PEAD is not significant in post-IFRS adoption period.

Our research contributes to academic researchers as well as practitioners. By connecting industry homogeneity in cost structure to market anomaly (i.e., post-earnings announcement drift), our study sheds light on another determinant factor which affects the market's efficiency regarding information processing. Moreover, by suggesting the importance of accounting consistency across firms to investors' ability of information processing, our paper provides authorities opportunity to overhaul the accounting practice and regulation for each industry and to enhance investor informational efficiency. Lastly, we suggest that investors are able to earn more profit by understanding and exploiting industry economic fundamentals implied in different homogeneity of industry in developing their investment strategy.

Notes

(1) Since industry is classified by mostly the production activity of firm, the information on industry characteristic is embedded in

industry-wide cost structure determined by the property in production activity. Therefore, we posit that the industry with high homogeneity among peer firms in cost structure provides more information regarding industry characteristics.

（2）Information transfer within industry is significantly associated with industry structure such as competitive strength of industry or industry homogeneity in terms of production activity. This means that how accessible are investors to the information of target firms is affected by industry structure. However, little research has examined the impact of industry structure on PEAD induced by the investors' informational inefficiency.

References

Ball, R., and P. Brown, 1968. An empirical evaluation of accounting income numbers. *Journal of Accounting Research* 6: 159-178.

Ball, R., and E. Bartov., 1996. How naive is the stock market's use of earnings information? *Journal of Accounting and Economics* 21 (3): 319-337.

Bartov, E., S. Radhakrishnan, and I. Krinsky, 2000. Investor sophistication and patterns in stock returns after earnings announcements. *The Accounting Review* 75 (1): 43-63.

Bernard, V., and J. Thomas., 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics* 13: 305-340.

Bhushan, R., 1994. An informational efficiency perspective on the post-earnings announcement drift. *Journal of Accounting and Economics* 18: 45-65.

Bills, K. L, D. C. Jeter, and S. E. Stein, 2015. Auditor industry specialization and evidence of cost efficiencies in homogenous industries. *The Accounting Review* 90 (5): 1721-1754.

Brown, P., and R. Ball, 1967. Some preliminary findings on the association between the earnings of a firm, its industry, and the economy. *Journal of Accounting Research* 5: 55–77.

Carhart, M. M., 1997. On persistence in mutual fund performance. *The Journal of Finance* 52: 57–82.

Cairney, T. D., and G. R. Young, 2006. Homogenous Industries and Auditor Specialization: An Indication of Production Economies. *Auditing: A Journal of Practice and Theory* 25: 49-67.

Cairney, T. D., and E. G. Stewart, 2015. Audit fees and client industry homogeneity. *Auditing: A Journal of Practice & Theory* 34 (4): 33-57.

Cao, S. S., and G. S. Narayanamoorthy, 2012. Earnings volatility, post-earnings announcement drift, and trading frictions. *Journal of Accounting Research* 50: 41-74.

Fama, E. and K. French, 1993. Common risk factors in the returns on stocks and bonds, *Journal of Financial Economi*cs 33: 3-56.

Ferguson, A., and Z. Matolcsy, 2004. Audit quality and post earnings announcement drift. *Asia-Pacific Journal of Accounting and Economics* 11: 121-137.

Foster, G., and C. Olsen., and T. Shevlin, 1984. Earnings releases, anomalies, and the behavior of security returns. *The Accounting Review* 59: 574-603.

Freeman, R., and S. Tse, 1989. The multi-period information content of earnings announcements: Rational delayed reactions to earnings news. *Journal of Accounting Research* 27: 49-79.

Hirshleifer, D., S. Lim, and S. Teoh, S., 2009. Driven to distraction: Extraneous events and underreaction to earnings news. *The Journal of Finance* 64: 2289–2325.

Hui, K. W., and P. E. Yeung, 2013. Underreaction to industry-wide earnings and the post-forecast revision drift. *Journal of Accounting Research* 51, 701–737.

Hui, K. W., K. K. Nelson, and P. E. Yeung, 2016. On the persistence and pricing of industry-wide and firm-specific earnings, cash flows, and accruals. *Journal of Accounting and Economics* 61: 185-202.

Jones, C., and R. Litzenberger, 1970. Quarterly earnings reports and intermediate stock price trends. *The Journal of Finance* 25: 143-148.

Peterson, K., R. Schmardebeck, and T. J. Wilks, 2015. The earnings quality and information processing effects of accounting consistency. *The Accounting Review* 90: 2483-2514.

Petersen, M. 2009, Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies* 22:435-480.