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Article in *Journal of Financial and Quantitative Analysis* · May 2009

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# Corporate Governance and Institutional Ownership

Kee H. Chung and Hao Zhang<sup>\*</sup>

## Abstract

In this study we examine the relation between corporate governance and institutional ownership. Our empirical results show that the fraction of a company's shares that are held by institutional investors increases with the quality of its governance structure. In a similar vein, we show that the proportion of institutions that hold a firm's shares increases with its governance quality. Our results are robust to different estimation methods and alternative model specifications. These results are consistent with the conjecture that institutional investors gravitate to stocks of companies with good governance structure to meet fiduciary responsibility as well as to minimize monitoring and exit costs.

*JEL Classification:* G20; G30

*Key words:* Corporate governance; Institutional ownership; Fiduciary responsibility; Monitoring costs; Liquidity; Trading costs

Forthcoming in the *Journal of Financial and Quantitative Analysis*

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## **I. Introduction**

Companies use a broad set of tools to attract more investors to their stocks in the hope that greater investor base raises share price and increases firm value.<sup>1</sup> For instance, the board of directors of Ciena Corporation approved a reverse stock split in 2006 based on the belief that the resulting higher share price would attract more institutional investors.<sup>2</sup> Our study explores another important mechanism that can affect the investor base of a company. Specifically, we analyze the role of corporate governance as a means to attract institutional investors. Although field survey results indicate that corporate governance has become an important investment criterion of institutional investors,<sup>3</sup> there is only limited empirical evidence on the issue. In this study, we shed further light on the relation between institutional ownership and corporate governance using comprehensive measures of governance quality.

Corporate governance has been a subject of numerous studies during the last two decades. Williamson (1985) and Grossman and Hart (1986) hold that managerial opportunism reduces the amount of capital that investors are willing to contribute to the firm. Shleifer and Vishny (1997)

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<sup>1</sup> Merton (1987) suggests that an increase in the firm's investor base lowers investors' expected returns and increases the market value of its shares.

<sup>2</sup> Many companies explicitly state that the main goal of their reverse splits is to attract more institutional investors. See [http://www.commtouch.com/Site/News\\_Events/pr\\_content.asp?news\\_id=954&cat\\_id=1](http://www.commtouch.com/Site/News_Events/pr_content.asp?news_id=954&cat_id=1) and [http://www.businesswire.com/portal/site/google/?ndmViewId=news\\_view&newsId=20080922005721&newsLang=en](http://www.businesswire.com/portal/site/google/?ndmViewId=news_view&newsId=20080922005721&newsLang=en).

<sup>3</sup> Survey results indicate that institutional investors prefer companies with good governance structure. McKinsey & Company (2002) surveyed more than 200 institutional investors in 31 countries and showed that institutional investors put corporate governance quality on a par with financial indicators when evaluating investment decisions.

note that corporate governance deals with various constraints that either managers put on themselves or investors put on managers to reduce the agency problem. Gompers, Ishii, and Metrick (2003) show that better corporate governance leads to greater firm values and higher stock returns. Chung, Elder, and Kim (2009) show that better governance results in higher stock market liquidity.

Badrinath, Kale, and Ryan (1996), Falkenstein (1996), and Huang (2008) show that institutional investors prefer stocks that have higher market liquidity and lower return volatility. Other studies show that institutional investors prefer stocks of companies with better disclosure ([Bushee and Noe \(2000\)](#)), stocks of larger companies ([Gompers and Metrick \(2001\)](#)), stocks of companies that pay cash dividends or repurchase shares ([Grinstein and Michaely \(2005\)](#)), and stocks of companies with better managerial performance (Parrino, Sias, and Starks (2003)). None of these studies examined the effect of corporate governance on institutional ownership.

Dahlquist et al. (2003), [Giannetti and Simonov \(2006\)](#), [Ferreira and Matos \(2008\)](#), Leuz, Lins, and Warnock (2009) analyze the effect of ownership structure on institutional investors' stock selection decisions. Dahlquist et al. (2003) find no relation between the ratio of control to cash flow rights and the holding of foreign investors. [Giannetti and Simonov \(2006\)](#) show that both foreign and domestic financial institutions are reluctant to hold shares of companies that have high control to cash flow right ratios of principal shareholders. [Ferreira and Matos \(2008\)](#) show that institutions hold fewer shares of companies that have more closely-held ownership structure. Leuz, Lins, and Warnock (2009) find that U.S. institutions invest less in foreign firms with large insider block ownership. Li, Ortiz-Molina, and Zhao (2008) show that institutions avoid investing in companies with dual-class shares. Because these studies focus on only one

dimension of corporate governance (i.e., ownership structure), however, they offer limited insight on the relation between corporate governance and institutional ownership.

Bushee, Carter, and Gerakos (2008) analyze whether institutional investors tilt their portfolios toward firms with preferred governance mechanisms. The authors conclude that although institutional investors have incentives to tilt their portfolios toward firms with better governance mechanisms, there is no significant relation between institutional ownership and corporate governance.<sup>4</sup>

We shed further light on the behavior of institutional investors by analyzing the relation between corporate governance and institutional ownership. In contrast to prior research that relied on a single governance attribute, our study employs comprehensive measures of corporate governance quality that are constructed from 50 governance factors for a large number of U.S. companies. Our study provides answers to the following questions: Do institutional investors prefer stocks of companies that have better governance structure? If so, does the institutional investors' preference toward better-governed companies vary across different types of institutions? What kinds of corporate governance provisions are most attractive to institutional investors? Does the relation between corporate governance and institutional ownership vary with the firm's information environment?

The ordinary least squares (OLS) regression results show that the percentage of a firm's shares that are held by institutional investors is positively and significantly related to its governance quality across all types of institutional investors. The relation between institutional

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<sup>4</sup> Bushee, Carter, and Gerakos (2008) use corporate governance data provided by the Investor Responsibility Research Center (IRRC) which cover mainly corporate takeover defense strategies. As explained below, our data cover much broader arrays of corporate governance.

ownership and corporate governance is economically significant: an increase in governance quality from the 25<sup>th</sup> to 75<sup>th</sup> percentile results in an increase in institutional ownership by 14%. We show that the governance provisions that are most effective in attracting institutional investors concern either the composition/operation of board of directors or provisions that are designed to strengthen shareholder rights. The importance of corporate governance quality in institutional investors' stock selection decisions is smaller for those stocks that are followed by more analysts and have lower information asymmetry. We perform a battery of robustness tests and find that our results are not sensitive to different estimation methods, different proxies of governance quality, or additional control variables.

To determine whether the positive relation between governance quality and institutional ownership is driven by reverse causality, i.e., institutional investor activism causes firms to adopt better governance mechanisms, we also employ the two-stage least squares (2SLS) method using instrumental variables that are related to governance quality measures, but unlikely to be correlated with residuals in the second-stage regression. The results show that the coefficients on the instrumented governance quality measures are statistically significant and positive in the second-stage regressions, indicating that the positive relation between institutional ownership and corporate governance is driven, at least in part, by institutional preference toward companies with better governance structure.

The paper is organized as follows. Section II explains why institutional ownership is likely to increase with corporate governance quality. Section III describes data sources and presents descriptive statistics. Sections IV and V present empirical results. Section VI provides a brief summary and concluding remarks.

## II. Institutional Ownership and Corporate Governance

As in prior research, we define institutional ownership as the fraction of a firm's shares that are held by institutional investors. Hence, by definition, institutional ownership of a company is one minus the fraction of its shares held by non-institutions (i.e., individual investors). If we were to examine institutional investors' preference toward a certain group of companies, we would need to consider why institutional investors' preference for those companies is likely to be greater than that of individual investors. Below we present our conjectures on why institutional investors' gravitation to stocks of companies that have better governance structure is likely to be stronger than that of individual investors.

Institutional investors (e.g., banks, insurance companies, and pension funds) have strong fiduciary responsibilities. Del [Guercio \(1996\)](#) shows that many institutional investors tilt their portfolios to stocks that are viewed as prudent investments. [Grinstein and Michaely \(2005\)](#) suggest that institutions avoid firms that do not pay dividends, because a "prudent" stock should have a history of stable dividend payments. Because investors in poorly governed companies are likely to face large risks of expropriation and other self-dealing problems, they may not earn fair rates of return or even fail to preserve the invested capital (i.e., fail to meet the prudent-person rule). Hence, institutional investors' fiduciary responsibilities give them a strong incentive to choose stocks of companies with good governance structure.<sup>5</sup>

Despite the free-rider problem, institutional investors have a much stronger incentive to monitor companies that they own than individual investors because of their larger stakes in those companies, especially if exit is costly (i.e., large trading costs). Bushee and Noe (2000) suggest

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<sup>5</sup> Hawley and Williams (2000) provide evidence that the fiduciary duty of institutional investors facilitates their predisposition to companies with good governance mechanisms.

that institutional investors prefer firms with better disclosure rankings to reduce monitoring costs. To the extent that companies that have better governance structures require less outside monitoring, institutional investors are likely to prefer companies with better governance mechanisms to those with poor governance mechanisms.

Institutional investors are more likely to prefer stocks with high secondary market liquidity than individual investors because the price impact of trades has greater consequences to institutional investors. The price impact has greater consequences to institutional investors than to individual investors because institutional investors typically trade in larger quantities than individual investors. Chung, Elder, and Kim (2009) argue that good governance improves financial and operational transparency and thus reduces information asymmetry between insiders and outside investors. They find that firms with better corporate governance exhibit higher stock market liquidity and lower trading costs (e.g., narrower quoted and effective spreads as well as the smaller price impact of trades). This is another reason why institutional investors are more likely to prefer stocks of better-governed companies than individual investors.

In short, we conjecture that institutional investors are more likely to prefer stocks of better-governed companies than individual investors because better-governed companies are likely to require less monitoring, have higher stock market liquidity, and are easier to meet fiduciary responsibilities. In what follows, we test our conjecture by examining whether a firm's institutional ownership increases with its governance quality.

### **III. Data Sources, Variable Definition, and Descriptive Statistics**

Our initial study sample includes all stocks listed on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ between January 2001 and



December 2006. We obtain stock market related data from both the Center for Research in Security Prices (CRSP) database and the NYSE's Trade and Quote (TAQ) database, accounting data from Standard & Poor's Compustat, analyst coverage data from the Institutional Brokers' Estimate System (IBES), institutional holding (13f) data from the Thomson Reuters Ownership Database, and corporate governance data from the Institutional Shareholder Service (ISS). We exclude observations with missing variables and winsorize Compustat-based and 13f-based variables at the 1<sup>st</sup> and 99<sup>th</sup> percentile to reduce the influence of extreme observations and possible data errors. We exclude financial companies (SIC codes 6000-6999) and utilities (SIC codes 4900-4949) from the study sample. Our final sample consists of 12,093 firm-year observations. We limit our study period to 2001-2006 because the ISS corporate governance data are available only for this period.

We measure firm  $i$ 's institutional ownership in year  $t$  ( $INST\_OWNERSHIP_{i,t}$ ) by the ratio of the number of shares held by institutional investors to the total number of shares outstanding. Similar to the coding methods used in Brown and Caylor (2006, 2009) and Chung, Elder, and Kim (2009), we calculate governance scores for each firm by assigning one point for each governance provision that meets the minimum standard provided in *ISS Corporate Governance: Best Practices User Guide and Glossary* (2003). [Brown and Caylor \(2006\)](#) construct their governance index using 51 governance standards (out of 61) included in the ISS database. Chung, Elder, and Kim (2009) select 24 governance standards that are most closely related to financial and operational transparency. Following Chung, Elder, and Kim (2009), we exclude "Director Education" category. Although [Brown and Caylor \(2006\)](#) omit firms with dual-class shares, we include the dual class standard into our governance index construction because Li, [Ortiz-Molina, and Zhao \(2008\)](#) show that it is an important determinant of institutional

investment decisions. In this way, we construct our governance score,  $GOV\_SCORE1_{i,t}$ , with the maximum value of 50 and the minimum value of zero. Appendix A shows the list of governance categories and standards that are used in our study. To assess the sensitivity our results to different measures of governance quality, we also construct the second governance score,  $GOV\_SCORE2_{i,t}$ , using only the 36 governance standards that are included in the ISS database for our entire study period from 2001 to 2006.<sup>6</sup>

We also calculate the following variables (for firm  $i$  in year  $t$ ) that are included in our regression analyses: the market value of equity ( $MVE_{i,t}$ ), the standard deviation of quote-midpoint daily returns ( $VOLATILITY_{i,t}$ ), the average ratio of monthly trading volume to the number of shares outstanding ( $TURNOVER_{i,t}$ ), the average stock price ( $PRICE_{i,t}$ ), the continuously compounded annual stock return ( $RETURN_{i,t}$ ), the average effective bid-ask spread ( $BASPREAD_{i,t}$ ), the number of years since the firm first appears in the CRSP database ( $FIRM\_AGE_{i,t}$ ), the ratio of total debt to the book value of total assets ( $LEVERAGE_{i,t}$ ), the annual dividend yield ( $D\_YIELD_{i,t}$ ), the ratio of net income to the book value of total assets ( $ROA_{i,t}$ ), Tobin's  $q$  ratio ( $TOBIN'S\ Q_{i,t}$ ) calculated using the method in [Chung and Pruitt \(1994\)](#), and the asset tangibility ratio ( $TANGIBILITY_{i,t}$ ) calculated using the method in Berger et al. (1996) and Almeida and Campello (2007).

Table 1 shows descriptive statistics on governance scores, institutional ownership, and other stock characteristics for our study sample of firms. The mean (median) value of  $GOV\_SCORE1$  is 23.65 (24), indicating that our sample firms meet about half of the governance

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<sup>6</sup> The number of governance standards included in the ISS database is much smaller prior to enactment of the Sarbanes-Oxley Act in 2002.

standards.<sup>7</sup> The mean (median) value of GOV\_SCORE2 is 20.11 (20). The mean (median) value of our sample firms' institutional ownership is 56.31% (61.23%). The mean and median values of market capitalization are \$3,600 million and \$446 million, respectively, indicating a high skewness in the distribution of firm size. The mean (median) value of the effective bid-ask spread is 0.0083 (0.0035) and the mean (median) value of TOBIN'S Q ratio is 1.7182 (1.2707). The mean (median) value of asset tangibility is 0.5181 (0.5146), indicating that our sample firms hold large amounts of tangible assets.

[Place Table 1 around here.]

#### **IV. Empirical Results**

This section presents the results of univariate tests and regression analyses on the relation between corporate governance and institutional ownership.

##### **A. Univariate Tests**

In each year, we sort firms according to governance scores and group them into governance-score quintiles.<sup>8</sup> We then aggregate all firm-year observations within each quintile across the six-year study period. Table 2 shows the mean and median institutional ownership of

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<sup>7</sup> Brown and Caylor (2006) and Chung, Elder, and Kim (2008) report similar results. The 99<sup>th</sup> percentile value of our GOV\_SCORE1 is 35, which is also in line with the maximum governance score of 38 (out of 51) reported in Brown and Caylor (2006).

<sup>8</sup> We report the results based on GOV\_SCORE1. We also conduct the same test using GOV\_SCORE2 and find qualitatively identical results.

firms within each quintile. The results show that institutional ownership increases monotonically with governance scores. The mean institutional ownership of firms that belong to the lowest governance-score quintile is 42%, whereas the corresponding figure is 71% for firms that belong to the highest governance-score quintile.

[Place Table 2 around here.]

We perform the *t*-test (Wilcoxon test) using data for each year to determine whether the mean (median) value of institutional ownership for firms that belong to the highest governance score quintile is statistically different from the corresponding value for firms that belong to the lowest governance score quintile. The results show that the difference in the mean (median) institutional ownership between the two quintiles is statistically significant at the 1% level in all sample years. The last two rows in Table 2 show the mean value of each statistic across years.

To determine whether the relation between institutional ownership and corporate governance varies across different types of institutions, we repeat the above analysis using data for each of the following five types of institutions based on Thomson's classification: (1) bank trust departments; (2) insurance companies; (3) investment companies; (4) independent investment advisors; and (5) others (e.g., pension funds, foundations, and university endowments).<sup>9</sup> The results show that firms with higher governance scores exhibit greater institutional ownerships across all types of institutions. For example, for Type 1 institutions

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<sup>9</sup> CDA/Spectrum's classification of institutional investors is not reliable from 1998 forward. (See "Known problems and issues" about CDA 13f data on <http://wrds.wharton.upenn.edu/ds/tfn/sp34/doc.shtml>.) Therefore, we use the pre-1998 classification.

(banks), the mean and median institutional holdings of firms that belong to the lowest governance-score quintile are 4.87% and 3.24%, whereas the corresponding figures for firms that belong to the highest governance-score quintile are 9.82% and 9.40%, respectively. The difference in the mean (median) institutional ownership between the two quintiles is statistically significant at the 1% level in each year of our study period across all types of institutions.

## **B. Regression Results using the Level Variables**

Although the results in Table 2 are consistent with the conjecture that firms with better governance structure attract more institutional investors, the relation between the two variables may be driven by their respective correlations with other variables. Falkenstein (1996) and Huang (2008) show that mutual funds prefer stocks with higher market liquidity. Chung, Elder, and Kim (2009) find that firms with better governance structure tend to have higher stock market liquidity (e.g., narrower quoted and effective spreads). Consequently, the relation between institutional ownership and governance scores may be due to their respective correlations with liquidity. In addition, prior research identifies a number of variables that affect institutional investors' portfolio decisions. Gompers and Metrick (2001) find that institutional investors prefer stocks of larger companies, while Grinstein and Michaely (2005) show that institutional investors prefer firms that pay smaller dividends among dividend-paying firms. Badrinath, Kale, and Ryan (1996) show that institutional investors prefer firms with safety net characteristics, such as established (old) companies, low return volatility, and low financial leverage. Gompers, Ishii, and Metrick (2003) show that firms with stronger shareholder rights exhibit higher stock returns and better operating performance.

To examine the relation between institutional ownership and corporate governance after controlling for the factors that are associated with both or either one of the two variables, we estimate the following regression model:

$$(1) \quad \text{INST\_OWNERSHIP}_{i,t} = \beta_0 + \beta_1 \text{GOV\_SCORE}_{i,t} + \beta_2 \text{Log(MVE}_{i,t}) + \beta_3 \text{VOLATILITY}_{i,t} \\ + \beta_4 \text{TURNOVER}_{i,t} + \beta_5 \text{Log(PRICE}_{i,t}) + \beta_6 \text{RETURN}_{i,t} + \beta_7 \text{BASPREAD}_{i,t} \\ + \beta_8 \text{FIRM\_AGE}_{i,t} + \beta_9 \text{TOBIN'S Q}_{i,t} + \beta_{10} \text{TANGIBILITY}_{i,t} \\ + \beta_{11} \text{LEVERAGE}_{i,t} + \beta_{12} \text{D\_YIELD}_{i,t} + \beta_{13} \text{ROA}_{i,t} + \beta_{14} \text{S\&P 500}_{i,t} + \varepsilon_{i,t};$$

where all variables are the same as defined in Section III.

Panel A of Table 3 shows the OLS regression results with clustered standard errors at the firm level that are estimated from 12,093 firm-year observations (we include year dummies in the regression model). The clustered standard errors correctly account for the dependence in the data common in a panel data set and produce unbiased estimates. See [Petersen \(2009\)](#) for a detailed description of this method in the context of financial research. To assess the sensitivity of our results with respect to different estimation methods, we also estimate regression model (1) using the Fama-MacBeth method and report the results in Panel A.<sup>10</sup> Columns 1 and 2 show the results using GOV\_SCORE1 and columns 3 and 4 show the results using GOV\_SCORE2. The results show that the coefficients on both GOV\_SCORE1 and GOV\_SCORE2 are positive and statistically significant, indicating that the positive relation between institutional ownership and corporate governance quality remains intact even after controlling for other possible determinants of institutional ownership. The relation between institutional ownership and

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<sup>10</sup> Following [Fama and MacBeth \(1973\)](#), we first run cross-sectional regression using data for each year and then perform the *t*-test using the estimated regression coefficients across years. For each variable, we show the mean regression coefficient across years and its *t*-value. The high *t*-values are largely due to small variation in the estimated regression coefficients across years.

corporate governance is economically significant: an increase in governance score from the 25<sup>th</sup> to 75<sup>th</sup> percentile results in an increase in institutional ownership by 14%.<sup>11</sup>

[Place Table 3 around here.]

It is important to note that annual ISS governance data are gathered from proxy statements that are usually collected during the first half of each year and thus they may capture the governance structure during the second half of previous year.<sup>12</sup> Note also that our institutional ownership variable is constructed based on the year-end holding data. Hence, the positive relation between institutional ownership and governance score shown in Table 3 is more likely to indicate causality from governance to institutional ownership (i.e., better governance helps attract institutional investors) than the other way around.

Consistent with the results of previous studies, we find that institutional investors prefer large companies (see, e.g., [Gompers and Metrick \(2001\)](#)), value stocks, liquid stocks (see, e.g., [Falkenstein \(1996\)](#) and [Huang \(2008\)](#)), but avoid firms with greater return volatility (see, e.g., [Badrinath, Kale, and Ryan \(1996\)](#)) and high cash dividends (see, e.g., [Grinstein and Michaely \(2005\)](#)). Consistent with the street wisdom, we find that institutional investors prefer higher

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<sup>11</sup> Note that  $0.0088 \times (28 - 19) / 0.5631 = 14.1\%$ , where 0.0088 is the estimated coefficient on GOV\_SCORE1 in Table 3 (Panel A), 28 is the 75<sup>th</sup> percentile value of GOV\_SCORE1, 19 is the 25<sup>th</sup> percentile value of GOV\_SCORE1, and 0.5631 is the mean aggregate institutional ownership of our sample firms. Similarly, we obtain  $0.0104 \times (24 - 16) / 0.5631 = 14.8\%$  using GOV\_SCORE2.

<sup>12</sup> For example, Amylin Pharmaceuticals, Inc. began to meet the governance standard that “the positions of chairman and CEO should be separated,” from September 2003. However, this change shows up in the ISS database only from 2004.

priced stocks as well. We obtain qualitatively identical results from the pooled OLS regressions and the Fama-MacBeth regressions.

Different types of institutions are likely to have different investment objectives, investment horizons, or fiduciary responsibilities. To determine whether they exhibit different preferences toward corporate governance structure (after controlling for other possible determinants of institutional ownership), we re-estimate the above regression model using the percentage of shares held by each type of institution. The results (see Panel B of Table 3) show that all five types of institutional ownership are positively and significantly related to governance score and that the strength of the relation (as measured by *t*-statistics) varies across the types of institutions.<sup>13</sup>

Although we postulate that better corporate governance causes higher institutional ownership, the positive relation between the two variables may be driven by reverse causality, i.e., institutional investor activism causes firms to adopt better governance mechanisms. Prior research on the effectiveness of shareholder activism offers mixed results. Studies that look at market reactions to shareholder proposals generally find no significant abnormal returns (see, e.g., [Song and Szewczyk \(2003\)](#)).<sup>14</sup> Gillan and Starks (2000) analyze the effectiveness of shareholder activism by institutional and individual investors by looking at how other shareholders react to the type of proposal and the identity of the proposal sponsor. They measure

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<sup>13</sup> We report only the coefficients on GOV\_SCORE1. The results are qualitatively identical for GOV\_SCORE2.

<sup>14</sup> [Brav et al. \(2008\)](#) and [Klein and Zur \(2009\)](#) find significant abnormal returns around the announcement of shareholder activism. However, [Brav et al. \(2008\)](#) find that the market reaction to governance-related activism is insignificantly different from zero.



shareholder reactions by both the voting outcome on the proxy proposals and the stock market reaction to the proposals. They show that the proposals sponsored by active individual investors garner fewer votes and are accompanied by a small, positive stock return, whereas the proposals sponsored by institutional investors (i.e., public pension funds) or coordinated groups of investors receive more votes and are accompanied by a small, but measurable negative stock return. The authors also find that institutional investors submit less than 30% of the proposals during 1987-1994 and almost all of these institutional proposals are submitted by public pension funds (i.e., Type 5 institutional investors in our study).

As shown in Table 2 and Panel B of Table 3 above, all types of institutional ownership, including those of active and non-active institutions, are positively related to corporate governance scores. In an unreported test that excluded public pension funds from Type 5 institutional investors, we still find that firms with higher governance scores exhibit greater Type 5 institutional ownerships. These results add credence to our conjecture that the positive relation between institutional ownership and corporate governance may be driven, at least in part, by institutional preference toward companies with better governance structure.<sup>15</sup>

### **C. The Two-Stage Least Squares Regression Results**

To further address the endogeneity issue, we employ the two-stage least squares (2SLS) method using instrumental variables that are related to our governance scores, but unlikely to be

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<sup>15</sup> When institutional investors are dissatisfied with a firm's performance or governance structure, it may be more rational for them to follow the so-called "Wall Street Walk" rule and sell their shares than to become an active shareholder, because being an active shareholder could be costly and subject to a free rider problem.

correlated with residuals in the second-stage regression. [Fama and Jensen \(1983\)](#) suggest that firms with diverse and complex business operations are likely to have better corporate governance (e.g., independent boards) because such firms are likely to benefit more from good internal governance. It is difficult for outside shareholders to monitor and evaluate managers when the firm has complex business operations. Consequently, outside shareholders have a greater incentive to take measures that can improve internal governance. [Boone et al. \(2007\)](#), [Linck et al. \(2008\)](#), and [Lehn et al. \(2009\)](#) make similar arguments and provide evidence that the firm's operational complexity is one of the important determinants of board characteristics. Based on these considerations, we employ a measure of the firm's operational complexity, the logarithm of the number of business segments,  $\text{Log}(\text{N\_SEGMENT})$ , as an instrumental variable.<sup>16</sup>

[Hermalin and Weisbach \(1998\)](#) suggest that board independence depends on CEO bargaining power that derives from perceived ability. They predict that board independence will decline with CEO tenure, a proxy for the CEO's perceived ability and expertise. Consistent with this prediction, [Baker and Gompers \(2003\)](#) find evidence that board independence decreases with CEO tenure. We conjecture that other corporate governance mechanisms may also be chosen through a bargain process partially controlled by the CEO.<sup>17</sup> Therefore, overall governance

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<sup>16</sup> We find qualitatively similar results when we use the number of geographic segments as a proxy for the firm's operational complexity.

<sup>17</sup> Of the governance standards that are used to construct our governance scores, four of them are directly related to board independence. These standards are: (1) at least two-thirds of the directors should be independent; (2) nominating committee should be composed solely of independent directors; (3) compensation committee should be composed solely of independent directors; and (4) audit committee should be composed solely of independent directors.

mechanisms, which are designed to reveal and reduce the CEO's non-contractible control benefit, would be weaker if the CEO's bargain power and perceived ability are greater. Based on these considerations, we use the number of years as the CEO (CEO\_TENURE) as another instrumental variable.

In the first stage, we regress governance scores on the two instrumental variables discussed above and all of the exogenous variables in the second-stage regression. In the second stage, we regress institutional ownership on the predicted values of governance scores (from the first-stage regression) and all other explanatory variables in regression model (1). We obtain data on the number of business segments from the Compustat Business Information File and CEO tenure from the Compustat ExecuComp database.<sup>18</sup> Columns 5 and 7 of Panel A in Table 3 show the results of the first-stage regressions and columns 6 and 8 show the results of the second-stage regressions. Both the first- and second-stage regression results are based on clustered standard errors at the firm level. We also report the *F*-statistic for testing the joint statistical significance of instruments and the Sargan statistic for testing whether instruments are uncorrelated with the residuals in the second-stage regression.

Consistent with our conjecture, we find that the estimated coefficients on the number of business segments in the first-stage regressions are statistically significant and positive and those on CEO tenure are significant and negative. The *F*-test rejects the null hypothesis that the coefficients on the instruments are jointly zero. Moreover, the results of the Sargan test of overidentifying restrictions do not reject the null hypothesis that our instrumental variables are uncorrelated with the residuals in the second-stage regressions.

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<sup>18</sup> Compustat ExecuComp database mainly covers companies included in the S&P 1500 Index. As a result, our 2SLS regressions are based on much smaller sample sizes (relative to those used in OLS regressions).

More important, the results show that the coefficients on the instrumented governance scores are statistically significant and positive in the second-stage regressions, indicating that the positive effect of governance scores on institutional ownership remains intact even after controlling for the potential endogeneity problem. When we estimate the 2SLS model using the percentage of shares held by each type of institution as the dependent variable in the second-stage regressions, we find (for brevity, Panel C of Table 3 reports only the coefficients on the instrumented governance scores) that all five types of institutional ownership are positively related to the instrumented governance scores and four of those coefficients are statistically significant.

#### **D. Regression Results using Changes in Variables**

Regression analyses using changes in variables are generally less likely to show spurious relations than those using level variables. Hence, we examine whether year-to-year changes in institutional ownership can be explained by contemporaneous changes in governance scores. We have assumed so far that the relation between corporate governance and institutional ownership is contemporaneous. However, the effect of corporate governance on institutional ownership may be gradual. For example, the change in governance score in year  $t$  may have an impact on institutional ownership in both year  $t$  and year  $t + 1$ . To examine this possibility, we also estimate the model after we include both the contemporaneous and previous year's changes in governance score in the regression model, together with contemporaneous changes in the control variables.

Panel A of Table 4 shows that changes in institutional ownership are significantly and positively related to changes in governance score. Moreover, columns 2 and 4 show that the

coefficients on the previous year's change in governance score are also positive, although only one of them is statistically significant. These results suggest that institutional investors make gradual adjustments in their positions to changes in the firm's governance structure. The coefficients on the control variables have expected signs: institutional investors prefer stocks of larger companies as well as stocks with lower return volatility and higher liquidity.

[Place Table 4 around here.]

Although our study has established a positive relation between institutional ownership and broadly constructed governance scores, it would be of more practical importance to corporate directors to identify specific governance factors that are likely to be most effective in attracting institutional investors. The most effective way to attract institutional investors would be to improve those governance factors that are most strongly related to institutional ownership. To address this issue, we re-estimate the above regression model after we replace  $\Delta\text{GOV\_SCORE}_{i,t}$  with changes in the 36 governance provisions that have no missing observation during our study period. Panel B of Table 4 shows the ten governance factors whose changes are most significantly (i.e., largest  $t$ -statistics) and positively related to the changes in institutional ownership. Not surprisingly, these governance factors mainly concern either the composition/operation of board of directors or provisions that are designed to strengthen shareholder rights.<sup>19</sup>

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<sup>19</sup> Consistent with Li, Ortiz-Molina, and Zhao (2008), we find that the dual-class structure is an important determinant of institutional investment decisions.

## **E. Fixed Effects Regression Results**

We use the fixed effects regression model to further examine the relation between institutional ownership and corporate governance. This model controls for omitted variables that differ across firms but do not change over time and relies on time-series variations in variables to identify the relation between corporate governance and institutional ownership. The results (see column 1 of Panel A in Table 5) show that corporate governance scores are again significantly and positively related to institutional ownership.<sup>20</sup> These results are consistent with our earlier finding, supporting the hypothesis that firms with better governance mechanisms attract more institutional investors.

[Place Table 5 around here.]

## **F. Regression Results using the Lagged Dependent Variable as an Independent Variable**

As pointed out earlier, the positive regression coefficients on governance scores in Table 3 could be due to reverse causality: higher institutional ownership caused managers to adopt better governance mechanisms. Klein (1998), Klock, Mansi, and Maxwell (2005), and Brown and Caylor (2006) control for this possible reverse causality by including the lagged dependent variable in the regression model. Following these studies, we include one-year lagged institutional ownership in regression model (1) as an additional control variable.<sup>21</sup> The pooled

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<sup>20</sup> In Table 5 we only report the regression results using GOV\_SCORE1. We also performed the same robustness tests using GOV\_SCORE2 and found qualitatively similar results.

<sup>21</sup> We obtain qualitatively similar results when we include two-year lagged institutional ownership in the regression model as an additional control variable.

OLS regression results with clustered standard errors (see column 2 of Panel A in Table 5) show that the coefficient on corporate governance score remains to be positive and significant.

#### **G. Regression Results using Institutional Herding as an Additional Control Variable**

Previous studies show that institutional investors often herd in their investment decisions (see, e.g., [Nofsinger and Sias \(1999\)](#) and [Sias \(2004\)](#)). If institutional herding is correlated with a firm's corporate governance, it could bias our inference because the omitted variable, institutional herding, could cause higher levels of institutional ownership in good governance firms. We add one more control variable, HERDING, which measures the extent of herding (see [Lakonishok, Shleifer and Vishny \(1992\)](#)).<sup>22</sup> The pooled OLS regression results with clustered standard errors (see column 3 of Panel A in Table 5) show that the coefficient on HERDING is positive and significant. More important, the regression coefficient on governance score is positive and significant, suggesting that the omitted-variable problem is unlikely to explain our results.

#### **H. Regression Results using Analyst Following as an Additional Control Variable**

Another variable that may be correlated with institutional ownership is the number of financial analysts following the company. For example, [O'Brien and Bhushan \(1990\)](#) find a positive relation between analyst following and institutional ownership. Therefore, we include the number of analysts following the firm as an additional control variable. Consistent with the finding of [O'Brien and Bhushan \(1990\)](#), our pooled OLS regression results with clustered

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<sup>22</sup> Following [Lakonishok, Shleifer, and Vishny \(1992\)](#), we measure institutional herding by the ratio of the number of net buyers to the total number of net buyers and net sellers.

standard errors (see column 4 of Panel A in Table 5) show that institutional ownership is significantly and positively related to the number of analyst following. Furthermore, we find that the coefficient on corporate governance score remains positive and significant.

### **I. Using the Proportion of Institutions that Hold the Firm's Shares as the Dependent Variable**

To further assess the robustness of our results, we perform an alternative test of our hypothesis by examining the relation between the firm's governance score and the proportion of institutions that hold its shares,  $P\_INST_{i,t}$ . We calculate  $P\_INST_{i,t}$  by dividing the number of institutions that hold firm  $i$  in year  $t$  by the total number of institutions in year  $t$ .<sup>23</sup> The pooled OLS regression results with clustered standard errors (see column 5 of Panel A in Table 5) show that companies with higher governance scores attract more institutional investors as well. When we estimate the model using data for each type of institution, we find (see Panel B in Table 5) that  $P\_INST_{i,t}$  is significantly and positively related to governance scores across all types of institutions, indicating that firms with better corporate governance attract more institutions regardless of their types.

To assess the economic significance, we measure the effect of a firm's governance quality on the proportion of institutions that hold its shares. The results (see column 5 of Panel A in Table 6) show that the estimated regression coefficient on  $GOV\_SCORE1$  is 0.0161. This implies that an increase in governance score from the 25<sup>th</sup> to 75<sup>th</sup> percentile results in a 0.1449 increase in  $\text{Log}(P\_INST)$ ,<sup>24</sup> which is equivalent to an 15.6% increase in  $P\_INST$  for the average

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<sup>23</sup> We use  $\text{Log}(P\_INST)$  in the regression to reduce the effect of outliers. We obtain qualitatively identical results when we use the *number* of institutions that hold the firm's shares as the dependent variable.

<sup>24</sup> Note that  $0.0161 * (28 - 19) = 0.1449$ , where 0.0161 is the estimated regression coefficient on



firm.<sup>25</sup> Overall, our empirical results are consistent with the prediction of prior theoretical work that better corporate governance helps expand the investor base (see Shleifer and Vishny (1997)).

## **J. 2SLS Results for Robustness Checks**

Panel C of Table 5 reports the coefficients on the instrumented governance scores (from 2SLS regressions) in the robustness-check regressions. Similar to columns 1 through 5 of Panel A in Table 5, columns 1 through 5 of Panel C in Table 5 show the fixed effects regression results, the results using Lag(INST\_OWNERSHIP), institutional herding, or the number of analysts as an additional control variable, and the results using Log(P\_INST<sub>*i,t*</sub>) as the dependent variable, respectively. We use clustered standard errors at the firm level for regression results reported in columns 2 through 5 of Panel C in Table 5. The results show that the coefficients on the instrumented governance scores are all statistically significant and positive, except for the coefficient from the fixed effects regression.<sup>26</sup> When we estimate the 2SLS model using data for each type of institution, we find (see Panel D in Table 5) that P\_INST<sub>*i,t*</sub> is positively related to

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GOV\_SCORE1, 28 is the 75<sup>th</sup> percentile value of GOV\_SCORE1 and 19 is the 25<sup>th</sup> percentile value of GOV\_SCORE1.

<sup>25</sup> If the average firm in our study sample improves its governance score from 19 to 28, the percentage change in P\_INST would be equal to  $[(\exp(\text{Log}(0.0505) + 0.1449) - 0.0505)]/0.0505 = (0.0584 - 0.0505)/0.0505 = 15.6\%$ , where 0.0505 is the mean value of P\_INST in 2006 for our study sample of firms.

<sup>26</sup> Fixed effects regressions rely on time-series variation in variables to determine the relation between the dependent variable and the independent variable. The insignificant coefficient on the instrumented governance score from the fixed effects regression may be attributed, at least in part, to small year-to-year variations in our instrumental variables (i.e., the number of business segments and CEO tenure).

governance scores across all types of institutions, although only three of them are statistically significant. Based on these results, we conclude that our main results are not likely driven by reverse causality.

## **V. Institutional Ownership, Corporate Governance, and the Firm's Information Environment**

In this section, we examine whether the relation between institutional ownership and corporate governance varies across firms. The extent to which a firm's governance quality affects institutional investors' decisions is likely to depend on the firm's information environment. We conjecture that institutional investors' decisions are less likely to be influenced by governance quality for companies that are subject to lower information asymmetry. The relative importance of corporate governance to institutional investors is likely to be smaller for these companies because the conflict of interest between insiders (e.g., managers) and outsiders (investors) is likely to be smaller when there is lower information asymmetry between them. [Diamond \(1985\)](#) shows that a decrease in information asymmetry between management and traders results in a decrease in the latter's incentive to acquire private information, leading to lower information asymmetry among traders. In our study, we utilize several empirical proxies of information asymmetry that are frequently used in the market microstructure literature: the quoted and effective bid-ask spreads, the price impact of trades, and the probability of information-based trading (PIN).

We measure the quoted spread of stock (firm)  $i$  at time  $\tau$  by  $QUOTED\_SPREAD_{i,\tau} = (ASK_{i,\tau} - BID_{i,\tau})/M_{i,\tau}$ ; where  $ASK_{i,\tau}$  is the ask price at time  $\tau$ ,  $BID_{i,\tau}$  is the bid price at time  $\tau$ , and  $M_{i,\tau}$  is the mean of  $ASK_{i,\tau}$  and  $BID_{i,\tau}$ . For each stock, we then calculate the time-weighted average quoted spread during each year from 2001 through 2006. We measure the effective spread of

stock  $i$  at time  $\tau$  by  $\text{EFFECTIVE\_SPREAD}_{i,\tau} = 2D_{i,\tau} (P_{i,\tau} - M_{i,\tau})/M_{i,\tau}$ ; where  $P_{i,\tau}$  is the transaction price at time  $\tau$ ,  $M_{i,\tau}$  is the midpoint of the most recently posted bid and ask quotes, and  $D_{i,\tau}$  is a binary variable which equals one for customer buy orders and negative one for customer sell orders. We estimate  $D_{i,\tau}$  using the algorithm in Ellis, Michaely, and O'Hara (2000). For each stock, we then calculate the trade-weighted average effective spread during each year. We measure the price impact of trades by  $\text{PRICE IMPACT}_{i,\tau} = 100 D_{i,\tau}[(M_{i,\tau+5} - M_{i,\tau}) / M_{i,\tau}]$ , where  $M_{i,\tau}$  and  $M_{i,\tau+5}$  are quote midpoints at time  $\tau$  and  $\tau + 5$  minutes, respectively. The mean value of price impact during each year is calculated by weighting each trade equally. We estimate the probability of information-based trading (PIN) using the sequential trade model of Easley, Kiefer, O'Hara, and Paperman (EKOP) (1996).<sup>27</sup>

Institutional investors' decisions are also less likely to be driven by the firm's governance quality if there already exists a strong external monitoring. Jensen and Meckling (1976) and

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<sup>27</sup> The EKOP model of the trade process for firm  $i$  on day  $j$  is represented by the following likelihood function:

$$L_i(B_{i,j}, S_{i,j} | \theta_i) = (1 - \alpha_i) e^{-\varepsilon_i T_{i,j}} \frac{(\varepsilon_i T_{i,j})^{B_{i,j}}}{B_{i,j}!} e^{-\delta_i T_{i,j}} \frac{(\delta_i T_{i,j})^{S_{i,j}}}{S_{i,j}!} + \alpha_i \delta_i e^{-\delta_i T_{i,j}} \frac{(\delta_i T_{i,j})^{B_{i,j}}}{B_{i,j}!} e^{-(\mu_i + \varepsilon_i) T_{i,j}} \frac{[(\mu_i + \varepsilon_i) T_{i,j}]^{S_{i,j}}}{S_{i,j}!} + \alpha_i (1 - \delta_i) e^{-(\mu_i + \varepsilon_i) T_{i,j}} \frac{[(\mu_i + \varepsilon_i) T_{i,j}]^{B_{i,j}}}{B_{i,j}!} e^{-\varepsilon_i T_{i,j}} \frac{(\varepsilon_i T_{i,j})^{S_{i,j}}}{S_{i,j}!};$$

where  $B_{i,j}$  is the number of buyer-initiated trades,  $S_{i,j}$  is the number of seller-initiated trades,  $\alpha_i$  is the probability that an information event has occurred,  $\delta_i$  is the probability of a low signal given an event has occurred,  $\mu_i$  is the probability that a trade comes from an informed trader given an event has occurred,  $\varepsilon_i$  is the probability that the uninformed traders will actually trade,  $T_{i,j}$  is total trading time for the day, and  $\theta_i = (\alpha_i, \delta_i, \varepsilon_i, \mu_i)$  represents the vector of parameters to be estimated. We estimate these parameters  $\theta_i$  for firm  $i$  for each year by maximizing the joint likelihood over the  $J$  observed trading days in a calendar year. We then estimate the probability of information-based trading (PIN) for each year by

$$\text{PIN}_i = \frac{\hat{\alpha}_i \hat{\mu}_i}{\hat{\alpha}_i \hat{\mu}_i + 2\hat{\varepsilon}_i}.$$

Chung and Jo (1996) suggest that security analysts' monitoring of corporate performance motivates managers and thus reduces the agency costs associated with the separation of ownership and control. Consequently, we conjecture that institutional investors' decision to include a firm's stock in their portfolios is less influenced by the firm's governance quality if there are more analysts following the firm.

We sort firms according to the four measures of information asymmetry and the number of analysts in each year and group them into quintiles. Next, we aggregate observations in each quintile across years. We then estimate regression model (1) using data for each quintile and report the results in Panel A of Table 6. For brevity, we report only the regression coefficients on governance score and the associated *t*-statistics from pooled OLS regressions with clustered standard errors at the firm level (that include both year and industry dummy variables). The results show that the relation between institutional ownership and governance quality tends to be weaker (i.e., smaller *t*-statistics) among companies with smaller (quoted and effective) spreads, smaller price impact, lower PIN values, and higher analyst following.

[Place Table 6 around here.]

To further examine how information asymmetry and analyst following moderate the relation between institutional ownership and corporate governance, we estimate the following model:

$$\begin{aligned}
 (2) \quad \text{INST\_OWNERSHIP}_{i,t} = & \beta_0 + \beta_1 \text{GOV\_SCORE1}_{i,t} + \beta_2 \text{GOV\_SCORE1} * \text{Q\_Dummy}_{i,t} \\
 & + \beta_3 \text{Q\_Dummy}_{i,t} + \beta_4 \text{Log(MVE}_{i,t}) + \beta_5 \text{VOLATILITY}_{i,t} + \beta_6 \text{TURNOVER}_{i,t} \\
 & + \beta_7 \text{Log(PRICE}_{i,t}) + \beta_8 \text{RETURN}_{i,t} + \beta_9 \text{FIRM\_AGE}_{i,t} + \beta_{10} \text{TOBIN'S Q}_{i,t} \\
 & + \beta_{11} \text{TANGIBILITY}_{i,t} + \beta_{12} \text{LEVERAGE}_{i,t} + \beta_{13} \text{D\_YIELD}_{i,t} + \beta_{14} \text{ROA}_{i,t} \\
 & + \beta_{15} \text{S\&P 500}_{i,t} + \varepsilon_{i,t};
 \end{aligned}$$

where  $Q\_Dummy_{i,t}$  is equal to one for firms with the smallest (quintile 1) spreads, price impact, or PIN, and zero otherwise. Similarly,  $Q\_Dummy_{i,t}$  is equal to one for firms with the largest (quintile 5) analyst following, and zero otherwise. All other variables are the same as defined in Section III. Regression results reported in Panel B of Table 6 show that the coefficients ( $\beta_2$ ) on the interaction term are all statistically significant and negative. We interpret this result as evidence that the relation between institutional ownership and governance quality is weaker among firms with lowest information asymmetry and highest analyst following.<sup>28</sup>

Overall, our results are consistent with the hypothesis that the extent to which corporate governance structure matters in institutional investors' stock selection decisions depends on the firm's informational environments: corporate governance quality matters less in institutional investors' stock selection decisions for firms with low information asymmetry and/or high external monitoring.

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<sup>28</sup> To determine whether the results in Table 6 are driven by reverse causality, we replicate Panel A and Panel B of Table 6 using the 2SLS regression method. As in other tables, we use the number of business segments and CEO tenure as instrumental variables. As pointed out earlier, Compustat ExecuComp database mainly covers companies included in the S&P 1500 Index and, as a result, our 2SLS regressions are based on much smaller sample sizes (relative to OLS regressions). As a result, we group our sample firms into terciles (instead of quintiles) according to the four measures of information asymmetry and the number of analysts in each year and repeat the test. The results are qualitatively similar to those presented in Table 6. The results are available from the authors upon request.

## VI. Summary and Concluding Remarks

In this study, we analyze the relation between corporate governance structure and institutional investors' stock selection decisions. We conjecture that institutional investors prefer stocks of better-governed companies for fiduciary responsibilities, monitoring costs, and liquidity reasons, and find evidence that is consistent with the conjecture. Specifically, we find that the fraction of a firm's shares that are held by institutional investors increases with two comprehensive measures of the quality of the firm's governance that are constructed from 50 governance factors. Our results also show that the proportion of institutions that hold a firm's shares increases with its governance quality. We perform a number of robustness checks and show that our main results are robust.<sup>29</sup>

Previous studies suggest that corporate governance matters only in countries with poor legal protections. For instance, Dahlquist et al. (2003), Bushee, Carter and Gerakos (2008) and Leuz, Lins, and Warnock (2009) suggest that institutional investors prefer good governance companies only in countries with weak country-level legal protections. In contrast, our study shows that firm-level corporate governance matters for institutional investors' stock selection decisions even in a country with strong country-level legal protections, such as the U.S.

Our results suggest a possible channel through which corporate governance affects stock returns. Gompers, Ishii, and Metrick (2003) show that U.S. companies with weak corporate governance have earned negative abnormal returns and those with strong corporate governance

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<sup>29</sup> We acknowledge that institutional ownership would be positively related to governance score even if institutional and individual investors have the *same* preference toward companies with better governance structure, as long as institutional investors are more knowledgeable than individual investors about the importance of some of the factors of good governance.

have earned positive abnormal returns during 1990s. As corporate governance became an increasingly important investment criterion for institutional investors in the 1990s, institutional investors might have voted with feet by selling shares of firms with poor governance and buying shares of companies with good corporate governance during this period. The shift in the demand of institutional investors from stocks of poorly governed companies to stocks of better governed companies might have led to a decrease in the share price of poorly governed companies and an increase in the share price of better governed companies. These considerations suggest that the relation between corporate governance and abnormal stock returns documented in Gompers, Ishii, and Metrick (2003) might have been driven, at least in part, by the effect of corporate governance on institutional investment.

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TABLE 1

**Descriptive Statistics**

This table shows descriptive statistics on governance scores, institutional ownership, and other stock characteristics. GOV\_SCORE1 and GOV\_SCORE2 denote the governance score for each firm in a specific year. We determine whether a particular governance standard is met using the minimum standard provided in *ISS Corporate Governance: Best Practices User Guide and Glossary* (2003). We then obtain the governance score for each firm by awarding one point for each governance standard that is met. INST\_OWNERSHIP is the ratio of the number of shares held by institutional investors to the total number of shares outstanding, MVE is the market value of equity, VOLATILITY is the standard deviation of quote-midpoint daily returns, TURNOVER is the average ratio of monthly trading volume to the number of shares outstanding, PRICE is annual average stock price, RETURN is the continuously compounded annual stock return, BASPREAD is the mean effective bid-ask spread, FIRM\_AGE is the number of years since the firm first appears in the CRSP database, TOBIN'S Q is the Tobin's  $q$  ratio calculated using the method in Chung and Pruitt (1994), TANGIBILITY is the asset tangibility ratio calculated using the method in Berger et al. (1996) and Almeida and Campello (2007), LEVERAGE is the ratio of total debt to the book value of total assets, D\_YIELD is the annual dividend yield, ROA is the ratio of net income to the book value of total assets, and S&P 500 equals one if the firm is included in the S&P 500 index and zero otherwise.

Variables	Mean	Standard Deviation	Percentile						
			1	5	25	50	75	95	99
GOV_SCORE1	23.6462	5.8016	12.0000	14.0000	19.0000	24.0000	28.0000	33.0000	35.0000
GOV_SCORE2	20.1069	4.5084	11.0000	13.0000	16.0000	20.0000	24.0000	28.0000	29.0000
INST_OWNERSHIP	0.5631	0.2780	0.0048	0.0558	0.3501	0.6123	0.7948	0.9407	0.9847
MVE (in \$ millions)	3600.85	16546.46	10.69	27.54	146.74	446.11	1549.77	13765.97	64220.51
VOLATILITY	0.0309	0.0149	0.0101	0.0134	0.0205	0.0278	0.0378	0.0581	0.0799
TURNOVER	1.6462	2.0814	0.0879	0.1987	0.6246	1.1640	2.0397	4.4379	8.7576
PRICE	21.0106	26.4974	1.2659	2.3554	7.2849	15.8197	28.5500	54.2583	78.1139
RETURN	0.2158	0.5872	-0.7120	-0.5095	-0.1449	0.1134	0.4243	1.3387	2.4259
BASPREAD	0.0083	0.0148	0.0004	0.0006	0.0014	0.0035	0.0097	0.0305	0.0567
FIRM_AGE	17.3147	16.2267	1.0000	2.0000	6.0000	11.0000	23.0000	45.0000	78.0000
TOBIN'S Q	1.7182	1.5230	0.1887	0.4718	0.8684	1.2707	2.0376	4.4634	7.9432
TANGIBILITY	0.5181	0.1742	0.1223	0.2358	0.4055	0.5146	0.6163	0.8383	0.9430
LEVERAGE	0.1848	0.2033	0	0	0.0037	0.1404	0.2956	0.5473	0.8380
D_YIELD	0.0083	0.0359	0	0	0	0	0.0071	0.0368	0.0886
ROA	0.0085	0.1399	-0.5167	-0.3055	-0.0129	0.0389	0.0789	0.1597	0.2561
S&P 500	0.1834	0.2787	0	0	0	0	0	1	1

TABLE 2

**Institutional Ownership and Governance Score**

In each year, we sort firms according to governance scores and group them into governance-score quintiles. We then aggregate all firm-year observations within each quintile across the six-year study period. The first column shows the mean and median institutional ownership of firms within each quintile. To determine whether the relation between institutional ownership and corporate governance varies across different types of institutions, we repeat the above procedure using data for each of the following five types of institutions based on Thomson's classification: (1) bank trust departments; (2) insurance companies; (3) investment companies; (4) independent investment advisors; and (5) others (e.g., pension funds, foundations, and university endowments). We perform the *t*-test (Wilcoxon test) using data for each year to determine whether the mean (median) value of institutional ownership for firms that belong to the highest governance score quintile is statistically different from the corresponding value for firms that belong to the lowest governance score quintile. The last two rows show the mean value of each statistic across years.

	Total Institutional Ownership		Type 1 (Banks)	Type 2 (Insurance Companies)	Type 3 (Investment Companies)	Type 4 (Independent Investment Advisors)	Type 5 (Other Institutions: Pension Funds, Foundations, University Endowments)					
Governance Score Quintile	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median		
1 (Lowest)	0.4220	0.4031	0.0487	0.0324	0.0203	0.0107	0.0689	0.0482	0.2309	0.2146	0.0770	0.0576
2	0.4805	0.4885	0.0516	0.0406	0.0230	0.0124	0.0783	0.0581	0.2604	0.2545	0.0873	0.0699
3	0.5627	0.6109	0.0665	0.0596	0.0244	0.0155	0.0900	0.0745	0.2975	0.3003	0.1014	0.0849
4	0.6441	0.7057	0.0824	0.0798	0.0301	0.0201	0.1036	0.0940	0.3314	0.3379	0.1090	0.0970
5 (Highest)	0.7077	0.7486	0.0982	0.0940	0.0328	0.0231	0.1220	0.1138	0.3436	0.3435	0.1167	0.1044
Mean <i>t</i> -values (Student's <i>t</i> -test)	16.82		12.64		5.81		10.70		10.73		8.42	
Mean <i>z</i> -values (Wilcoxon test)		13.79		13.31		8.77		10.68		9.85		9.89

TABLE 3

### Regression Results on the Relation between Institutional Ownership and Governance Score with Control Variables

Columns 1 through 4 of Panel A show the results of the following regression model:

$$\text{INST\_OWNERSHIP}_{i,t} = \beta_0 + \beta_1 \text{GOV\_SCORE}_{i,t} + \beta_2 \text{Log}(\text{MVE}_{i,t}) + \beta_3 \text{VOLATILITY}_{i,t} + \beta_4 \text{TURNOVER}_{i,t} + \beta_5 \text{Log}(\text{PRICE}_{i,t}) + \beta_6 \text{RETURN}_{i,t} + \beta_7 \text{BASPREAD}_{i,t} + \beta_8 \text{FIRM\_AGE}_{i,t} + \beta_9 \text{TOBIN'S } Q_{i,t} + \beta_{10} \text{TANGIBILITY}_{i,t} + \beta_{11} \text{LEVERAGE}_{i,t} + \beta_{12} \text{D\_YIELD}_{i,t} + \beta_{13} \text{ROA}_{i,t} + \beta_{14} \text{S\&P } 500_{i,t} + \varepsilon_{i,t};$$

where  $\text{INST\_OWNERSHIP}_{i,t}$  is the ratio of the number of shares held by institutional investors to the total number of shares outstanding,  $\text{GOV\_SCORE}_{i,t}$  is the governance score,  $\text{MVE}_{i,t}$  is the market value of equity,  $\text{VOLATILITY}_{i,t}$  is the standard deviation of quote-midpoint daily returns,  $\text{TURNOVER}_{i,t}$  is the average ratio of monthly trading volume to the number of shares outstanding,  $\text{PRICE}_{i,t}$  is annual average stock price,  $\text{RETURN}_{i,t}$  is the continuously compounded annual stock return,  $\text{BASPREAD}_{i,t}$  is the mean effective bid-ask spread,  $\text{FIRM\_AGE}_{i,t}$  is the number of years since the firm first appears in the CRSP database,  $\text{TOBIN'S } Q_{i,t}$  is the Tobin's  $q$  ratio calculated using the method in Chung and Pruitt (1994),  $\text{TANGIBILITY}_{i,t}$  is the asset tangibility ratio calculated using the method in Berger et al. (1996) and Almeida and Campello (2007),  $\text{LEVERAGE}_{i,t}$  is the ratio of total debt to the book value of total assets,  $\text{D\_YIELD}_{i,t}$  is the annual dividend yield,  $\text{ROA}_{i,t}$  is the ratio of net income to the book value of total assets, and S&P 500 equals one if the firm is included in the S&P 500 index and zero otherwise. Columns 1 and 2 show the results using  $\text{GOV\_SCORE1}$  and columns 3 and 4 show the results using  $\text{GOV\_SCORE2}$ . Columns 1 and 3 show the pooled ordinary least squares (OLS) regression results and column 2 and 4 show the Fama-MacBeth regression results that are estimated from 12,093 firm-year observations. Columns 5 through 8 show the two-stage least squares (2SLS) regression results with the following two instrumental variables: the logarithm of the number of business segments,  $\text{Log}(\text{N\_SEGMENT}_{i,t})$ , and the number of years as the CEO,  $\text{CEO\_TENURE}_{i,t}$ . Columns 5 and 7 show the results of the first-stage regressions and columns 6 and 8 show the results of the second-stage regressions. We also report the F-statistic for testing the joint statistical significance of instruments and the Sargan statistic for testing whether instruments are uncorrelated with the residual in the second-stage regression. To determine whether the relation between institutional ownership and corporate governance varies across different types of institutions, we calculate for each company the percentage of shares held by each type of institution and re-estimate the above regression model. Panel B shows the OLS regression coefficients on  $\text{GOV\_SCORE1}$  and Panel C shows the 2SLS regression coefficients on  $\text{GOV\_SCORE1}$ . Both the OLS and 2SLS regression results are based on clustered standard errors at the firm level. Numbers in parenthesis are t-statistics.

*Panel A. Regression Results for Total Institutional Ownership*

	INST_ OWNERSHIP	INST_ OWNERSHIP	INST_ OWNERSHIP	INST_ OWNERSHIP	GOV_ SCORE1	INST_ OWNERSHIP	GOV_ SCORE2	INST_ OWNERSHIP
	Pooled OLS	Fama- MacBeth	Pooled OLS	Fama- MacBeth	2SLS (First-Stage Regression)	2SLS (Second-Stage Regression)	2SLS (First-Stage Regression)	2SLS (Second-Stage Regression)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GOV_SCORE1	0.0088*** (11.76)	0.0094*** (7.01)				0.0252*** (3.57)		
GOV_SCORE2			0.0104*** (12.58)	0.0106*** (9.24)				0.0286*** (3.79)
Log(N_SEGMENT)					0.3260** (2.25)		0.3561*** (2.74)	
CEO_TENURE					-0.0700*** (-7.83)		-0.0639*** (-7.84)	
Log(MVE)	0.0341*** (7.93)	0.0201 (1.15)	0.0338*** (7.90)	0.0199 (1.14)	0.4468*** (4.98)	-0.0255*** (-4.70)	0.3568*** (4.42)	-0.0247*** (-4.73)
VOLATILITY	-2.4016*** (-8.35)	-2.5076*** (-6.39)	-2.3631*** (-8.32)	-2.4976*** (-6.39)	-2.3509 (-0.29)	-1.8803*** (-3.72)	-2.6290 (-0.36)	-1.9734*** (-3.92)
TURNOVER	0.0110*** (4.00)	0.0205*** (3.79)	0.0111*** (4.05)	0.0206*** (3.82)	0.0090 (0.17)	0.0272*** (7.25)	-0.0167 (-0.36)	0.0278*** (7.40)
Log(PRICE)	0.1064*** (17.10)	0.1064*** (12.38)	0.1063*** (17.18)	0.1062*** (12.34)	-0.0782 (-0.49)	0.0939*** (11.15)	-0.0171 (-0.12)	0.0930*** (11.06)
RETURN	0.0118*** (3.18)	0.0135 (1.38)	0.0116*** (3.11)	0.0133 (1.36)	-0.1276 (-1.03)	0.0076 (1.17)	-0.0713 (-0.63)	0.0067 (1.04)
BASPREAD	-0.2835*** (-5.39)	-0.2967*** (-9.29)	-0.2787*** (-5.38)	-0.2925*** (-9.35)	-4.0894** (-2.30)	-0.2679*** (-3.00)	-4.4484*** (-2.63)	-0.2446*** (-2.71)
FIRM_AGE	0.0017*** (7.47)	0.0012*** (9.31)	0.0017*** (7.56)	0.0012*** (9.38)	0.0207*** (4.63)	0.0012*** (4.26)	0.0185*** (4.60)	0.0012*** (4.38)
TOBIN'S Q	-0.0213*** (-10.55)	-0.0198*** (-7.91)	-0.0211*** (-10.42)	-0.0195*** (-7.95)	-0.2004*** (-3.22)	-0.0117*** (-2.93)	-0.1973*** (-3.50)	-0.0110*** (-2.75)
TANGIBILITY	0.0206 (1.04)	-0.0192 (-0.28)	0.0220 (1.11)	-0.0189 (-0.26)	-0.1411 (-0.24)	-0.0255 (-0.87)	-0.2549 (-0.47)	-0.0247 (-0.85)
LEVERAGE	0.0739***	0.0620***	0.0742***	0.0626***	0.5157	0.0633***	0.3981	0.0629***



	(4.23)	(7.61)	(4.27)	(7.84)	(0.92)	(2.63)	(0.80)	(2.62)
D_YIELD	-0.3090**	-0.4595***	-0.3058**	-0.4557***	0.3708	-0.5084***	0.6483	-0.4982***
	(-2.43)	(-3.48)	(-2.44)	(-3.41)	(0.15)	(-3.02)	(0.28)	(-2.96)
ROA	-0.0679***	-0.0304	-0.0661***	-0.0287	1.0987	0.0664	0.9027	0.0688*
	(-3.16)	(-1.07)	(-3.07)	(-1.02)	(1.40)	(1.62)	(1.27)	(1.70)
S&P 500	-0.1180***	-0.0936***	-0.1177***	-0.0929***	0.9434***	-0.0309**	0.8408***	-0.0307**
	(-5.39)	(-3.19)	(-5.19)	(-3.20)	(3.85)	(-2.16)	(3.84)	(-2.19)
Intercept	-0.2192***	0.0034	-0.2197***	0.0055	23.1075***	0.0837	20.1588***	0.0929
	(-2.86)	(0.11)	(-2.87)	(0.02)	(13.17)	(0.40)	(13.27)	(0.46)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	No	Yes	No	Yes	Yes	Yes	Yes
<i>F</i> -statistic					80.08		81.89	
[ <i>p</i> -value]					[< 0.001]		[< 0.001]	
Sargan statistic					0.1530		0.4510	
[ <i>p</i> -value]					[0.6956]		[0.5018]	
<i>R</i> <sup>2</sup>	0.5521		0.5539		0.7253	0.3231	0.5899	0.3236
Number of Observations	12,093	12,093	12,093	12,093	5,691	5,691	5,691	5,691

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*Panel B. OLS Regression Results for Each Type of Institution*

	Type 1 (Banks)	Type 2 (Insurance Companies)	Type 3 (Investment Companies)	Type 4 (Independent Investment Advisors)	Type 5 (Other Institutions: Pension Funds, Foundations, University Endowments)
	(1)	(2)	(3)	(4)	(5)
GOV_SCORE1	0.0008*** (4.89)	0.0003*** (3.36)	0.0011*** (4.51)	0.0058*** (11.57)	0.0023*** (9.11)
$R^2$	0.4066	0.1169	0.3229	0.3414	0.2085
Number of Observations	12,001	10,484	11,383	12,093	12,093

*Panel C. 2SLS Regression Results for Each Type of Institution*

	Type 1 (Banks)	Type 2 (Insurance Companies)	Type 3 (Investment Companies)	Type 4 (Independent Investment Advisors)	Type 5 (Other Institutions: Pension Funds, Foundations, University Endowments)
	(1)	(2)	(3)	(4)	(5)
GOV_SCORE1	0.0065*** (3.72)	0.0019* (1.86)	0.0012 (1.32)	0.0123*** (2.64)	0.0035** (1.99)
$R^2$	0.3250	0.1091	0.2361	0.2710	0.2929
Number of Observations	5,666	5,617	5,655	5,691	5,691

\*Significant at the 10% level.

\*\*Significant at the 5% level.

\*\*\*Significant at the 1% level.

TABLE 4

**Regression Results using Changes in Variables**

Panel A shows the results of the following regression model:

$$\begin{aligned} \Delta \text{INST\_OWNERSHIP}_{i,t} = & \beta_0 + \beta_1 \Delta \text{GOV\_SCORE}_{i,t} + \beta_2 \text{Lag}(\Delta \text{GOV\_SCORE}_{i,t}) + \beta_3 \Delta \text{Log}(\text{MVE}_{i,t}) + \beta_4 \Delta \text{VOLATILITY}_{i,t} + \beta_5 \Delta \text{TURNOVER}_{i,t} \\ & + \beta_6 \Delta \text{Log}(\text{PRICE}_{i,t}) + \beta_7 \Delta \text{RETURN}_{i,t} + \beta_8 \Delta \text{BASPREAD}_{i,t} + \beta_9 \Delta \text{TOBIN'S } Q_{i,t} + \beta_{10} \text{TANGIBILITY}_{i,t} + \beta_{11} \Delta \text{LEVERAGE}_{i,t} \\ & + \beta_{12} \Delta \text{D\_YIELD}_{i,t} + \beta_{13} \Delta \text{ROA}_{i,t} + \varepsilon_{i,t}; \end{aligned}$$

where  $\Delta$  denotes change in the variable,  $\text{INST\_OWNERSHIP}_{i,t}$  is the ratio of the number of shares held by institutional investors to the total number of shares outstanding,  $\text{GOV\_SCORE}_{i,t}$  is the governance score,  $\text{MVE}_{i,t}$  is the market value of equity,  $\text{VOLATILITY}_{i,t}$  is the standard deviation of quote-midpoint daily returns,  $\text{TURNOVER}_{i,t}$  is the average ratio of monthly trading volume to the number of shares outstanding,  $\text{PRICE}_{i,t}$  is annual average stock price,  $\text{RETURN}_{i,t}$  is the continuously compounded annual stock return,  $\text{BASPREAD}_{i,t}$  is the mean effective bid-ask spread,  $\text{TOBIN'S } Q_{i,t}$  is the Tobin's  $q$  ratio,  $\text{TANGIBILITY}_{i,t}$  is the asset tangibility ratio,  $\text{LEVERAGE}_{i,t}$  is the ratio of total debt to the book value of total assets,  $\text{D\_YIELD}_{i,t}$  is the annual dividend yield, and  $\text{ROA}$  is the ratio of net income to the book value of total assets. Panel B shows the pooled OLS regression results when we replace  $\Delta \text{GOV\_SCORE}_{i,t}$  in the above regression model with changes in the 36 governance provisions that have no missing observation during our study period. Panel B shows the estimated regression coefficients on the ten governance provisions that are significantly and positively related to institutional ownership. All regression results are based on clustered standard errors at the firm level. Numbers in parenthesis are t-statistics.

*Panel A. OLS Regression Results using  $\Delta \text{GOV\_SCORE}$*

	$\Delta \text{INST\_OWNERSHIP}$			
	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS
	(1)	(2)	(3)	(4)
$\Delta \text{GOV\_SCORE1}$	0.0019*** (4.02)	0.0014** (2.71)		
$\text{Lag}(\Delta \text{GOV\_SCORE1})$		0.0005 (1.49)		
$\Delta \text{GOV\_SCORE2}$			0.0020*** (3.60)	0.0012** (2.02)

Lag( $\Delta$ GOV_SCORE2)				0.0008*
				(1.87)
$\Delta$ Log(MVE)	0.0505*** (6.54)	0.0487*** (5.62)	0.0506*** (6.56)	0.0488*** (5.64)
$\Delta$ VOLATILITY	-0.8645*** (-4.97)	-1.1001*** (-5.76)	-0.8742*** (-5.01)	-1.1099*** (-5.80)
$\Delta$ TURNOVER	0.0021* (1.83)	0.0041*** (3.46)	0.0021* (1.85)	0.0040*** (3.48)
$\Delta$ Log(PRICE)	0.0523*** (7.37)	0.0560*** (7.38)	0.0522*** (7.35)	0.0561*** (7.36)
$\Delta$ RETURN	-0.0047 (-1.48)	-0.0039 (-1.04)	-0.0047 (-1.47)	-0.0039 (-1.03)
$\Delta$ BASPREAD	-0.0627*** (-2.63)	-0.0460** (-2.07)	-0.0629*** (-2.65)	-0.0461** (-2.08)
$\Delta$ TOBIN'S Q	-0.0092 (-0.54)	-0.0232** (-2.45)	-0.0088 (-0.53)	-0.0240** (-2.50)
$\Delta$ TANGIBILITY	0.0360** (2.04)	0.0421** (2.06)	0.0360** (2.04)	0.0419** (2.05)
$\Delta$ LEVERAGE	0.0270 (1.22)	-0.0025 (-0.15)	0.0268 (1.20)	-0.0029 (-0.18)
$\Delta$ D_YIELD	-0.0260 (-1.47)	-0.0440 (-1.42)	-0.0254 (-1.44)	-0.0438 (-1.43)
$\Delta$ ROA	0.0000 (0.04)	0.0000 (0.20)	0.0000 (0.07)	0.0000 (0.21)
Intercept	0.0322*** (4.39)	0.0265*** (6.72)	0.0324*** (4.41)	0.0225*** (6.15)
Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
$R^2$	0.2103	0.2353	0.2098	0.2346
Number of Observations	8,381	5,932	8,381	5,932

\*Significant at the 10% level.  
\*\*Significant at the 5% level.  
\*\*\*Significant at the 1% level.

*Panel B. Governance Provisions Significantly and Positively Related to Institutional Ownership*

Governance Provisions	Coefficient on $\Delta$ Gov_Provision
The current minimum standard is that at least two-thirds of the directors on the board should be independent.	0.0052** (2.10)
Compensation committee of the board should be composed solely of independent directors.	0.0130*** (3.07)
Governance committee meets at least once during the year.	0.0092** (1.94)
Board guidelines should be published in the proxy on an annual basis.	0.0086*** (2.81)
A simple majority vote is required to approve a merger (not supermajority).	0.0104*** (2.65)
Company has no poison pill.	0.0078** (2.16)
Common stock entitled to one vote per share. There is no dual class in place.	0.0051** (2.45)
A retirement age or term limits serve as useful tools for ensuring that new board talent is regularly sought.	0.0132*** (3.34)
Outside directors meet without CEO and disclosure the number of time they met.	0.0067* (1.80)
Officers and directors should have a significant ownership position.	0.0156** (2.42)
$R^2$	0.2107
Number of Observations	8,381

\*Significant at the 10% level.

\*\*Significant at the 5% level.

\*\*\*Significant at the 1% level.

TABLE 5

**Results of Robustness Checks**

Panel A shows the results of robustness checks. Column 1 shows the fixed effect regression results. Column 2 shows the pooled OLS regression results when we add lagged institutional ownership as an independent variable. Column 3 shows the pooled OLS regression results when we add HERDING as a control variable. Column 4 shows the pooled OLS regression results when we add the number of analysts following, N\_ANALYSTS, as a control variable. Column 5 shows the pooled OLS regression results when we use the natural logarithm of the proportion of institutions that hold the firm's stock, Log(P\_INST), as the dependent variable. Panel B shows the pooled OLS regression results for each type of institution using Log(P\_INST) as the dependent variable. Panel C shows the 2SLS regression results. Panel D shows the 2SLS regression results for each type of institution using Log(P\_INST) as the dependent variable. Both the OLS and 2SLS regression results are based on clustered standard errors at the firm level. Numbers in parenthesis are t-statistics.

*Panel A. Regression Results for Total Institutional Ownership*

	INST OWNERSHIP				Log(P INST)
	Firm Fixed Effect	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS
	(1)	(2)	(3)	(4)	(5)
GOV_SCORE1	0.0019*** (4.47)	0.0034*** (7.33)	0.0093*** (12.56)	0.0068*** (8.83)	0.0161*** (8.76)
Log(MVE)	0.0528*** (11.67)	0.0193*** (7.44)	0.0350*** (8.23)	0.0110** (2.40)	0.4692*** (41.67)
VOLATILITY	-1.3614*** (-10.31)	-1.7306*** (-7.07)	-2.8278*** (-9.95)	-4.0234*** (-11.90)	-3.6986*** (-5.91)
TURNOVER	0.0058*** (7.18)	0.0058*** (3.09)	0.0094*** (3.72)	0.0310*** (9.95)	0.0132*** (2.98)
Log(PRICE)	0.0587*** (12.79)	0.0424*** (10.20)	0.1001*** (16.03)	0.1084*** (16.53)	0.2476*** (15.40)
RETURN	-0.0016 (-0.73)	0.0312*** (5.27)	0.0069* (1.86)	0.0129*** (3.24)	0.0490*** (4.45)
BASPREAD	-0.0655*** (-4.61)	-0.1609*** (-4.39)	-0.2811*** (-5.17)	-0.4711*** (-5.448)	-0.9024*** (-4.85)
FIRM_AGE	0.0022* (1.84)	0.0007*** (4.63)	0.0013*** (5.63)	0.0009*** (3.64)	0.0018*** (3.41)
TOBIN'S Q	-0.0101*** (-7.11)	-0.0112*** (-7.67)	-0.0225*** (-11.19)	-0.0171*** (-6.78)	-0.1071*** (-15.98)
TANGIBILITY	0.0234 (1.60)	0.0291** (2.53)	0.0063 (0.91)	-0.0032 (-0.15)	0.2894*** (6.04)
LEVERAGE	0.0250** (2.09)	0.0366*** (3.62)	0.0806*** (4.61)	0.0641*** (3.30)	-0.5023*** (-11.42)
D_YIELD	-0.0208 (-0.66)	-0.1122 (-1.55)	-0.2893** (-2.47)	-0.2513** (-2.12)	0.0960 (0.73)
ROA	0.0046 (0.36)	-0.0267* (-1.76)	-0.0706*** (-3.31)	-0.0419* (-1.72)	-0.2257*** (-4.09)
S&P 500	-0.0594*** (-3.74)	-0.0551*** (-7.02)	-0.1048*** (-8.10)	-0.0861*** (-6.85)	-0.0701** (-2.35)
Lag(INST_ OWNERSHIP)		0.5985*** (36.37)			

HERDING			0.1803***		
			(7.19)		
N_ANALYSTS				0.0021***	
				(3.71)	
Intercept		-0.1780***	-0.2474**	0.1332*	-7.2400***
		(-4.18)	(-3.14)	(1.70)	(-51.63)
Industry Dummies	No	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
$R^2$	0.9274	0.7894	0.5596	0.4452	0.8398
Number of Obs.	12,093	8,838	12,093	9,517	12,093

*Panel B. OLS Regression Results for Each Type of Institution*

	Log(P_INST)				
	Type 1 (Banks)	Type 2 (Insurance Companies)	Type 3 (Investment Companies)	Type 4 (Independent Investment Advisors)	Type 5 (Other Institutions: Pension Funds, Foundations, University Endowments)
	(1)	(2)	(3)	(4)	(5)
GOV_SCORE1	0.0115*** (7.22)	0.0172*** (9.73)	0.0076*** (5.43)	0.0177*** (10.32)	0.0181*** (10.04)
$R^2$	0.8435	0.7899	0.8034	0.8531	0.8548
Number of Observations	12,001	10,484	11,383	12,093	12,093



*Panel C. 2SLS Regression Results for Total Institutional Ownership*

	INST OWNERSHIP				Log(P INST)
	Firm Fixed Effect	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS
	(1)	(2)	(3)	(4)	(5)
GOV_SCORE1	0.0009 (0.21)	0.0107** (2.12)	0.0213*** (3.17)	0.0201** (2.50)	0.0210** (2.29)
$R^2$	0.8577	0.6255	0.3517	0.3389	0.8526
Number of Obs.	5,691	4,294	5,691	5,157	5,691

*Panel D. 2SLS Regression Results for Each Type of Institution*

	Log(P INST)				
	Type 1 (Banks)	Type 2 (Insurance Companies)	Type 3 (Investment Companies)	Type 4 (Independent Investment Advisors)	Type 5 (Other Institutions: Pension Funds, Foundations, University Endowments)
	(1)	(2)	(3)	(4)	(5)
GOV_SCORE1	0.0223** (2.35)	0.0164* (1.71)	0.0252 (1.06)	0.0121 (1.42)	0.0206** (2.12)
$R^2$	0.8752	0.7446	0.8093	0.8531	0.8941
Number of Obs.	5,666	5,617	5,655	5,691	5,691

\*Significant at the 10% level.

\*\*Significant at the 5% level.

\*\*\*Significant at the 1% level.

TABLE 6

### Institutional Ownership, Corporate Governance, and Information Environment

We sort firms according to the four measures of information asymmetry (i.e., the quoted spread, the effective spread, the price impact of trades, and the probability of information-based trading (PIN)) and the number of analysts in each year and group them into quintiles. Next, we group all firm-years within each quintile over the entire study period. Panel A shows the results when we estimate regression model (1) using data for each quintile. For brevity, we report only the regression coefficients on governance score and the associated  $t$ -statistics from the pooled OLS regressions. Panel B shows the pooled OLS results of the following regression model:

$$\text{INST\_OWNERSHIP}_{i,t} = \beta_0 + \beta_1 \text{GOV\_SCORE1}_{i,t} + \beta_2 \text{GOV\_SCORE1} * \text{Q\_Dummy}_{i,t} + \beta_3 \text{Q\_Dummy}_{i,t} + \beta_4 \text{Log(MVE}_{i,t}) + \beta_5 \text{VOLATILITY}_{i,t} + \beta_6 \text{TURNOVER}_{i,t} + \beta_7$$

$$\text{Log(PRICE}_{i,t}) + \beta_8 \text{RETURN}_{i,t} + \beta_9 \text{FIRM\_AGE}_{i,t} + \beta_{10} \text{TOBIN'S } Q_{i,t} + \beta_{11} \text{TANGIBILITY}_{i,t} + \beta_{12} \text{LEVERAGE}_{i,t} + \beta_{13} \text{D\_YIELD}_{i,t} + \beta_{14} \text{ROA}_{i,t} + \beta_{15} \text{S\&P } 500_{i,t} + \varepsilon_{i,t};$$

where  $\text{Q\_Dummy}_{i,t}$  is equal to one for firms with the smallest (quintile 1) spreads, price impact, or PIN, and zero otherwise. Similarly,  $\text{Q\_Dummy}_{i,t}$  is equal to one for firms with the largest (quintile 5) analyst following, and zero otherwise. All other variables are the same as defined in Table 3. All regression results are based on clustered standard errors at the firm level. Numbers in parenthesis are  $t$ -statistics.

*Panel A. Regression Results for Each Quintile of Information Asymmetry and Analyst Following*

	INST OWNERSHIP				
	(1)	(2)	(3)	(4)	(5)
	Quintile 1 (Smallest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Greatest)
Quoted Spread					
GOV_SCORE1	0.0039** (2.43)	0.0056*** (4.67)	0.0085*** (6.21)	0.0112*** (7.22)	0.0080*** (5.58)
Effective Spread					
GOV_SCORE1	0.0027* (1.92)	0.0071*** (5.29)	0.0082*** (5.40)	0.0103*** (6.57)	0.0067*** (5.72)
Price Impact					
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5

	(Smallest)				(Greatest)
GOV_SCORE1	0.0028 (1.61)	0.0079*** (5.84)	0.0078*** (5.38)	0.0109*** (7.33)	0.0089*** (5.75)
PIN	Quintile 1 (Smallest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Greatest)
GOV_SCORE1	0.0045*** (3.93)	0.0067*** (5.45)	0.0096*** (6.90)	0.0113*** (8.63)	0.0092*** (6.34)
Number of Analysts	Quintile 1 (Smallest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Greatest)
GOV_SCORE1	0.0102*** (6.22)	0.0087*** (6.40)	0.0072*** (5.58)	0.0048*** (3.64)	0.0030** (2.35)

*Panel B. Regression Results with Q Dummy Variable*

	INST OWNERSHIP				
	(1)	(2)	(3)	(4)	(5)
	Lowest Quoted Spread Quintile Dummy	Lowest Effective Spread Quintile Dummy	Lowest Price Impact Quintile Dummy	Lowest PIN Quintile Dummy	Highest N_ANALYSTS Quintile Dummy
GOV_SCORE1	0.0106*** (13.15)	0.0110*** (13.32)	0.0109*** (13.17)	0.0106*** (13.18)	0.0083*** (10.28)
GOV_SCORE1*Q_Dummy	-0.0024*** (-2.93)	-0.0031*** (-3.70)	-0.0028*** (-3.51)	-0.0022*** (-3.14)	-0.0027*** (-3.39)
Q_Dummy	0.0244* (1.75)	0.0343* (1.81)	0.0317** (2.01)	0.0622*** (2.91)	0.0668*** (3.01)
$R^2$	0.5261	0.5267	0.5259	0.5254	0.4202
Number of Observations	12,093	12,093	12,093	12,093	9,517

\*Significant at the 10% level.

\*\*Significant at the 5% level.

\*\*\*Significant at the 1% level.

## Appendix A. Governance Categories and Standards Used by Institutional Shareholder Service (ISS)

This appendix shows the governance categories and standards used by Institutional Shareholder Service (ISS). Specifically, the minimum governance standards provided in *ISS Corporate Governance: Best Practices User Guide and Glossary* (2003) are reported in this appendix. We construct our governance index based on these minimum governance standards. We use all of these standards to construct our governance score, GOV\_SCORE1. Column 2 “GIM( #)” indicates the provisions related to Gompers, Ishii, and Metrick (2003) index that is designed primarily to capture anti-takeover provisions in a firm’s charter, bylaws, and state law. Column 3 shows 36 governance standards reported continuously from 2001 to 2006 by ISS data. We use them to construct our GOV\_SCORE2 variable.

ISS Governance Categories and Standards Used to Construct GOV_SCORE1	GIM (#)	GOV_SCORE2
<b>Board</b>		
1 The current minimum standard is that at least two-thirds of the directors on the board should be independent.		X
2 Nominating committee of the board should be composed solely of independent directors.		X
3 Compensation committee of the board should be composed solely of independent directors.		X
4 Governance committee meets at least once during the year.		X
5 Directors should be elected by shareholders on an annual basis	Delay (#2)	X
6 Boards should not have fewer than 6 members or more than 15 members.		X
7 Shareholders should have the right to vote on changes to expand or contract the size of the board.		
8 Shareholders should have the right to cumulate their votes for directors.	Voting (#3)	X
9 In addition to serving on his own company's board, the CEO should not serve on more than two other boards of public companies.		X
10 Outside directorships should be limited to service on the boards of five or fewer public companies. A service limit of four or fewer public company boards is considered even better.		
11 Former CEOs should not serve on the board of directors.		X
12 The positions of chairman and CEO should be separated or a lead director should be specified.		X
13 Board guidelines should be published in the proxy on an annual basis.		X
14 Management should take action on all shareholder proposals supported by a majority vote within 12 months of the shareholders’ meeting.		X
15 Directors should attend at least 75% of board meetings.		
16 Shareholders should be given an opportunity to vote on all directors selected to fill vacancies.		
17 CEO's should not be the subject of transactions that create conflicts of interest as disclosed in the proxy statement.		

Audit			
1	Audit committee should be composed solely of independent directors.		X
2	Consulting fees (audit-related and other) should be less than audit fees.		
3	The company should disclose its policy with respect to the rotation of auditors.		
4	Shareholders should be permitted to ratify management's selection of auditors each year.		
Charter			
1	Company has no poison pill.	Other (#5)	X
2	A simple majority vote is required to amend charter/bylaws (not supermajority).	Voting (#5)	X
3	A simple majority vote is required to approve a merger (not supermajority).	Voting (#5)	X
4	Shareholders may act by written consent and the consent is non-unanimous.	Delay (#4)	X
5	Shareholders should be permitted to call special meetings.	Delay (#3)	X
6	Board cannot amend bylaws without shareholder approval or only under limited circumstances.	Voting (#1,2)	X
7	Company is not authorized to issue blank check preferred stock.	Delay (#1)	X
8	Common stock entitled to one vote per share. There is no dual class in place.		X
State			
1	Incorporation in a state without any anti-takeover provisions.		X
Compensation			
1	An option-pricing model is used to measure the cost of all stock-based incentive plans.		
2	Shareholder approval should be sought prior to repricing underwater stock options.		
3	Option re-pricing did not occur within last three years.		X
4	All stock-based incentive plans should be submitted to shareholders for approval.		X
5	No interlocking directors should serve on the Compensation Committee.		X
6	Directors should receive a portion of their compensation in the form of stock.		X
7	Non-Employee directors should not participate in pension plans.		
8	Company expense stock options.		
9	Average options granted in past 3 years as percentage of share outstanding (i.e., Burn Rate) are less than 3%.		
10	New loan programs under stock option plans are prohibited. Company doesn't provide any loans to directors.		
Progressive			
1	A retirement age or term limits serve as useful tools for ensuring that new board talent is regularly sought.		X
2	Performance of board should be reviewed regularly.		X
3	Outside directors meet without CEO and disclose the number of time they met.		X
4	A board-approved CEO succession plan should be in place and evaluated by the directors periodically.		X
5	A policy authorizing the board to hire its own advisors should be disclosed.		X
6	A policy requiring directors to resign upon a change in job status should be disclosed.		X

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Ownership		
1	All directors with more than one year of service own stock.	X
2	Executives are subject to stock ownership guidelines.	X
3	Directors are subject to stock ownership guidelines.	X
4	Officers and directors should have a significant ownership position (at least 1% but not over 30%)	X

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