Stock Price Synchronicity and Corporate Governance Practices[*]

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This study examines the association between stock price synchronicity and corporate governance practices. Utilizing a unique data set on firm-level corporate governance practices provided by the Korea Corporate Governance Service (KCGS), this study examines whether sound corporate governance practices increase firm-specific information and thus, reduce stock price synchronicity. This study also investigates whether corporate governance practices can predict stock return skewness.

This study finds that (1) sound corporate governance practices are negatively related to stock price synchronicity; (2) further, sound corporate governance practices are negatively related to stock return skewness; (3) this association becomes stronger in simultaneous equations estimation with analyst following and corporate governance practices; and (4) of the five corporate governance practices, shareholder rights protection is most closely related to stock price movement. Overall, this study suggests that sound corporate governance practices play an important role in influencing stock price movement.

Key words: Stock price synchronicity; return skewness; corporate governance; shareholder rights protection; simultaneous equations estimation.

I. Introduction

This study investigates the impact of corporate governance practices on stock price synchronicity and stock return skewness in the Korean stock market. In the United States, there is evidence of a dramatic increase in the idiosyncratic volatility of stock returns relative to market volatility over the past several decades (Campbell, Lettau, Malkiel, and Xu, 2001). The increasingly idiosyncratic volatility of stock returns is attributed to more timely information dissemination about the future cash flow of firms. Remarkable developments in information technology and financial innovations such as new derivative markets may be factors implicated in this volatility. Furthermore, laws and corporate governance regulations

that require more timely disclosure have contributed to more firm-specific information dissemination in the stock market. Accordingly, correlations between individual stocks and the explanatory power of the market model have gradually declined over time.

Morck, Yeung, and Yu (2000) provide intuitive evidence by studying the variation across countries in the explanatory power of the market model (R^2). They argue that the market model has a much greater R^2 in less developed markets that have weak legal protection for outside investors. Their argument is consistent with that of other researchers (Campbell et al., 2001; Gertner, Scharfstein, and Stein, 1994; Stein, 1997). In a stock market with strong shareholder rights protection, business conglomerates tend to break up into companies that specialize in a single industry or economic activity. This can lead to a shift towards reliance on external capital markets as opposed to internal markets. Jin and Myers (2006) extend the argument of Morck et al. (2000) by examining the relation between several measures of firm opaqueness and shareholder rights protection. They argue that the R^2 is determined by the ratio of observable firm-specific risks, that is, by the degree of transparency. Consistent with their hypothesis, they find that countries in which firms are more opaque to investors have a higher average R^2 and frequent crashes in firm-specific returns.

In connection with firm-specific returns in less developed stock markets, it has been argued that poorly governed stock markets that have weak legal protection to outside investors also tend to show more positively skewed returns. Bae, Lim, and Wei (2007) note that firm managers in poorly governed economies usually take advantage of risk sharing among affiliated firms and asymmetric news disclosure policies. For example, the negative shock of distressed firms that belong to business groups is not fully reflected in stock returns due to the implicit guarantee of a bailout. Therefore, their stock returns are more positively skewed. Further, managers of firms with poor corporate governance practices have more discretionary power to hide bad news or release bad news gradually. Thus, the stock returns of those firms are likely to be more positively skewed.

Based on previous studies, two hypotheses of the Korean stock market are proposed. The first hypothesis proposes that sound corporate governance is negatively related to stock price synchronicity. The second hypothesis proposes that sound corporate governance is negatively related to stock return skewness. Korea is a more suitable country by which to test these two hypotheses than other countries, because the Korean economy is still controlled by large business conglomerates (hereafter, chaebol groups) and their corporate governance

practices have been distrusted for a long time. Previous studies (Bae et al., 2007; Ferris, Kim, and Kitsabunnarat, 2003; Shin and Park, 1999) have found that chaebol groups are characterized by noteworthy traits. First, chaebol groups use a system of centralized control by a concentrated ownership and employ an explicit internal capital market to allocate funds to their member firms on the basis of need (e.g., cross shareholdings, reciprocal debt guarantees, internal transactions between firms, and exchanges of human resources within groups). Thus, income shifting among chaebol-affiliated firms happens frequently. Second, important corporate governance practices have been nonexistent in chaebol groups for a long time. Even though the corporate governance practices of chaebol groups have improved since the 1997 Asian financial crisis, there is still some doubt whether their reform efforts are sufficient.

To examine the relation between corporate governance practices and stock price synchronicity and return skewness, this study uses firm-specific corporate governance score data for the 2001-2004 periods from the Korea Corporate Governance Service (KCGS), which is an independent non-profit organization under the joint sponsorship of six securities-related organizations in Korea. This data set on comprehensive corporate governance practices has five categories that relate to (1) shareholder rights protection;

(2) board of directors; (3) corporate disclosure; (4) audit committee; and (5) dividend policy. This study also uses stock price synchronicity and stock return skewness measures that are estimated by weekly returns, patterned after previous studies (Morck et al., 2000; Jin and Myers, 2006; Bae et al., 2007). Additionally, this study addresses the issue of endogeneity with the analysis of the effects of corporate governance practices, analyst following, and stock price movement. Corporate governance practices and analyst following are endogenous to firm performance and thus, stock price movement. In addition, the quality of corporate governance is also endogenous to analyst following (Piotroski and Roulstone, 2004; Lang, Lins, and Miller, 2004; Chan and Hameed, 2006; Knyazeva, 2006). This study presents the results of simultaneous equations estimation that is performed to mitigate the endogeneity problem.

Consistent with the first hypothesis, this study finds that firms with sound corporate governance practices have lower stock price synchronicity. The results indicate that of the five corporate governance practices, shareholder rights protection is most closely related to lower stock price synchronicity. In addition, the results show a negative relation between stock return skewness and corporate governance practices. These results corroborate the findings of previous studies, which suggest that corporate governance practices

do, in fact, affect stock price synchronicity and return skewness.

This study contributes to the literature on corporate governance and stock markets. First, it investigates whether firm-specific corporate governance practices are directly related to firm-specific stock price synchronicity in Korea. The results of this study are the first evidence that global standards of corporate governance have had an influence on stock price synchronicity in Korea. Second, in its analysis of return skewness, this study extends the prior work of Bae et al. (2007) by using a different set of data, more control variables, and different sample periods. Weekly returns data, rather than daily returns data, are examined, and extensive control variables that are relevant to stock price movement are included. Further, simultaneous equations estimation is performed to mitigate the possible endogeneity problem, based on prior studies (Piotroski and Roulstone, 2004; Lang, Lins, and Miller, 2004; Chan and Hameed, 2006; Knyazeva, 2006). Finally, from a broad perspective, this study adds to the growing literature on the role of corporate governance practices in improving firms' information quantity and quality in the context of stock price movement.

This study is organized as follows. Section 2 reviews the literature on the relation between corporate governance and stock markets, with a focus on stock price synchronicity and return skewness. Section 3 describes the research design and empirical measure of the research variables. Section 4 discusses the main results and additional tests. Section 5 gives the conclusions of this study.

II. Research and Development of the Hypothesis

2.1 Corporate Governance and Equity Price

Several prior studies investigate the relation between corporate governance practices, especially shareholder rights protection, and firm operating performance or stock performance, in the U.S. context. Many of these studies regard corporate governance practices as exogenous shocks that influence the stock price movement.

Gompers, Ishii, and Mertrick (2003) combine a large set of governance provisions into an index (G-index) to test the empirical relation between this index and corporate performance. They provide evidence that the strength of shareholder rights is strongly correlated with stock returns during the 1990s and that this return difference has been reflected in price.[1]

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1) An investment strategy in which shares in the "democracy firms" with strong shareholder rights are purchased, and shares in the "dictatorship firms" with weak shareholder rights are sold generates abnormal returns of 8.5% per year.

Similarly, Bebchuk, Cohen, Ferrell (2005) set an "entrenchment index" that is based on six key provisions that prevent a majority of shareholders from removing incumbent management.[2] They find that an increase in the level of this index is monotonically associated with economically significant reductions in firm valuation, as measured by Tobin's Q. They also find that firms that have higher levels of this index are associated with large negative abnormal returns from 1990 to 2003.

Using both internal and external corporate governance indices,[3] Cremers and Nair (2005) argue that takeover exposure should be correlated with higher expected returns. A portfolio that buys firms with high takeover vulnerability and high blockholder ownership (e.g., public pension fund) generates an annualized abnormal return of 10% to 15%. Brown and Caylor (2006) support all three prior studies by using a broader alternative governance measure, the GOV-Score.

However, Core, Guay, and Rusticus (2006) revisit the findings of Gompers et al. (2003).

Based on prior findings, Core et al. (2006) postulate that if the relation between poor governance and poor returns is casual, the market should be negatively surprised by the poor operating performance of firms with weak governance. However, they can not find evidence that the market is negatively surprised by significant operating underperformance of firms. That is, their results can not support the general hypothesis that weak governance is related to poor stock returns.

2.2 Corporate Governance and Stock Price Synchronicity

Taking a different angle on the issue of whether corporate governance practices are exogenous shocks that influence stock price, Morck et al. (2000) compare stock price synchronicity among countries. They study the difference in stock price movement between poor economics and rich economics, by adopting Roll's research methods (Roll, 1988, 1992).[4]

Morck et al. (2000) define stock price

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2) The six key provisions are as follows: four constitutional provisions, (i.e., staggered boards, limits to shareholders by law amendments, supermajority requirements for mergers, and supermajority requirements for charter amendments) and two takeover readiness provisions (i.e., poison pills and golden parachutes).

3) A large shareholder (internal control) engages in monitoring the management and pays for part of the gains that occur through takeover, which consequently makes the appearance of a bidder more likely (Shleifer and Vishny, 1986). Thus, a large shareholder, by facilitating takeovers, may work with the market for corporate control (external control). In such a plan, an internal governance mechanism is required for the external mechanism to function, which leads to a complementary relation between these mechanisms (Cremers and Nair, 2005).

4) Roll (1988) calculates the R^2 for the returns of large stocks as explained by systematic economic influences, by the returns on other stocks in the same industry, and by public firm-specific news events. The average explanatory power of well-accepted market models is quite modest, but there are some firms with impressive R^2s. He studies these firms

synchronicity as the extent to which stock returns on individual firms move together. They consider three possible explanations for this difference in stock price movement. First, firms in less developed countries tend to be undiversified, so firm-level earnings are more correlated, which results in stock price synchronicity. Second, low-income economies that have weak protection of private property rights also induce market-wide stock price movement. Countries in which the governments are relatively opaque make informed arbitrage less economically attractive because economic fundamentals may be obscured by unpredictable political events.[5] Third, firm-specific information is less useful to risk arbitrageurs in countries where intercorporate income shifting is prevalent. This effect impedes the capitalization of firm-specific information into stock prices and thus reduces firm-specific stock price variation, again, which increases stock return synchronicity.

Using the approach of Morck et al. (2000), Wurgler (2000) gives meaningful evidence that countries that have large stock markets which impound more firm-specific information into individual stock prices exhibit a better capital allocation. Campbell et al. (2001) suggest that the increasingly idiosyncratic volatility in the U.S. market over the past several decades is due to evolving changes in corporate governance practices.[6] In relation to informed trading, Piotroski and Roulstone (2004) investigate three informed market participants—financial analysts, institutional investors, and insiders. They find that stock return synchronicity is positively associated with analysts' forecasting activities because analysts increase the amount of industry level information on prices through intra-industry information transfers. In contrast, insider traders generate a negative influence on stock price synchronicity because their transactions convey firm-specific information. Chan and Hameed (2006) confirm that greater coverage by analysts increases stock price synchronicity.

Jin and Myers (2006) extend the work of

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to understand why the explanatory power is different. In addition, Roll (1992) compares stock price indices across countries in an attempt to explain why they exhibit such disparate behavior. Three separate explanatory influences are empirically documented: the technical aspect of the index construction, the industrial structure, and exchange rate behavior of each country.

5) According to Morck et al. (2000), the difference in stock price movement among countries is not due to market size, but due to property rights. Among developed economy stock markets, higher firm-specific returns variation is associated with stronger public investor property rights, indicating that strong property rights promote informed arbitrage, which capitalizes detailed firm-specific information.

6) Over the past several decades, there has been a strong tendency to break up conglomerates and replace them with more focused companies that specialize in a single industry or economic activity. This has caused a shift towards a reliance on external as opposed to internal capital markets. Now, in the U.S. market, firms are separately listed, and their idiosyncratic risks are also separately measured (Campbell et al., 2001).

Morck et al. (2000) by examining the relation between stock price synchronicity measures and several measures of opaqueness. They confirm that the R^2 and the frequency of crashes (i.e., large, negative firm-specific returns) are higher in countries with less developed financial markets that include more opaque firms. Based on the preceding studies, the first hypothesis is proposed.

H 1: Sound corporate governance practices are negatively related to stock price synchronicity.

2.3 Corporate Governance and Return Skewness

Regarding the argument that stock price synchronicity is more common in emerging markets, the relation between the stock return skewness of less developed countries and corporate governance practices has also aroused the interest of researchers. Although there have been few investigations of the relation between return skewness and corporate governance practices in accounting research or even in financing research, it is well known that a positive skewness of firm-level returns is more common in emerging markets than in developed markets.[7]

Chen, Hong, and Stein (2001) develop a series of cross-sectional regression specifications to forecast firm-level return skewness. They argue that positively skewed firm-level returns are closely related to the asymmetric disclosure behavior of firm managers. For example, managers who have discretionary power over information disclosure will immediately disclose good news, but disclose bad news gradually. Even managers working for small firms can hide bad news more easily because small firms are followed by few analysts and are monitored less by outsiders. The researchers find that the positive skewness of firm-level returns is more pronounced in less developed economies.

Adopting the approach of Chen at al. (2001), Bae et al. (2007) also investigate why corporate governance matters to return asymmetry. They suggest that the discretionary disclosure policies of firm managers may be the primary reason for asymmetric return distribution. In addition, risk sharing or coinsurance contributes to a more positive return skewness in emerging markets. Business groups in emerging markets usually facilitate risk sharing or coinsurance by smoothing income flows. Thus, the earnings or returns of group-affiliated firms are more

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7) To understand the relevant theory, see Chen et al. (2001). According to previous studies, skewness estimates are positive for most individual stocks because of lack of diversification. Further, small firms in low capitalization and trading volume markets exhibit significant asymmetric (i.e., positive return skewness) return distribution as return skewness is related to trading volume.

positively skewed than those of independent firms. Moreover, as business groups are the prevalent organizational form in emerging markets, positive skewness is more pronounced in emerging markets. Based on the preceding studies, the second hypothesis is proposed.

H 2: Sound corporate governance practices are negatively related to stock return skewness.

III. Model Development and Research Design

3.1 The Regression Models

A link between corporate governance practices and stock price synchronicity and return skewness is investigated using three regression models. The three pooled cross-sectional models are as follows.

Stock Price Synchronicity
= f [$CGSCORE$ (FAC1-FAC5),
Control variables]

$$SYNCH = \alpha + \beta_1 CGSCORE\ (FAC1\text{-}FAC5)$$
$$+ \beta_2 SKEWNESS + \beta_3 KURTOSIS$$
$$+ \beta_4 LNNIND + \beta_5 HERF$$
$$+ \beta_6 LNTASSET + \beta_7 LNROACO$$
$$+ \beta_8 ROAVAR + \beta_9 LNANAL$$

$$+ \beta_{10} BETA + \beta_{11} BM + \beta_{12} LEV$$
$$+ \beta_{13} RETVOL + \beta_{14} RD$$
$$+ \beta_{15} ADV + \beta_{16} PPE$$
$$+ \beta_{17} Year\ Dummy$$
$$+ \beta_{18} Industry\ Dummy + \varepsilon \quad (1)$$

$$FSYNCH = \alpha + \beta_1 CGSCORE\ (FAC1\text{-}FAC5)$$
$$+ \beta_2 LNNIND + \beta_3 HERF$$
$$+ \beta_4 LNTASSET + \beta_5 LNROACO$$
$$+ \beta_6 ROAVAR + \beta_7 LNANAL$$
$$+ \beta_8 BETA + \beta_9 BM + \beta_{10} LEV$$
$$+ \beta_{11} RETVOL + \beta_{12} RD$$
$$+ \beta_{13} ADV + \beta_{14} PPE$$
$$+ \beta_{15} Year\ Dummy$$
$$+ \beta_{16} Industry\ Dummy + \varepsilon \quad (2)$$

Stock Return Skewness
= f [$CGSCORE$ (FAC1-FAC5),
Control variables]

$$RETSKEW = \alpha + \beta_1 CGSCORE\ (FAC1\text{-}FAC5)$$
$$+ \beta_2 RETSKEWLAG$$
$$+ \beta_3 RETLAG + \beta_4 LNNIND$$
$$+ \beta_5 HERF + \beta_6 LNTASSET$$
$$+ \beta_7 ROAVAR + \beta_8 LNANAL$$
$$+ \beta_9 LNSHRTURN + \beta_{10} BM$$
$$+ \beta_{11} LEV + \beta_{12} RETVOL$$
$$+ \beta_{13} RD + \beta_{14} PPE + \beta_{15} ADV$$
$$+ \beta_{16} Year\ Dummy$$
$$+ \beta_{17} Industry\ Dummy + \varepsilon \quad (3)$$

Dependent Variables

SYNCH	=	logarithmic transformation of the R^2 of weekly data, defined as $\log (R^2/(1-R^2))$;
FSYNCH	=	logarithmic transformation of the fraction, defined as $\log (f /(1-f))$;
RETSKEW	=	the measure of return asymmetry, estimated by taking the sample's third moment of weekly returns.

Test Variables

CGSCORE	=	corporate governance overall score, consisting of five categories;
FAC1	=	shareholder rights protection score;
FAC2	=	board of directors score;
FAC3	=	corporate disclosure score;
FAC4	=	audit committee score;
FAC5	=	dividend policy score.

Control Variables

SKEWNESS	=	the skewness of the residual return in Eq. (4);
KURTOSIS	=	the kurtosis of the residual return in Eq. (4);
ROAVAR	=	the standard deviation of the return on assets (ROA) measured over the previous five years;
LNROACO	=	the logarithmic transformation of the R^2 from a regression of the firm's annual return on assets on a market index of the ROA. This general synchronicity of firm-level fundamentals is estimated using the previous five annual observations in each firm-specific regression of Eq.(9);
LNTASSET	=	firm size measured by the natural logarithm of the total assets of the firm;
LNNIND	=	the logarithm of the number of firms in the industry;
HERF	=	a revenue-based Herfindahl index of industry level concentration;
LNANAL	=	the natural logarithm of the number of forecast estimates (N) during the calendar year, $\log(1+N)$;
BETA	=	stock beta calculated by the capital asset pricing model over a 60-month period;
MB	=	(market value of equity + book value of total assets-book value of equity)/ book value of total assets;
LEV	=	leverage estimated as long-term debt scaled by the market value of equity;
RETVOL	=	return volatility estimated as the standard deviation of weekly returns over a one-year period;
RD	=	research and development (R&D)/sales;
PPE	=	property, plant, and equipment (PP&E)/sales;
ADV	=	advertisement expenses /sales;
LNSHRTURN	=	log of share turnover, defined as total annual trading volume scaled by the total shares outstanding;
ROA	=	return on assets measured as income before extraordinary items scaled by beginning total assets;
BM	=	book to market as a ratio of the book value of equity to the market value of equity;
ALTMAN	=	Altman's Z-score estimated using Altman's equation (1968);
RETLAG	=	returns in the one-year lag period.

3.2 Research Variables

3.2.1 Dependent Variables - Stock Price Synchronicity and Return Skewness

This paper calculates the R^2 and residual returns of the weekly rate of returns following an expanded market model by Jin and Myers (2006). This equation includes two lead and lag terms for the Korean and the U.S. market indexes to correct for nonsynchronous trading.[8] The firm-specific return is measured by the residual return from Eq. (4) and the skewness and kurtosis of the residual return are used as additional control variables.

$$r_{i,t} = a_i + \beta_1 r_{m,t} + \beta_2 [r_{u.s.,t} + EX_t]$$
$$+ \beta_3 r_{m,t-1} + \beta_4 [r_{u.s.,t-1} + EX_{t-1}]$$
$$+ \beta_5 r_{m,t-2} + B_6 [r_{u.s.,t-2} + EX_{t-2}]$$
$$+ \beta_7 r_{m,t+1} + \beta_8 [r_{u.s.,t+1} + EX_{t+1}]$$
$$+ \beta_9 r_{m,t+2} + \beta_{10} [r_{u.s.,t+2} + EX_{t+2}]$$
$$+ \varepsilon_t \qquad (4)$$

where

r_{it} = the return on stock i in week t;
r_{mt} = the local market index return;
$r_{u.s.,t}$ = the U.S. market index return, a proxy for the global market;
EX_t = the rate of change in exchange rate vs. the U.S. dollar.

This study also uses an alternative method of distinguishing firm-specific stock price movement from market-wide price movement. Using weekly data, this study calculates the fraction (f) of the frequency of stock price movement that moves in the same direction as the market index in year T. This modified technique for the fraction of stock price synchronicity measurement (Morck et al., 2000) is as follows.

$$f_{iT} = n_{iT}{}^{same} / (n_{iT}{}^{same} + n_{iT}{}^{diff}) \qquad (5)$$

where

$n_{iT}{}^{same}$ = the frequency of movement of stocks the price of which moves in the same direction as the market index in year T.
$n_{iT}{}^{diff}$ = the frequency of movement of stocks the price of which moves in the opposite direction to the market index in year T.

These two stock price synchronicity measures, the R^2 and f_{iT} with weekly returns, have been applied to logistic transformation in previous studies (Morck et al., 2000; Piotroski and Roulstone, 2004; Jin and Myers, 2006).

$$SYNCH = \log\left(\frac{R^2}{1-R^2}\right) \qquad (6)$$

$$FSYNCH = \log\left(\frac{f}{1-f}\right) \qquad (7)$$

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8) The market model by Morck et al. (2000) does not correct for nonsynchronous trading.

Further, this study also estimates the return asymmetry proxy, *RETSKEW*.[9] *RETSKEW* is the degree of the skewness of weekly returns for the firm *i* over a one-year period (Chen et al., 2001; Bae et al., 2007). A positive value of *RETSKEW* corresponds to a distribution that is skewed to the right.

$$RETSKEW = \frac{\sum_{i}^{n}(R-\bar{R})^3}{(N-1)S^3}, \qquad (8)$$

where

$\bar{R}$ = the weekly returns mean for stock i during the one-year period ;

S = the standard deviation of the weekly returns.

3.2.2 Test variables - The Corporate Governance Score Measure

The corporate governance overall score that is used in this study has a distinct advantage over corporate governance variables that have been used in prior studies.[10] The corporate governance overall score integrates several aspects of corporate governance practices within possible limits. This solves the correlated omitted variables problem in that each of the five elements that are correlated with each other predicts stock price synchronicity and return skewness separately. Therefore, this study can examine both the respective effects and the overall effect of corporate governance practices on stock price movement. Firms with sound corporate governance practices have higher score.

The corporate governance score is divided into five categories.[11] The shareholder rights protection (*FAC1*) category consists of three parts: shareholder rights provisions, controlling ownership structure, and related party transactions. Board of directors (*FAC2*) consists of two parts: board structure and meeting procedures. Corporate disclosure (*FAC3*) is related to management transparency and the voluntary and mandatory disclosure behaviors of the corporation. Audit committee (*FAC4*) includes audit committee structure and procedures. Dividend policy (*FAC5*) consists of the dividend yield, dividend payout ratio of the past three years, and treasury stock purchases.[12]

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9) Skewness is a measure of the symmetry of return distribution. Return distribution is symmetric if it looks the same to the left and right of the center.

10) This firm-specific data set of corporate governance scores is also used in the following working papers. To know more details on governance score, see Byun (2007) and Byun, Kwak, and Hwang (2007).

11) As the construction of the data set is somewhat different across years, the data set is reconstructed into five sub-indexes in accordance with each other.

12) Black, Jang, and Kim (2006a), Park, Park, and Hwang (2005), and Yoon and Oh (2005) use the same data, but they examine only the one-year cross-sectional data provided by the KCGS.

3.2.3 Firm-Specific Control Variables

The control variables for stock price synchronicity regression are primarily taken from previous studies (Roll, 1988; Morck et al., 2000; Piotroski and Roulstone, 2004; Jin and Myers, 2006; Chan and Hameed, 2006). This paper uses the skewness and kurtosis of the residual return of Eq. (4) as additional control variables, following Jin and Myers (2006). They treat the skewness of residual returns as a measure of crash likelihood but they do not make specific predictions about the skewness and kurtosis of residual returns. Because skewness and kurtosis are part of the firm-specific information that domestic and U.S. market indexes cannot explain, this study predicts both variables to be negative.

According to Piotroski and Roulstone (2004), an obvious market leader acts as a leading indicator for smaller firms and in turn all firms are likely to be synchronized to the leader's returns due to the intra-industry transfer of information. Therefore, industry concentration (*HERF*) as the two-digit SIC code industry's Herfindahl index for the year is expected to be positive. However, Piotroski and Roulstone do not predict the sign on the coefficient of the number of firms in the industry (*LNNIND*).

Morck et al. (2000) argue that firm fundamentals might more often move together in low-income countries because business conglomerates usually share their risks through cross shareholding, widespread intercorporate ownership, and/or income shifting. In such cases, greater correlation across firms is observed in economic fundamentals. To capture the general synchronicity of firm-level fundamentals, Morck et al. (2000) construct an earnings co-movement index by running the regression Eq. (9). This paper follows the same approach.[13]

$$ROA_i = \alpha_i + b_i \times ROA_m,\qquad(9)$$

where

ROA_i = a firm's return on assets, calculated as income before extraordinary items scaled by beginning total assets;

ROA_m = the value weighted average of the return on assets for all firms in the sample.

Firm size *(LNTASSET)* is also included to control for omitted firm-specific factors. Firm size is positively associated with various dimensions of the firm's information environment, indicating the negative relation between stock price synchronicity and firm size. However, large firms are market leaders and thus their price behavior is likely to

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13) Following Morck et al. (2000), this paper uses the previous five years of data for each sample year.

induce similar overall market movement. This kind of size effect can influence stock price synchronicity positively. Thus, the sign on the coefficient of firm size is not clear.

The volatility of the operating performance or stock performance of a firm is less likely to be correlated with market trends. Therefore, this study expects earnings variability (*ROAVAR*) and return volatility (*RETVOL*) to be negatively related to stock price synchronicity. However, the proxy of market risk, *BETA*, is positively correlated with stock price synchronicity by definition.

Analyst behavior variables are also included in the regression, because previous studies report that the forecasting activities of analysts increase the amount of industry level information of prices through intra-industry information transfers (Piotroski and Roulstone, 2004). Furthermore, Chan and Hameed (2006) report that the portfolio returns of high analyst following lead the portfolio returns of low analyst following. That is, the aggregate change in the earnings forecasts in a high analyst-following portfolio affects the aggregate returns of the portfolio itself as well as those of the low analyst-following portfolio.

The control variables for the stock return skewness regressions are also taken primarily from other studies (Campbell et al., 2001; Chen et al., 2001; Bae et al., 2007). In stock return skewness regression, the usual control variables are past return, trading volume, and traditional risk factors such as firm size, book to market, return volatility, and earnings variability. Several studies on return asymmetry distribution provide evidence that stocks experiencing either a surge in turnover or high past returns are predicted to have less positive skewness. Therefore, firm size is expected to have a negative coefficient, which indicates that large firms are more likely to have less positive skewness. High leverage and *BM* are expected to have a positive sign since manager of firms with high leverage and BM may disclose good news more timely than bad news (Hong and Stein, 2003). Analyst following is included to check the impact of the information environments of firms on return skewness.

For both stock price synchronicity and return skewness regressions, research and development expenses (*RD)* and sum of advertising expenses *(ADV)* are included as control variables to check the impact of intangible assets. Further, tangible assets *(PPE)* are also considered a control variable, due to their information value (Harris and Raviv, 1990). To control for year and industry level fixed effects, this study includes an array of year indicator variables and one-digit SIC code industry indicator variables.

IV. Sample Selection and Descriptive Statistics

4.1 Sample Selection

This study uses a given corporate governance score based on the KCGS surveys for the 2001-2004 period. Financial statements data are taken from the KIS-FAS data base, stock price and return data are taken from the KIS-SMAT data base, stock return data are taken from the KSRI data base, and analyst earnings forecast data are taken from the FnGuide data base. Firms are excluded if they belong to the financial service industry, because regulated firms have stricter corporate governance systems than unregulated firms.

Following Jin and Myers (2006), this paper excludes firms with stocks that trade for fewer than 30 weeks during a particular year. All of the firms in the sample have the requisite data on stock price synchronicity, stock return skewness, and corporate governance score. To alleviate potential measurement error problems, observations that fall into one percent of the top or bottom of the dependent variables are deleted. All control variables are also winsorized at the 1st or 99th percentile to reduce the influence of extreme values. As outlined in Panel A of Table 1, the number of final observations is 1,454 over the 2001-2004 period for the *SYNCH* regression model. Panel B of Table 1 provides the distribution of sample firms across different industries, using one-digit Korean SIC codes. All of the models are heavily concentrated in the manufacturing industry, with a concentration of approximately 76%.

4.2 Descriptive Statistics and Pearson Correlations of Variables

4.2.1 Descriptive Statistics

Table 2 presents the summary statistics of the regression variables. Panel A provides the descriptive statistics for the dependent variables with both raw data and log-transformation forms that are based on pooled data across years. The mean and median R^2s from the estimations of Equation (4) are 0.277 and 0.268, respectively. The mean and median fractions (f) of stock movement are 0.566 and 0.566, respectively. The individual stock return skewness with weekly returns data has a positive mean (median) value of 0.536 (0.446), which indicates that the weekly returns are positively skewed. This positive skewness of weekly data is consistent with the findings of Bae et al. (2007), which show the positive skewness of daily returns data.[14]

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14) According to Bae et al. (2007), the mean (median) return skewness of daily returns is 0.226 (0.230) for the period 1995-2000. For the market index, the mean skewness is 0.28.

〈Table 1〉 Distribution of Samples by Year and by Industry

Panel A: Sample Distribution by Year				
Year	No. of Survey Respondent	(1) SYNCH	(2) FSYNCH	(3) RETSKEW
2001	261	229	229	228
2002	553	491	491	487
2003	426	382	383	379
2004	407	352	351	345
Total	1,647	1,454	1,454	1,439
Panel B: Sample Distribution by Industry				
Title of Industries		(1) SYNCH	(2) FSYNCH	(3) RETSKEW
Fishing		15	16	15
Mining		2	3	3
Manufacturing		1,109	1,109	1,095
Utilities		32	34	35
Construction		91	92	90
Wholesale and Retail		116	115	114
Transportation		37	36	36
Telecommunications		9	7	10
Real estate, Rental, and Leasing		3	3	3
Business Services		34	34	32
Education Services		3	3	3
Recreation, Culture, and Health Services		3	2	3
Total (Firm)		1,454 (571)	1,454 (574)	1,439 (560)

The sample consists of corporate governance scored nonfinancual firms listed on the Korea Stock exchange (KSE) during the period 2001 to 2004. This study obtains observations from various sources, including the Korea Corporate Governance Service (KCGS), and KIS FAS data base, KIS SMAT data base and KSRI stock data base. Model (1) of logistic transformation R^2, *SYNCH* has 1,454 firm-year observations. Model (2) of logistic transformation of the fraction of stock price that move in the same direction with market index, *FSYNCH* has 1,454 firm-year observations, and model (3) of stock return skewness, *RETSKEW* has 1,439 firm-year observations.

Figures 1 and 2 show Korean stock price synchronicity and the fractions of stock price movement over the sample periods, respectively.

The stock price synchronicity of Korean listed firms does not appear to decrease dramatically.

Panel B and C provide descriptive statistics
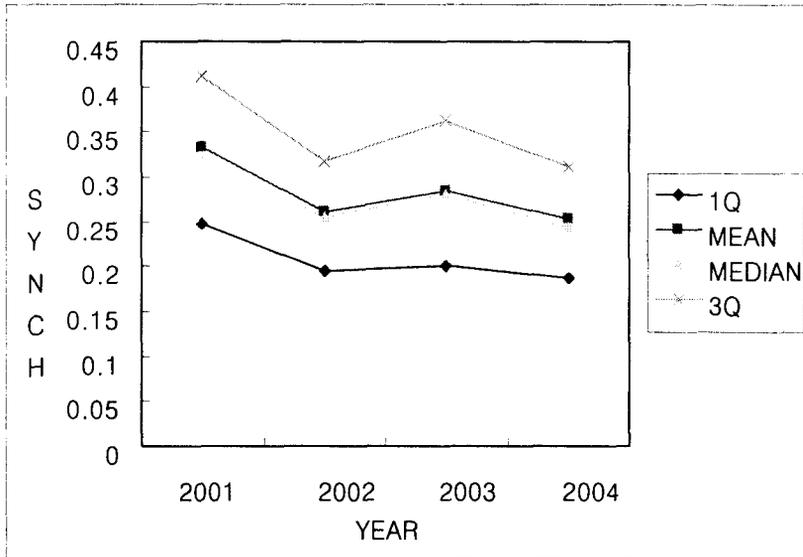
Figure 1 shows the stock price synchronicity of Korean listed firms measured by the R^2 of the extended market model using weekly data.

⟨Figure 1⟩ The Synchronicity of Korean Stock Prices by R-Square.
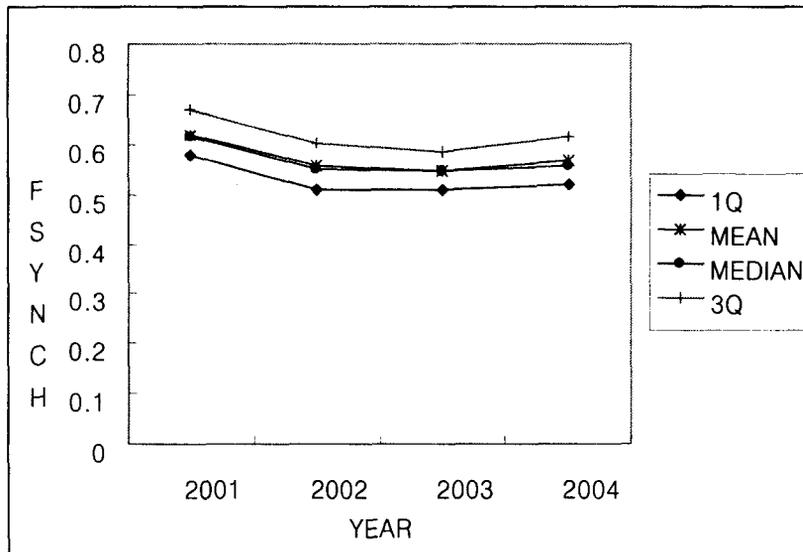

Figure 2 shows the stock price synchronicity of Korean listed firms using weekly data measured by the fraction of the frequency of movement of stock prices that move in the same direction as the market index.

⟨Figure 2⟩ The Synchronicity of Korean Stock Prices by Fraction.

for corporate governance overall score and control variables. The corporate governance overall score is a mean of 42.50, below half, ranging from 9.50 to 82.30. The mean (median) SKEWNESS and KURTOSIS are 0.53 (0.45) and 2.13 (0.97), respectively. Higher skewness and kurtosis in the distribution of weekly residual returns is associated with lower stock price synchronicity. The mean (median) of HERF is 2209.690 (1927.700), indicating that there is intense competition in the Korean market. The mean of firm size (*LNTASSET*) is 26.22 (approximately 1 trillion won) with large variation across the sample. The mean (median) of Altman's Z score, an indicator of a firms' financial condition, is 1.059 (0.892). The mean (median) of Tobin's Q, *BM*, and *ROA* are 0.809 (0.756), 2.73 (2.23), and 0.04 (0.04), respectively, showing a business slowdown for the sample period.

4.2.2 Pearson Correlations among Regression Variables

Panel A of Table 3 shows the Pearson correlations of the dependent variables. *SYNCH* and *FSYNCH* are positively and significantly correlated with each other and negatively and significantly related to *RETSKEW*. The *CGSCORE* is positively and significantly correlated with *SYNCH* and *FSYNCH*, but negatively correlated with

RETSKEW. Consistent with previous studies (Chen et al., 2001; Piotroski and Roulstone, 2004; Chan and Hameed, 2006), *LNANAL* is positively correlated with *SYNCH*, but negatively correlated with *RETSKEW*. Panel B of Table 3 reports the Pearson correlations between the dependent variables and control variables. The skewness and kurtosis of residual returns are negatively correlated with *SYNCH*, and *BETA* and *HERF* are positively related to *SYNCH and FSYNCH*. Firm size (*LNTASSET*) is positively correlated with *SYNCH*, *FSYNCH*, *CGSCORE*, and *LNANAL*, but negatively correlated with *RETSKEW*. Previous studies argue that the managers of small firms can easily hide bad news in the short term because they face less scrutiny from outside analysts than do managers of large firms. Consequently, firm size is negatively correlated with return skewness. As predicted, leverage and *BM* are positively related to *RETSKEW*.

4.3 Empirical Results

4.3.1 Regression Results of Synchronicity on Corporate Governance Overall Score

Table 4 presents the results of ordinary least squares (OLS) regression of stock price synchronicity against the corporate governance overall score with the relevant control variables.

⟨Table 2⟩ Descriptive Statistics for Variable Measures

Panel A: Dependent Variables

Variables	N	MEAN	STD	MIN	Q1	MEDIAN	Q3	MAX
R^2_wekly data	1454	0.277	0.102	0.054	0.202	0.268	0.343	0.655
Fraction (f)	1454	0.566	0.067	0.396	0.519	0.566	0.610	0.761
SYNCH	1454	-1.025	0.544	-2.873	-1.374	-1.007	-0.651	0.639
FSYNCH	1454	0.272	0.280	-0.421	0.077	0.266	0.446	1.157
RETSKEW	1444	0.536	1.056	-6.152	-0.005	0.446	1.018	6.066

Panel B: Test Variables

CGSCORE	1454	0.425	0.095	0.203	0.357	0.416	0.480	0.823
FAC1	1454	0.152	0.064	0.067	0.107	0.140	0.173	0.370
FAC2	1454	0.124	0.052	0.023	0.083	0.120	0.160	0.293
FAC3	1454	0.080	0.048	0.000	0.057	0.077	0.110	0.260
FAC4	1454	0.032	0.026	0.000	0.010	0.030	0.050	0.143
FAC5	1454	0.037	0.036	0.000	0.010	0.026	0.050	0.145

Panel C: Control Variables

SKEWNESS	1454	0.530	0.825	-4.541	0.102	0.455	0.908	5.513
KURTOSIS	1454	2.138	3.502	-1.065	0.205	0.977	2.693	36.496
LNNIND	1454	7.226	1.015	4.585	6.832	7.540	7.874	8.517
HERF	1454	2209.690	1877.740	467.531	637.850	1927.700	3168.140	8432.790
LNTASSET	1454	26.217	1.406	24.312	25.218	25.964	26.991	30.520
LNROA	1454	-1.600	2.734	-9.843	-2.633	-0.945	0.165	3.679
ROAVAR	1454	0.047	0.043	0.001	0.017	0.030	0.061	0.144
LNANAL	1454	2.328	2.471	0.000	0.000	1.386	4.927	6.988
BETA	1454	0.791	0.361	-0.119	0.539	0.784	1.021	1.593
MB	1454	0.768	0.232	0.403	0.610	0.743	0.890	1.313
LEV	1454	1.260	2.271	0.016	0.184	0.505	1.301	16.488
RETVOL	1454	0.071	0.031	0.030	0.048	0.065	0.087	0.152
RD	1454	0.003	0.007	0.000	0.000	0.000	0.002	0.027
PPE	1454	0.747	0.535	0.155	0.382	0.615	0.945	2.824
ADV	1454	0.008	0.018	0.000	0.000	0.001	0.006	0.087
LNSHRTURN	1442	-2.217	1.513	-7.906	-3.198	-2.261	-1.334	4.483
ROA	1386	0.046	0.120	-0.818	0.010	0.043	0.095	1.539
BM	1454	2.734	2.361	-21.523	1.296	2.233	3.543	24.521
ALTMAN	1378	1.059	1.679	-0.031	0.665	0.892	1.160	40.877
TOBINQ	1416	0.809	0.297	0.319	0.633	0.756	0.906	2.050

The variables are defined as follows.

R^2_weekly data = the fraction of the variance of weekly returns of a firm's stock explained by variation in local market returns and U.S. market returns. The proxy of stock price synchronicity;

Fraction(f) = the fraction of stocks that move in the same direction as the market index.

SYNCH = logarithmic transformation of R^2_weekly data, defined as log $(R^2/(1-R^2))$;

FSYNCH = logarithmic transformation of f, defined as log (f/(1-f));

RETSKEW = the measure of return asymmetry, computed by taking the sample's third moment of weekly return.

CGSCORE = corporate governance overall score, consisting of five categories;

FAC1 = shareholder rights protection score;

FAC2 = board of directors score;

FAC3 = corporate disclosure score;

FAC4 = audit committee score;

FAC5 = dividend policy score.

SKEWNESS = the skewness of the weekly residual return;

KURTOSIS = the kurtosis of the weekly residual return;

ROAVAR = the standard deviation of return on assets (ROA) measured over the prior five years;

LNROACO = the logarithmic transformation of the R^2 from a regression of the firm's annual return on assets on a market index of ROA. This general synchronicity of firm-level fundamentals is estimated using prior five annual observations in each firm-specific regression;

LNTASSET = firm size measured by the natural log of the total assets of the firm;

LNNIND = the log of the number of firms in the industry;

HERF = a revenue-based Herfindahl index of industry level concentration;

BIANAL = 1 if analysts follow the firm, otherwise 0;

LNANAL = natural logarithm of the number of forecast estimates (N), Log (1+N);

BETA = stock beta calculated by the capital asset pricing model over a 60-month period;

MB = (market value of equity + book value of total assets-book value of equity)/ book value of total assets;

LEV = leverage estimated as long term debt scaled by the market value of equity;

RETVOL = return volatility estimated as the standard deviation of weekly returns over a one-year period;

RD = R&D/sales;

PPE = PPE/sales;

ADV = ADV/sales;

LNSHRTURN = log of share turnover, defined as total annual trading volume scaled by total shares outstanding;

ROA = return on assets measured as income before extraordinary items scaled by beginning total assets.

BM = book to market as a ratio of book value of equity to market value of equity;

ALTMAN = Altman's Z-score estimated using Altman's equation (1968);

TOBINQ = Tobin's Q measured by the market value of equity plus the book value of debt scaled by total assets;

RETLAG = returns in the one-year lag period.

⟨Table 3⟩ Pearson Correlations of Regression Variables

Panel A: Pearson Correlations of Dependent Variables and Test Variables					
	SYNCH	FSYNCH	RETSKEW	CGSCORE	LNANAL
FSYNCH	0.327***				
RETSKEW	-0.186***	-0.068***			
CGSCORE	0.090***	0.060**	-0.101***		
LNANAL	0.257***	0.137***	-0.182***	0.434***	

Panel B: Pearson Correlations of Dependent Variables and Control Variables					
	SKEWNESS	KURTOSIS	ROAVAR	LNROA	LNTASSET
SYNCH	-0.202***	-0.318***	-0.097***	0.036	0.196***
FSYNCH	-0.015	-0.048*	-0.077***	-0.015	0.126*
RETSKEW	0.881***	0.312***	0.116***	-0.044*	-0.081***
CGSCORE	-0.087***	-0.082***	-0.149***	0.084***	0.483***
LNANAL	-0.159***	-0.242***	-0.241***	0.046*	0.666***
	LNNIND	HERF	BIANAL	BETA	MB
SYNCH	0.014	0.069***	0.246***	0.202***	0.071***
FSYNCH	-0.014	0.036	0.130***	0.181***	-0.030
RETSKEW	-0.016	-0.068***	-0.146***	-0.036	-0.048*
CGSCORE	-0.059**	0.092***	0.371***	0.182***	0.150***
LNANAL	-0.056**	0.113***	0.861***	0.258***	0.194***
	LEV	RETVOL	RD	PPE	ADV
SYNCH	0.014	-0.075***	0.040	-0.034	0.043*
FSYNCH	-0.005	0.003	0.033	0.017	-0.007
RETSKEW	0.104***	0.243***	0.014	0.059**	0.004
CGSCORE	0.024	0.083***	-0.000	-0.001	0.038
LNANAL	-0.037	-0.103***	0.069***	0.023	0.127***
	LNSHRTURN	ROA	BM	ALTMAN	TOBINQ
SYNCH	-0.005	0.037	-0.041	0.022	0.076***
FSYNCH	0.025	0.000	0.030	-0.030	-0.015
RETSKEW	0.120***	-0.092***	0.124***	0.016	-0.065**
CGSCORE	0.069***	0.105***	-0.098***	0.049	0.162***
LNANAL	-0.093***	0.157***	-0.178***	0.042	0.262***

***, **, and * denote the significance at the 0.01, 0.05, and 0.10 levels, respectively. See Table 2 for variable definitions.

The statistical significance of the reported coefficients in the OLS regressions is based on the heteroscedasticity consistent covariance matrix (White, 1980).

The *CGSCORE* is negatively significant in the first OLS regression for *SYNCH* (coefficient = -0.392, t = -1.91). The *CGSCORE* is also negatively significant in the second OLS regression for *FSYNCH* (coefficient = -0.191, t = -1.82). Consistent with the first hypothesis, there is a negative association between the *CGSCORE* and *SYNCH*. Similarly, there is a negative association between the *CGSCORE* and *FSYNCH* with all control variables. As noted, *FSYNCH*, the alternative variable of *SYNCH*, is estimated by the frequency of stock price movement in the same direction as the market index. The correlation between *FSYNCH* and *SYNCH* is only 0.365 and thus *FSYNCH* may be a more noisy proxy than *SYNCH*. Consistent with expectations, the explanatory power of the *FSYNCH* model is somewhat weaker than that of the *SYNCH* model.

This negative coefficient of stock price synchronicity is expected because previous studies have already shown the negative relation between stock price synchronicity and corporate governance practices. Morck et al. (2000) interpret the negative correlation between shareholder rights protection and synchronicity as being partly due to higher political risk. For example, a progression of

trading activities—accumulating information and capitalizing the proprietary information into share price by risk arbitrage—may be less economically attractive in environments that poorly protect private property rights. Jin and Myers (2006) also argue that an increase in opaqueness along with poor shareholder rights protection leads to higher stock price synchronicity.

The results of the control variables are almost as predicted. The kurtosis of residual returns is significantly negatively related to price synchronicity. Firm size (*LNTASSET*) is highly synchronized with market returns due to its leading role as an economic indicator. Analyst following (*LNANAL*) enters with a positive sign because analysts' activities increase market-wide information through intra-industry information transfer. Finally, tangible assets are negatively associated with price synchronicity, which indicates the information role of tangible assets. The results on the control variables of the *FSYNCH* model are almost the same as the results of the *SYNCH* model. *LNTASSET* and *BETA* are positively related to *FSYNCH*, and *LEV* is negatively associated with *FSYNCH*.

4.3.2 Regression Results of Skewness on Corporate Governance Overall Score

According to Bae et al. (2007), stock returns

⟨Table 4⟩ Results of Regression of Stock Price Movement on the
Corporate Governance Overall Score

| Variables | Predicted sign | OLS | | Predicted sign | OLS |
		SYNCH	FSYNCH		RETSKEW
INTERCEPT	+/-	-2.039*** (-4.77)	-0.093 (-0.40)	+/-	1.075* (1.81)
CGSCORE	-	-0.392* (-1.91)	-0.191* (-1.82)	-	0.038 (0.11)
SKEWNESS	-	-0.027 (-1.27)			
KURTOSIS	-	-0.045*** (-7.60)			
LNNIND	+/-	0.024 (1.08)	0.006 (0.69)	+/-	-0.041 (-1.42)
HERF*(10^{-4})	+	0.169 (1.60)	0.056 (1.18)	-	-0.010*** (-3.44)
LNTASSET	+/-	0.051*** (3.26)	0.022*** (2.65)	-	-0.069*** (-3.11)
LNROACO	+	0.001 (0.23)	-0.002 (-1.06)		
ROAVAR	-	-0.225 (-0.68)	-0.117 (-0.65)	+/-	-0.131 (-0.20)
LNANAL	+	0.015* (1.91)	-0.001 (-0.22)	-	0.005 (0.48)
BETA	+	0.134*** (3.51)	0.112*** (5.32)		
MB	-	-0.047 (-0.78)	-0.032 (-0.96)		
LEV	-	-0.006 (-0.96)	-0.008** (-2.56)	+	0.014 (1.15)
RETVOL	-	0.813 (1.51)	-0.172 (-0.68)	+/-	14.779*** (10.57)
RD	-	2.161 (1.21)	1.062 (0.95)	+/-	2.003 (0.60)
PPE	-	-0.073*** (-2.90)	-0.009 (-0.72)	+/-	0.014 (0.33)

⟨Table 4⟩ Results of Regression of Stock Price Movement on the
Corporate Governance Overall Score

Variables	Predicted sign	OLS		Predicted sign	OLS
		SYNCH	FSYNCH		RETSKEW
ADV	−	0.769	-0.278	+/−	1.971*
		(1.10)	(-0.74)		(1.72)
BM				+	0.060***
					(4.97)
RETSKEWLAG				+	0.035
					(1.57)
RETLAG				−	-0.097**
					(-2.11)
LNSHRTURN				−	-0.076***
					(-3.35)
YEAR D.		Included	Included		Included
IND. D.		Included	Included		Included
Adj. R²		0.2014	0.1653		0.2141
N. of Obs.		1,454	1,454		1,439

See Table 2 for variable definitions. t-statistics are reported in parentheses. ***, **, and * denote the significance of the parameter estimated at the 0.01, 0.05, and 0.10 levels, respectively, based on the heteroscedasticity consistent covariance matrix following White (1980). The models are defined as follows.

$$SYNCH = \alpha + \beta_1 CGSCORE + \beta_2 SKEWNESS + \beta_3 KURTOSIS + \beta_4 LNNIND + \beta_5 HERF + \beta_6 LNTASSET$$
$$+ \beta_7 LNROACO + \beta_8 ROAVAR + \beta_9 LNANAL + \beta_{10} BETA + \beta_{11} MB + \beta_{12} LEV + \beta_{13} RETVOL$$
$$+ \beta_{14} RD + \beta_{15} PPE + \beta_{16} ADV + \beta_{17} YEAR\ DUMMY + \beta_{18} INDUSTRY\ DUMMY + \varepsilon \quad (1)$$

$$FSYNCH = \alpha + \beta_1 CGSCORE + \beta_2 LNNIND + \beta_3 HERF + \beta_6 LNTASSET + \beta_5 LNROACO + \beta_6 ROAVAR$$
$$+ \beta_7 LNANAL + \beta_8 BETA + \beta_9 MB + \beta_{10} LEV + \beta_{11} RETVOL + \beta_{12} RD + \beta_{13} PPE + \beta_{14} ADV$$
$$+ \beta_{15} YEAR\ DUMMY + \beta_{16} INDUSTRY\ DUMMY + \varepsilon \quad (2)$$

$$RETSKEW = \alpha + \beta_1 CGSCORE + \beta_2 LNNIND + \beta_3 HERF + \beta_4 LNTASSET + \beta_5 ROAVAR + \beta_6 LNANAL$$
$$+ \beta_7 LEV + \beta_8 RETVOL + \beta_9 RD + \beta_{10} PPE + \beta_{11} ADV + \beta_{12} BM + \beta_{13}\ RETSKEWLAG$$
$$+ \beta_{14}\ RETLAG + \beta_{15}\ LNSHRTURN + \beta_{16}\ YEAR\ DUMMY + \beta_{17}\ INDUSTRY\ DUMMY + \varepsilon \quad (3)$$

of firms with poor corporate governance are more positively skewed than those of firms with sound corporate governance. That is, corporate governance variables can determine the features of return distribution. They use a chaebol group dummy as a proxy of bad corporate governance practices to examine the positive association between RETSKEW and chaebol firms. Generally, chaebol firms are insured against each other by income smoothing, and the managements of chaebol firms have more discretionary power in terms of disclosing information because investors can not monitor chaebol firms effectively.

Evidence is consistent with both risk-sharing hypothesis and discretionary-disclosure hypothesis.[15]

Unlikely Bae et al. (2007), this study runs the regression of stock return skewness on the corporate governance overall scores, instead of chaebol dummy. First of all, *RETSKEW* is directly regressed on the *CGSCORE* with all of the control variables by OLS estimation.[16] However, as shown in Table 4, the *CGSCORE* has an insignificant coefficient (coefficient = 0.038, t = 0.11) and this result can not provide evidence on the negative relation between *RETSKEW* and *CGSCORE*. Consequently, this study also investigates the chaebol group dummy (*GROUP*), exactly following Bae et al. (2007). The chaebol dummy takes the value of 1 if the sample belongs to chaebol firms and 0 otherwise. Further, two interaction variables are added: (1) the chaebol dummy x the financial distress dummy (*GROUP_F*), and (2) the non-chaebol dummy x the financial distress dummy (*NONGROUP_F*). The financial distress dummy takes the value of 1 if the interest coverage ratio belongs to

the lowest quartile.

Even though the regression result is not tabulated, the *GROUP* (coefficient = 0.027, t = 0.41) and *GROUP_F* (coefficient = -0.208, t = -1.51) have insignificant coefficients and *NONGROUP_F* (coefficient = -0.208, t = -1.86) has a negatively significant coefficient. These results weakly support the risk-sharing theory of chaebol firms that is posited by Bae et al. (2007) because only non-chaebol firms shows more negative skewness when they are financially distressed. These unexpected results of return skewness should be tested again, due to the endogeneity problem of corporate governance variables, which is addressed in many prior studies.[17] Therefore, the endogeneity problem of corporate governance is discussed in the following section.

The results of the control variables are almost predicted, but somewhat different from the results of previous studies (e.g., Chen et al., 2001; Bae et al., 2007). Past returns (*RETLAG*), firm size (*LNTASSET*), and trading volume (*LNSHRTURN*) are negatively and significantly associated with

15) The sample period of Bae et al. (2007) is 1995-2000. Their empirical evidence shows that the stock returns of chaebol firms are more positively skewed. Further, they add two interaction variables in their model: (i) the chaebol dummy times the financial distress dummy, and (ii) the non-chaebol dummy times the financial distress dummy. The financial distress dummy takes the value of 1 if interest payments exceed earnings before interest and taxes. They find that only the interaction variable of the non-chaebol dummy times the financial distress dummy is negatively significant. However, their results may be influenced by the 1997 Asian financial crisis.

16) The statistical significance of the reported coefficients in the OLS regressions is based on the heteroscedasticity consistent covariance matrix (White, 1980).

17) Investigation of the possible endogeneity problem is recommend for studies on corporate governance. See Bhagat and Jefferis (2002), Black, Jang, and Kim (2006a), and Larcker and Rusticus (2005).

RETSKEW. Book to market (*BM*) is strongly and positively associated with *RETSKEW.* These results are consistent with Chen et al. (2001). However, these results, except for *RETLAG,* are not consistent with the results of Bae et al. (2007). In their study, book to market and turnover ratios are never significant and firm size is positively significant.[18] This difference in results may be due to the differences in sample period, sample size, and variable measures. Especially, since the sample period of Bae et al. (2007) is 1995-2000, their results may be influenced by the 1997 Asian financial crisis. Furthermore, return volatility (*RETVOL*) and advertisements (*ADV*) are positively associated with *RETSKEW,* and industry concentration (*HERF*) is negatively associated with *RETSKEW.*

4.3.3 Discussion about Endogeneity Problems of Corporate Governance Practices

As shown in Table 4, the coefficients on the *CGSCORE* are marginally significant or not significant in the OLS regressions of stock price synchronicity and stock return skewness, respectively. As mentioned before, these weak results may due to the endogeneity problem of corporate governance practices.

Black et al. (2006a) suggest using the simultaneous equations estimation to mitigate the potential endogeneity problem of corporate governance practices. Following their suggestion, this study conducts simultaneous estimation using a 2 trillion *won* asset dummy variable (*ADUMMY*) and other instrumental variables.[19] The results are presented in Table 5. To run the first-stage regression, this study adopts the determinants of Korea corporate governance systems that are presented in the study by Black et al. (2006b): firm size, long term profitability, firm risks, and industry factors. In addition, the analyst following variable is also included, following prior studies (Lang, Lins, and Miller, 2004; Knyazeva, 2006). The first-stage regression model is as follows.

$$
\begin{aligned}
CGSCORE = a &+ \beta_1 ADUMMY \\
&+ \beta_2 LNTASSET + \beta_3 ALTMAN \\
&+ \beta_4 TOBINQ + \beta_5 PERFORM \\
&+ \beta_6 BM + \beta_7 ROAVAR \\
&+ \beta_8 RETVOL + \beta_9 LNANAL \\
&+ \beta_{10} SYNCH
\end{aligned}
$$

---

18) The coefficient on lagged skewness (*RETSKEWLAG*) for this study is positive, consistent with Bae et al. (2007), but not significant. However, in the OLS regression model using the chaebol group dummy (*GROUP*), the coefficient on lagged skewness (*RETSKEWLAG*) is positive and marginally significant (coefficient = 0.037, t = 1.65).

19) According to Black et al. (2006a), an asset size dummy can be ideally exogenous under Korean law. An asset size dummy should be correlated with the independent variable of interest (here, the *CGSCORE*) and predict the dependent variable (here, *SYNCH, FSYNCH,* and *RETSKEW*) only indirectly, through its effect on the independent variable, but not directly. For a more detailed explanation, see Black, Jang, and Kim (2006a, 2006b).

$$+ \beta_{11} Year\ Dummy$$
$$+ \beta_{12} Industry\ Dummy + \varepsilon \ (10)$$

In Table 5, each model shows a significant coefficient on the *CGSCORE*; the coefficient on the *CGSCORE* in the *SYNCH* model (coefficient = -3.208, t = -4.29), the coefficient on the *CGSCORE* in the *FSYNCH* model (coefficient = -1.728, t = -4.22), and the coefficient on the *CGSCORE* in the *RETSKEW* model (coefficient = -3.727, t = -2.72) become larger and stronger. This means that stock price synchronicity and return skewness are more responsive to corporate governance practices with less variance. To test the endogeneity of each equation, the Hausman test is performed. All of the test results are significant at a 1% significance level (p < 0.0001). In addition, the adjusted R^2 of the first-stage *CGSCORE* model is 59.39%, which indicates that the explanatory power of the first-stage model is appropriate. All of the determinants of corporate governance are strongly significant.

4.3.4 Discussion of Endogeneity Problem of Analyst Following

According to Chan et al. (2006), price synchronicity analysis is susceptible to the endogeneity of analyst following. For example, if the firm-specific information that is collected by analysts includes a large amount of macroeconomic information, analysts' activities induce the increase of market-wide information or stock price synchronicity. In addition, the stock price movement of firms that is driven by a divergence of opinion among investors can influence the level and extent of analysts following. Based on the same logic, stock return skewness is also susceptible to the endogeneity of analyst following. If the firm-specific information that is collected by analysts is primarily based on public information, analysts' activities affect the firm-specific return distribution, or return skewness, and vice versa. To correct for the endogeneity of analyst following, an analyst following equation (11) is included in the set of the simultaneous equations model. The specifications of the analyst following equation for the model follow.

$$LNANAL = \alpha + \beta_1 LNTASSET$$
$$+ \beta_2 ROAVAR + \beta_3 ROA$$
$$+ \beta_4 LNSHRTURH$$
$$+ \beta_5 RETVOL + \beta_6 CGSCORE$$
$$+ \beta_7 SYNCH + \beta_8 Year\ Dummy$$
$$+ \beta_9 Industry\ Dummy + \varepsilon \ (11)$$

The variables chosen for Equation (11) are taken from previous studies that indicate that analysts cover large firms with high trading volumes and profitability as well as lower return volatility and earning variability

〈Table 5〉 Results of Regression on the Corporate Governance Overall Score using 2SLS

Variables	2SLS		2SLS		2SLS	
	CGSCORE	SYNCH	CGSCORE	FSYNCH	CGSCORE	RETSKEW
INTERCEPT	0.009 (0.16)	-2.820*** (-5.57)	0.028 (0.48)	-0.431 (-1.53)	0.011 (0.19)	-0.156 (-0.19)
CGSCORE		-3.208*** (-4.29)		-1.728*** (-4.22)		-3.727*** (-2.72)
SKEWNESS		-0.039* (-1.70)				
KURTOSIS		-0.045*** (-7.24)				
LNNIND		0.012 (0.62)		0.008 (0.87)		-0.034 (-1.15)
HERF*(10^{-4})		0.150 (1.45)		0.051 (0.94)		-0.500*** (-3.28)
LNTASSET	0.016*** (7.37)	0.127*** (4.99)	0.016*** (7.32)	0.060*** (4.23)	0.016*** (7.34)	0.045 (0.95)
LNROACO		0.0006 (0.11)		-0.003 (-1.04)		
ROAVAR	-0.166*** (-3.67)	-0.899** (-2.28)	-0.145*** (-3.19)	-0.322 (-1.50)	-0.162*** (-3.53)	-0.881 (-1.35)
LNANAL	0.003*** (3.16)	0.024*** (2.71)	0.003*** (3.05)	0.005 (1.15)	0.002*** (2.62)	0.011 (0.81)
BETA		0.135*** (3.02)		0.128*** (5.23)		
MB		0.056 (0.77)		0.018 (0.44)		
LEV		-0.011 (-1.53)		-0.008** (-2.06)		0.010 (0.85)
RETVOL	-0.075 (-1.15)	0.845 (1.39)	-0.090 (-1.37)	-0.440 (-1.45)	-0.068 (-0.88)	14.403*** (12.08)
RD		2.962 (1.30)		0.746 (0.60)		2.660 (0.71)
PPE		-0.076*** (-2.66)		-0.020 (-1.32)		-0.011 (-0.24)
ADV		0.743 (0.91)		-0.446 (-1.00)		1.924 (1.44)
BM	-0.003*** (-3.55)		-0.003*** (-3.52)		-0.004*** (-3.99)	0.035** (2.38)
RETSKEWLAG						0.044* (1.85)

〈Table 5〉 Results of Regression on the Corporate Governance Overall Score using 2SLS

	2SLS		2SLS		2SLS	
Variables	CGSCORE	SYNCH	CGSCORE	FSYNCH	CGSCORE	RETSKEW
RETLAG						-0.119**
						(-2.48)
LNSHRTURN						-0.080***
						(-3.49)
DMASSET	0.071***		0.073***		0.072***	
	(8.72)		(8.92)		(8.72)	
TOBINQ	0.004		0.005		0.003	
	(0.58)		(0.76)		(0.44)	
ALTMAN	0.002***		0.002**		0.003**	
	(2.63)		(2.56)		(2.54)	
ROA	0.072***		0.068***		0.063***	
	(5.03)		(4.72)		(4.42)	
SYNCH	-0.004					
	(-1.20)					
FSYNCH			-0.006			
			(-1.07)			
RETSKEW					-0.001	
					(-0.48)	
YEAR D.	Included	Included	Included	Included	Included	Included
IND. D.	Included	Included	Included	Included	Included	Included
Hausman test[†]	24.47***	18.77***	85.24***	18.94***	10.26***	8.49****
Adj. R^2	0.5949	0.1867	0.5960	0.1510	0.5942	0.1994
N. of Obs.	1,331	1,331	1,335	1,335	1,328	1,328

Table 5 shows the results of simultaneous equations estimation using 2SLS for models (1) through (3). This table presents coefficients of the following set of models.

$CGSCORE = \alpha + \beta_1 ADUMMY + \beta_2 LNTASSET + \beta_3 ALTMAN + \beta_4 TOBINQ + \beta_5 PERFORM + \beta_6 BM + \beta_7 ROAVAR + \beta_8 RETVOL + \beta_9 CGSCORE + \beta_{10} SYNCH(FSYNCH, RETSKEW) + \beta_{11} YearDummy + \beta_{12} IndustryDummy + \varepsilon$

$SYNCH = \alpha + \beta_1 CGSCORE + \beta_2 SKEWNESS + \beta_3 KURTOSIS + \beta_4 LNNIND + \beta_5 HERF + \beta_6 LNTASSET + \beta_7 LNROACO + \beta_8 ROAVAR + \beta_9 LNANAL + \beta_{10} BETA + \beta_{11} MB + \beta_{12} LEV + \beta_{13} RETVOL + \beta_{14} RD + \beta_{15} PPE + \beta_{16} ADV + \beta_{17} YEAR DUMMY + \beta_{18} INDUSTRY DUMMY + \varepsilon$ (1)

$FSYNCH = \alpha + \beta_1 CGSCORE + \beta_2 LNNIND + \beta_3 HERF + \beta_4 LNTASSET + \beta_5 LNROACO + \beta_6 ROAVAR + \beta_7 LNANAL + \beta_8 BETA + \beta_9 MB + \beta_{10} LEV + \beta_{11} RETVOL + \beta_{12} RD + \beta_{13} PPE + \beta_{14} ADV + \beta_{15} YEAR DUMMY + \beta_{16} INDUSTRY DUMMY + \varepsilon$ (2)

$RETSKEW = \alpha + \beta_1 CGSCORE + \beta_2 LNNIND + \beta_3 HERF + \beta_4 LNTASSET + \beta_5 ROAVAR + \beta_6 LNANAL + \beta_7 LEV + \beta_8 RETVOL + \beta_9 RD + \beta_{10} PPE + \beta_{11} ADV + \beta_{12} BM + \beta_{13} RETSKEWLAG + \beta_{14} RETLAG + \beta_{15} LNSHRTURN + \beta_{16} YEAR DUMMY + \beta_{17} INDUSTRY DUMMY + \varepsilon$ (3)

See Table 2 for variable definitions. t-statistics for the t-test are reported in parentheses. ***, **, and * denote the significance of the parameter estimated at the 0.01, 0.05, and 0.10 levels, respectively. † The Hausman test is performed to test the simultaneity.

(Piotroski and Roulston, 2004; Chan and Hameed, 2006). In addition, corporate governance is included in Equation (11) because analyst coverage is closely associated with the quality of corporate governance (Lang et al., 2004; Knyazeva, 2006). *LNSHRTURN* is the trading volume of the current year scaled by average total assets.

First, the simultaneous equations estimation is run for each model with Equation (11). The first-stage results (untabulated) indicate that analyst following is more likely for large firms with greater turnover, less earnings and return volatility, and a high quality of corporate governance. In addition, the adjusted R^2 of Equation (11) averages 53.23%, which indicates that the explanatory power of Equation (11) is high. All determinants of *LNANAL* are strongly significant. The second-stage results (untabulated) of the three models show a strong negative relationship between the *CGSCORE* and stock price synchronicity (*SYNCH and FSYNCH*), but not between the *CGSCORE* and stock return skewness (*RETSKEW*)

Then, as a robustness check of the 2SLS results, 3SLS is run again for the three models with the corporate governance equation (Eq. 10) and the analyst following equation (Eq. 11). The prior studies on

analyst following find that forecasts may be influenced by the quality of governance. Simultaneously, corporate governance may be influenced by analyst monitoring. Thus, the quality of corporate governance may be endogenous to analyst following. However, to establish the presence of a link between analyst following and corporate governance and determine the nature of that link are empirical questions (Lang et al., 2004; Knyazeva, 2006). Therefore, 3SLS with the corporate governance equation (Eq. 10) and the analyst following equation (Eq. 11) may be suitable to try to find the link.[20]

Table 6 shows the results of simultaneous equations estimation using 3SLS. As shown in Table 6, models (1) through (3) show significant coefficients on the *CGSCORE*; the coefficients on the *CGSCORE* in the *SYNCH* model (coefficient = -5.515, t = -7.48), the coefficients on the *CGSCORE* in the *FSYNCH* model (coefficient = -2.643, t = -6.58), and the coefficients on the *CGSCORE* in the *RETSKEW* model (coefficient = -5.969, t = -4.41) become larger and stronger than the results of 2SLS. Similar to 2SLS, the Hausman test is performed to find the endogeneity of each equation. All Hausman test results of 3SLS are more significant than the test results of 2SLS. In addition, the

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20) The 3SLS is a system estimating procedure that estimates all the identified structural equations together as a set, instead of estimating the structural parameters of each equation separately as is the case with the 2SLS procedure (Bhagat and Jefferis, 2002).

system weighted R^2 of the three models are approximately 70.00%, indicating that the results of 3SLS may be more efficient than the results of 2SLS.[21]

4.3.5 Regression Results on Firms with Analysts Following

This section answers the question whether corporate governance practices have a different impact with regard to analyst following. If analyst following has a strong impact on the information environment of firms, there should be a difference between the samples of stock price synchronicity and stock return skewness with and without analyst following.

First, to find the effect of analyst following, the sample is partitioned into firms with analyst coverage and firms without analyst coverage. The total number of observations of the entire sample during the period 2001–2004 is 1,454, of which 792 observations are from firms with analyst coverage. Several features are worth noting. Firms with analyst coverage are in general larger than firms without analyst coverage. The corporate governance score is significantly different between the two groups. Earnings and return

volatility, book-to-market ratio, stock price synchronicity, and stock return skewness between the two groups are all statistically significant at the one percent level.

Then, OLS regressions are run for firms with analyst following and firms without analyst following (untabulated). For the analyst following sample, the coefficients on the *CGSCORE* of the *SYNCH* model (coefficient = -0.656, t = -2.59) and the coefficients on the *CGSCORE* of the *FSYNCH* model (coefficient = -0.302, t = -2.16) are all significant and larger and stronger than the results of the full sample. However, the coefficient on the *CGSCORE* of the *RETSKEW* model (coefficient = -0.241, t = -0.56) for analyst following firms is not significant, like that of the full sample model. In contrast, the coefficients on the *CGSCORE* for stock price synchronicity models for firms without analyst following are not significant.[22] These findings may indicate that analysts play an important role in corporate governance in the context of stock price movement, and the difference is pivotal between firms with and without analyst following.

Table 7 presents the results of simultaneous equations estimations for the corporate governance

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21) In general, 3SLS is more efficient than 2SLS because the 3SLS is a full-information method. That is, 3SLS utilizes knowledge of all the restrictions in the entire system when estimating the structural parameters (Bhagat and Jefferis, 2002).

22) The coefficients on the *CGSCORE* by OLS estimation for firms without analyst following are as follows: (i) *SYNCH* model (coefficient = -0.145, t = -0.44), (ii) *FSYNCH* model (coefficient = -0.064, t = -0.37), and (iii) *RETSKEW* model (coefficient = -0.202, t = -0.31).

⟨Table 6⟩ Results of Regression on the Corporate Governance Overall Score using 3SLS

Variables	CGSCORE	3SLS LNANAL	SYNCH	3SLS FSYNCH	3SLS RETSKEW
INTERCEPT	0.1733*** (3.31)	-10.787*** (-5.14)	-1.100 (-2.22)	0.433 (1.58)	1.285 (1.55)
CGSCORE		35.221*** (9.84)	-5.515*** (-7.48)	-2.643*** (-6.58)	-5.969*** (-4.41)
SKEWNESS			-0.040* (-1.87)		
KURTOSIS			-0.033*** (-5.64)		
LNNIND			0.002 (0.16)	0.006 (0.67)	- 0.034 (-1.19)
HERF*(10⁻⁴)			0.054 (0.56)	0.024 (0.49)	-0.500*** (-3.44)
LNTASSET	0.007*** (3.91)	-0.035 (-0.29)	0.098*** (3.92)	0.041*** (2.97)	0.018 (0.40)
LNROACO			-0.002 (-0.43)	-0.004 (-1.65)	
ROAVAR	-0.083* (-1.88)	1.12 (0.57)	-0.897** (-2.25)	-0.28 (-1.40)	-1.090* (-1.67)
LNANAL	0.019*** (30.02)		0.105*** (12.48)	0.043*** (9.15)	0.090*** (6.30)
BETA			0.118*** (2.89)	0.114*** (5.02)	
MB			0.064 (0.94)	0.008 (0.22)	
LEV			-0.002 (-0.31)	-0.002 (-0.66)	0.021* (1.83)
RETVOL	-0.092 (-1.44)	0.336 (0.11)	0.135 (0.22)	-0.472 (-1.55)	14.050*** (11.97)
RD			1.934 (0.93)	0.246 (0.21)	1.096 (0.31)
PPE			-0.045* (-1.70)	-0.008 (-0.61)	0.021 (0.48)
ADV			0.349 (0.47)	-0.455 (-1.09)	1.513 (1.19)
BM	-0.001* (-1.82)				0.027* (1.91)

⟨Table 6⟩ Results of Regression on the Corporate Governance Overall Score using 3SLS

Variables	CGSCORE	*3SLS* LNANAL	SYNCH	*3SLS* FSYNCH	*3SLS* RETSKEW
RETSKEWLAG					0.056** (2.46)
RETLAG					-0.182*** (-3.95)
LNSHRTURN		0.107*** (2.73)			-0.083*** (-3.80)
DMASSET	0.022*** (3.29)				
TOBINQ	0.002 (0.65)				
ALTMAN	0.0008 (1.34)				
ROA	0.025* (1.76)	0.104 (0.15)			
SYNCH	-0.054*** (-17.41)	2.363*** (17.30)			
YEAR D.	Included	Included	Included	Included	Included
IND. D.	Included	Included	Included	Included	Included
Hausman test†	553.36***	198.21***	278.09***	26.32***	128.18***
System Weighted R^2			0.7148	0.7040	0.6969
N. of Obs.	1,327	1,327	1,327	1,331	1,328

Table 6 shows the results of simultaneous equations estimation using 3SLS for models (1) through (3). This table presents the coefficients of the following set of models.

CGSCORE = $a + \beta_1 ADUMMY + \beta_2 LNTASSET + \beta_3 ALTMAN + \beta_4 TOBINQ + \beta_5 PERFORM + \beta_6 BM + \beta_7 ROAVAR + \beta_8 RETVOL + \beta_9 CGSCORE + \beta_{10} SYNCH(FSYNCH,RETSKEW) + \beta_{11} YearDummy + \beta_{12} IndustryDummy + \varepsilon$

LNANAL = $a + \beta_1 LNTASSET + \beta_2 ROAVAR + \beta_3 ROA + \beta_4 LNSHRTURN + \beta_5 RETVOL + \beta_6 CGSCORE + \beta_8 SYNCH (FSYNCH,RETSKEW) + \beta_9 YEAR DUMMY + \beta_{10} INDUSTRY DUMMY + \varepsilon$

SYNCH = $a + \beta_1 CGSCORE + \beta_2 SKEWNESS + \beta_3 KURTOSIS + \beta_4 LNNIND + \beta_5 HERF + \beta_6 LNTASSET + \beta_7 LNROACO + \beta_8 ROAVAR + \beta_9 LNANAL + \beta_{10} BETA + \beta_{11} MB + \beta_{12} LEV + \beta_{13} RETVOL + \beta_{14} RD + \beta_{15} PPE + \beta_{16} ADV + \beta_{17} YEAR DUMMY + \beta_{18} INDUSTRY DUMMY + \varepsilon$ (1)

FSYNCH = $a + \beta_1 CGSCORE + \beta_2 LNNIND + \beta_3 HERF + \beta_6 LNTASSET + \beta_5 LNROACO + \beta_6 ROAVAR + \beta_7 LNANAL + \beta_8 BETA + \beta_9 MB + \beta_{10} LEV + \beta_{11} RETVOL + \beta_{12} RD + \beta_{13} PPE + \beta_{14} ADV + \beta_{15} YEAR DUMMY + \beta_{16} INDUSTRY DUMMY + \varepsilon$ (2)

RETSKEW = $a + \beta_1 CGSCORE + \beta_2 LNNIND + \beta_3 HERF + \beta_4 LNTASSET + \beta_5 ROAVAR + \beta_6 LNANAL + \beta_7 LEV + \beta_8 RETVOL + \beta_9 RD + \beta_{10} PPE + \beta_{11} ADV + \beta_{12} BM + \beta_{13} RETSKEWLAG + \beta_{14} RETLAG + \beta_{15} LNSHRTURN + \beta_{16} YEAR DUMMY + \beta_{17} INDUSTRY DUMMY + \varepsilon$ (3)

See Tables 2 for variable definitions. *t*-statistics are reported in parentheses. ***, **, and * denote the significance of the parameter estimated at the 0.01, 0.05, and 0.10 levels, respectively. † The Hausman test is performed to test the simultaneity.

overall score only for firms with analyst following. Like the full sample, the coefficients on the *CGSCORE* with the analyst following sample are also significant at a strong significance level in simultaneous equations estimations. Especially, the coefficients on the *CGSCORE* of the analyst following sample executed by 2SLS are larger and stronger than the coefficients on the *CGSCORE* of the full sample executed by OLS. Similarly, the coefficients on the *CGSCORE* of the analyst following sample executed by 3SLS are larger and stronger than the coefficients on the *CGSCORE* of the full sample executed by OLS.

4.3.6 Regression Results on Corporate Governance Categories by Year

As noted, because the survey construction for 2001-2002 is somewhat different from the survey construction for 2003-2004, for the purposes of this study, the former is divided into five categories in accordance with the latter.[23] In this section, the role of each corporate governance category is investigated. OLS regressions for the three models are performed for one year, two years, and three years.

In yearly regressions (untabulated), shareholder rights protection (*FAC1*) and audit committee (*FAC4*) are the most frequently significant categories for stock price synchronicity regressions from 2001 to 2004. To test the robustness of the results of yearly regression, two-year regression and three-year regression are run again. Panel A of Table 8 reports the summary of the regression results for the corporate governance categories for two years and three years. For the two-year and three-year regressions for the full sample, *FAC1* is still the most significant among the five corporate governance categories. The results of three models (i.e., *SYNCH*, *FSYNCH*, and *RETSKEW*) indicate that shareholder rights protection is the most critical corporate governance practice to make firms disclose more and timely firm-specific information. These results are consistent with those of many prior studies in which it is argued that shareholder right protection is the most important measure among the corporate governance practices.

The economic significance of these results is approximately estimated.[24] In the case of the two-year regression of the *SYNCH* model, for the average firm, a one standard deviation increase in the shareholder rights protection

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23) For the period 2001, the data set is classified into four categories, as *FAC3* and *FAC5* are not separable. Thus, only yearly regressions are run for 2001.

24) The computation of the 6.00% decrease in *SYNCH* for the average firm in our sample is as follows: 0.025 (one standard deviation of *FAC1* for 2003-2004)* -2.399 (*FAC1* coefficient for 2003-2004)* -1.0603 (mean *SYNCH* for 2003-2004). The computation of the other elements' impact is similar.

〈Table 7〉 Results of Regression on the Corporate Governance Overall Score using Firms with Analyst Following

Variables	2SLS			3SLS		
	SYNCH	FSYNCH	RETSKEW	SYNCH	FSYNCH	RETSKEW
INTERCEPT	-3.726***	-0.871**	-0.881	-1.318**	0.249	0.924
	(-5.46)	(-2.22)	(-0.70)	(-2.07)	(0.67)	(0.76)
CGSCORE	-4.738***	-2.187***	-5.957***	-5.065***	-2.456***	-6.900***
	(-5.75)	(-4.58)	(-3.60)	(-6.37)	(-5.27)	(-4.22)
SKEWNESS	-0.092***			-0.057**		
	(-2.70)			(-2.01)		
KURTOSIS	-0.025***			-0.017**		
	(-2.85)			(-2.44)		
LNNIND	0.092***	0.071***	-0.072	0.048***	0.048***	-0.070
	(2.93)	(3.95)	(-1.25)	(2.93)	(3.05)	(-1.34)
HERF*(10^{-4})	0.410***	0.280***	-0.800	0.095	0.140*	-0.900***
	(2.62)	(3.21)	(-2.89)	(0.75)	(1.78)	(-3.59)
LNTASSET	0.176***	0.070***	0.151**	0.084***	0.030	0.072
	(5.30)	(3.68)	(2.28)	(2.69)	(1.64)	(1.12)
LNROACO	0.006	-0.005		-0.004	-0.007*	
	(0.75)	(-1.10)		(-0.64)	(-1.85)	
ROAVAR	-0.684**	-0.099	-2.121	-0.422	-0.002	0.003
	(-2.32)	(-0.59)	(-1.61)	(-1.44)	(-0.01)	(0.01)
LNANAL	0.011	0.008	-0.016	0.144***	0.071***	0.115***
	(0.68)	(0.94)	(-0.52)	(9.40)	(7.91)	(3.79)
BETA	0.123*	0.098***		0.093*	0.081**	
	(1.90)	(2.68)		(1.74)	(2.49)	
MB	0.143*	0.080		0.116	0.066	
	(1.65)	(1.61)		(1.51)	(1.43)	
LEV	-0.004	-0.006	0.034	0.017*	0.004	0.062***
	(-0.35)	(-0.91)	(1.46)	(1.74)	(0.76)	(2.94)
RETVOL	1.377	-0.072	8.546***	0.654	-0.140	8.675***
	(1.46)	(-0.15)	(4.79)	(0.73)	(-0.29)	(5.01)
RD	0.954	0.251	4.471	0.754	0.259	3.447
	(0.34)	(0.16)	(0.86)	(0.33)	(0.18)	(0.73)
PPE	-0.082**	-0.014	0.099	-0.019	0.004	0.142**
	(-2.05)	(-0.64)	(1.34)	(-0.57)	(0.22)	(2.11)
ADV	-0.662	-1.087*	3.647*	-0.503	-0.866*	2.893*
	(-0.65)	(-1.87)	(1.98)	(-0.60)	(-1.68)	(1.74)
BM			-0.020			-0.035
			(-0.82)			(-1.49)
RETSKEWLAG			0.011			0.029
			(0.27)			(0.78)
RETLAG			-0.152**			-0.253***
			(-2.04)			(-3.75)
LNSHRTURN			0.320***			-0.024
			(2.80)			(-0.64)
YEAR D.	Included	Included	Included	Included	Included	Included
IND. D.	Included	Included	Included	Included	Included	Included
Hausman test†	41.20***	22.95***	16.74***	56.93***	43.27***	68.87***
Adj. R² / S. W. R²	0.1577	0.1956	0.1117	0.6226	0.6080	0.5958
N. of Obs.	705	705	705	705	705	705

See Tables 2 and 6 for variable and model definitions. t-statistics are reported in parentheses. ***, **, and * denote the significance of the parameter estimated at the 0.01, 0.05, and 0.10 levels, respectively. † The Hausman test is performed to test the simultaneity.

category induces a 6.00% decrease in stock price synchronicity. Similarly, a one standard deviation increase in the audit committee category induces a 6.83% decrease in stock return skewness. The F-test and Wald-test are carried out to examine whether five corporate governance categories have a significant incremental explanatory power for stock price synchronicity and return skewness.[25] The F-test and Wald-test show significant results for the *SYNCH* and *FSYNCH* regressions, but not *RETSKEW* regressions. Panel B of Table 8 shows the regression results of stock price movement on corporate governance categories for analyst following firms. The results are almost the same as the results of full sample. For this small sample, *FAC1* (shareholder rights protection) is the most significant category, followed by *FAC 4* (audit committee).

4.3.7 Factor Analysis on Corporate Governance Categories

This study uses factor analysis to identify the most representative factors of corporate governance categories.[26] Panel C of Table 8 reports the regression results of the corporate governance factors based on factor analysis. To run the regression with new factor by factor analysis, factor analysis is performed by year. For example, the results of the factor analysis of the *SYNCH* model for the year 2004 (untabulated) show that two large eigenvalues account for 60.7% of the standardized variances. After rotating the component matrix using varimax rotation, the five categories load on two factors. That is, *FAC2*, *FAC3*, and *FAC4* load heavily on FACTOR 1 and *FAC1* and *FAC5* load heavily on FACTOR 2. The final communality estimates indicate that the five corporate governance categories are well accounted for by two components. The results of the factor analysis of the other models are all similar.

Because FACTOR 1 is related to the transparency of management (i.e., board of directors, corporate disclosure, and audit committee), it is labeled *M_TRANS* (i.e., management transparency). FACTOR 2 is labeled *M_EFFIC* (i.e., management efficiency) because it is related to the efficiency of management in enhancing the wealth of shareholders (i.e., shareholder rights protection

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25) The F-test examined the significance of the additional explanatory power of corporate governance categories. This was determined by the F-statistics for the test FAC1=FAC2=FAC3=FAC4=FAC5=0. The Wald-test (W = (RRSS-URSS)/(URSS/n)) examined whether regression on the overall score and the regression on the five composites differ in explanatory power, that is, adj_R^2. See C. S. Maddala, *Econometrics*, (3rd ed.).

26) As both the F-test and the Wald-test are significant only for the 2003-2004 periods in the previous section (4.4.1.), the factor analysis results for the period should be less noisy. In addition, factor analysis is also used to address the potential multicollinearity problem of the five corporate governance practices.

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⟨Table 8⟩ Results of Regression of Stock Price Movement on Corporate Governance Categories

	SYNCH		FSYNCH		RETSKEW	
	2003-2004	*2002-2004*	*2003-2004*	*2002-2004*	*2003-2004*	*2002-2004*
Panel A: Results of Regression on the Full Sample						
FAC1	-2.399***	-1.634***	-1.080***	-0.948***	0.632	-1.769*
	(-2.93)	(-2.66)	(-2.64)	(-3.00)	(0.56)	(-1.80)
FAC2	-1.020	-0.639	-0.303	-0.370	0.239	0.608
	(-1.47)	(-1.50)	(-0.85)	(-1.59)	(0.22)	(0.78)
FAC3	-0.399	0.315	0.437	0.023	-0.401	-0.038
	(-0.27)	(0.52)	(0.59)	(0.06)	(-0.17)	(-0.02)
FAC4	1.441	0.858	1.155**	0.805*	-2.846*	-1.169
	(1.30)	(1.00)	(2.02)	(1.76)	(-1.77)	(-0.82)
FAC5	0.380	0.706	-0.240	0.536	3.544	1.320
	(0.24)	(1.26)	(-0.31)	(1.70)*	(1.63)	(1.13)
F-test[†]	2.63**	2.59**	2.25*	3.43***	1.21	1.16
Wald-test[† †]	9.30*	12.11**	11.44**	16.96**	6.14	5.94
Adj_R^2	0.1561	0.1614	0.0745	0.0582	0.3042	0.2088
N. of Obs.	734	1,225	734	1,225	724	1,211
Panel B: Results of Regression for Firms with Analysts Following						
FAC1	-2.858***	-2.660***	-1.258**	-0.952**	2.009	-1.799
	(-2.71)	(-3.25)	(-2.14)	(-1.98)	(1.14)	(-1.25)
FAC2	0.160	-0.183	-0.324	-0.343	-2.093	-0.071
	(0.17)	(-0.31)	(-0.66)	(-1.07)	(-1.52)	(-0.06)
FAC3	-0.375	0.511	-0.897	-0.212	-2.065	-0.132
	(-0.20)	(0.69)	(-0.77)	(-0.41)	(-0.47)	(-0.07)
FAC4	-2.743*	-1.947*	1.601*	0.913	3.669	0.582
	(-1.84)	(-1.66)	(1.95)	(1.33)	(1.40)	(0.24)
FAC5	-1.980	0.539	1.621	0.401	-7.990	-1.229
	(-0.90)	(0.65)	(1.33)	(0.77)	(-1.46)	(-0.50)
F-test[† †]	2.49**	3.18***	1.90*	1.36	1.76	0.33
Wald-test[† † †]	5.26	12.70**	10.20**	6.52	8.38*	1.27
Adj_R^2	0.0800	0.1471	0.2080	0.1330	0.0630	0.0667
N of Obs.	324	599	324	599	325	598
Panel C: Results of Regression on Corporate Governance Factors by Factor Analysis						
M_TRANS	-0.013	-0.001	0.014	0.0005	-0.043	-0.009
	(-0.50)	(-0.07)	(1.09)	(0.05)	(-1.19)	(-0.32)
M_EFFIC	-0.051**	-0.037***	-0.025**	-0.022***	0.047	-0.030
	(-2.43)	(-2.73)	(-2.46)	(-3.04)	(1.64)	(-1.37)
Adj_R^2	0.1517	0.1598	0.0725	0.0543	0.3049	0.2082
N. of Obs.	734	1,225	734	1,225	724	1,211

Panel A shows the summary of two-year and three-year regressions for models (1) through model (3). Panel B shows the results of the summary of the two-year and three-year regressions for models (1) through model (3) with analysts following firms. Panel C shows the results of the regression on corporate governance factors based on factor analysis. See Table 2 for variable definitions. t-statistics are reported in parentheses. ***, **, and * denote the significance of the parameter estimated at the 0.01, 0.05, and 0.10 levels, respectively, based on the heteroscedasticity consistent covariance matrix following White (1980). † † F-statistics for the F-test (FAC1=FAC2=FAC3=FAC4=FAC5=0) are reported. The F-test examines the significance of any additional explanatory power that corporate governance categories collectively add to the model. † † † F-statistics for the Wald-test between the regression on the corporate governance overall score and the regression on the five categories are reported in the second row from the bottom. The Wald-test examines whether regressions on the overall score and regression on the five categories differ in adj_R^2.

and dividend policy). Both factors are expected to be negatively associated with the stock price movement. The summary of the OLS regression results are shown in Panel C of Table 8. *M_EFFIC* is negatively significant in the *SYNCH* and *FSYNCH* models, but not significant in the *RETSKEW* model. This means that in the context of stock price movement the corporate governance practices of Korean listed firms primarily depend on shareholder right protection and dividend policy. These OLS regression results with the new corporate governance factor by factor analysis provide additional evidence that corporate governance factors can reduce stock price synchronicity.

V. Summary and Conclusions

The purpose of this study is to examine the relationship between corporate governance practices and stock price movement. Firms with poor corporate governance practices usually furnish less accurate and less timely information to outside investors, which leads to synchronous stock price movement. This study provides direct evidence that corporate governance practices influence stock price synchronicity and stock return distribution.

This study uses corporate governance score data from the KCGS and stock price synchro-

nicity and return skewness measures that are based on previous studies. The results indicate that firms that are associated with a sound corporate governance system have lower stock price synchronicity. These results become stronger after controlling for endogeneity problems related to the corporate governance score and analysts' activities. Shareholder rights protection is the most important of the corporate governance practices for the reduction of stock price synchronicity. In addition, this study finds a negative relation between stock return skewness and corporate governance practices by simultaneous equations estimation. Overall, the results of this study suggest that sound corporate governance practices play an important role in influencing stock price movement.

There are some policy implications from our findings. Corporate governance practices, such as the shareholder rights protection and firm-specific information disclosure, are closely related to the development of the stock market. Since informative stock price leads efficient capital allocation by directing capital towards high quality firms the role of sound corporate governance systems is inevitable and desirable for an efficient capital market. If corporate governance systems can not protect investors, then higher productivity and long-term economic growth driven by efficient corporate investments can not be stimulated nor sustained. This

requires that Korean companies strengthen their corporate governance systems and consequently, improve the quality information disclosure. At the same time, from the regulator perspective, it would be desirable to devise incentives for companies and information intermediaries to improve on this situation. After all, policy makers should enhance appropriate regulation to facilitate firm-specific information flow and support companies to improve their corporate governance systems.

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기업지배구조와 주가 동조화에 관한 연구

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요 약

　본 연구는 각 기업의 지배구조 시스템이 주가의 동조화 (synchronicity) 현상과 주식수익률 분포의 비대칭성 (positive skewness) 현상에 미치는 영향을 연구하였다. 한국기업지배구조센터가 제공하는 기업 단위의 지배구조 점수를 사용하여, 본 연구는 기업지배구조가 좋은 기업이 기업 고유의 유용한 정보를 많이 공시하고, 따라서 주가의 동조화 현상을 줄이는 데 기여하는 지를 분석하였다. 또한 기업지배구조가 좋은 기업의 적시적 공시 행위가 주가 수익률 분포의 비대칭성 현상을 줄이는 지도 분석하였다.

　연구결과에 따르면, 지배구조 시스템이 좋은 기업은 주가 동조화 현상이 감소되고 있고, 주식 수익률 분포의 비대칭성도 완화되는 것으로 나타났다. 이런 현상은 기업지배구조 점수와 재무분석가 활동(analyst following)의 내생성을 고려하는 simultaneous equations estimation를 사용한 분석에서 더욱 강하게 나타나고 있다. 나아가 기업지배구조 점수를 구성하는 5가지 하부구조 (주주의 권리 보호, 이사회 구성과 운영, 기업 공시, 감사기구, 그리고 경영과실 배분) 점수 중 주주의 권리 보호 항목이 이런 주가 동조화와 주식 수익률 분포의 비대칭성을 줄이는데 가장 중요한 항목으로 나타나고 있다. 결론적으로 기업의 선진적 지배구조 시스템은 기업정보 공시의 양이나 적시성과 관련되어 기업 주가의 움직임에 큰 역할을 하는 것으로 고려될 수 있다.

　주제어: 주가 동조화, 주식수익률 분포, 기업지배구조, 주주의 권리 보호, Simultaneous equations estimation

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