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Concentrated Shareholdings and the Number of Outside Analysts

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Abstract: Assuming some fixed cost to information acquisition, diffuse shareholders in publicly held firms have little incentive to produce information that can substitute for the services of financial analysts. However, we argue that concentrated shareholdings, either by outsiders like institutions or by inside managers, reduce the demand for analyst services. The former group finds it worthwhile to produce its own information and avoid any moral hazard problems associated with analyst forecasts, while the concentration of shareholdings by insiders reduces the moral hazard problem associated with outside claimants (Jensen and Meckling 1976) and may work as an independent signal of quality (Leland and Pyle 1977). Earlier authors have provided evidence that the number of analysts following a firm is associated with the distribution of shareholdings between institutions, insiders, and other shareholders. In this paper we provide evidence that, after controlling for any average distributional effects, increased concentration of shareholdings by either insiders or outsiders (like institutions) is associated with lower analyst following. The results are robust to alternative measures of concentration and the definition of outside shareholders.

JEL classification: D82, G34

Key words: outside analysts, concentrated shareholdings, incentive problems

Concentrated Shareholdings and the Number of Outside Analysts

1. Introduction

The typical investor has a small stake in a given firm and therefore has little incentive, given even small fixed costs, to produce independent information concerning the firm's prospects or monitor managers. Thus, these investors get most of their information from either management or outside analysts. Indeed, as argued by Jensen and Meckling (1976), one of the socially valuable roles of analysts may lie in mitigating moral hazard problems between insiders and outside claimants. Thus, the demand for financial analysts may depend on the composition of outside shareholders and the distribution of shares between insiders and disparate groups of outsiders.

Earlier authors (see, e.g., Bhushan (1989), Moyer, Chatfield and Sisneros (1989)) have in fact provided evidence that the number of analysts following a given firm is inversely related to the percentage of the firm held by insiders and positively related to measures of institutional shareholdings including the percentage holdings of institutional investors and/or the number of institutional investors. These authors argue that the insider relationship can be attributed to lower moral hazard costs when insiders collectively hold a higher stake in the firm. The relationship between analyst following and institutional holdings comes from the idea that, unlike individual investors, sophisticated institutions will, other things the same, demand more professionally generated third party information concerning the firm's prospects. More generally, one could argue that analyst following may increase or decrease, depending on how shares are allocated, on average, across groups of investors.

Our contribution to this literature involves our argument that the demand for analyst services will, for a given distribution of shares between outsiders and insiders, be inversely related to the concentration of shareholdings, regardless of the source. This hypothesis follows from the fact that, should senior managers hold large stakes in the firm, there is a greater

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likelihood that managerial incentives will be aligned with those of other shareholders. Moreover, if a given outsider has a large enough stake in the firm, it will at some point find it in its interest to produce its own in-house information and avoid both the cost and moral hazard problems associated with this third party producer of information (Diamond (1984), Ramakrishnan and Thakor (1984)). These large outside stakeholders, like institutions, may in some instances also act as a stand-in for controlling moral hazard and thus benefit small shareholders (Shliefer and Vishny (1986)). For these reasons, our primary hypothesis is that analyst following is inversely related to the concentration of holdings by both insiders and outsiders.

Our hypothesis concerning concentration and analyst following is not inconsistent with existing evidence concerning analyst following and the distribution of shareholding. As noted earlier, prior studies by Bhushan (1989) and Moyer et al. (1989) focus on the total percentage of institutional or insider holding. We extend these studies by investigating how the concentration of holdings are associated with analyst following. For reasons cited earlier, we argue that this distribution of holdings is important, with more concentrated holdings being negatively associated, *ceteris paribus*, with analyst following.

We empirically test this hypothesis by using a random sample of 1,178 firms for the year 1995. We find that, using a variety of alternative measures for concentration of ownership, the number of analysts following the firm declines as concentration of ownership on the part of either insiders or outsiders increases. In the case of insiders we find, for example, a significant negative relationship between the number of analysts following a firm and the Herfindahl index of insider ownership concentration. As we explain in detail later, due to the type of ownership data that is available, we can not construct the Herfindahl index of ownership concentration for all outside stockholders. However, it is possible to construct the Herfindahl index of ownership concentration specifically for outside institutional stockholders. Therefore, we employ this measure and find a significant negative relationship between the number of analysts following a

firm and the Herfindahl index of institutional ownership concentration.[1] Further, we look at the

blockholdings of all outside shareholders (institutions and individuals) as another measure of

outside ownership concentration and find similar results.[2] The results are robust across two

alternative specifications of outside blockholdings, including the number of blockholders and the

total percentage of shares held by these blockholders.

The rest of the paper is organized as follows. The next section examines the issues and

hypotheses in more detail. Section 3 describes the sample, the variables, and descriptive

statistics for the data. In section 4, we specify the empirical models and discuss the results. The

final section provides concluding comments.

2. Issues and hypotheses

The main objective of this paper is to address whether the presence of concentrated

ownership is associated with less information production by third parties; in this case outside

analysts. We briefly present our arguments for the relationship between analyst following and

concentrated holdings by outsiders. We then discuss our hypothesis regarding the concentration

of holdings by insiders and analyst following.

2.1 Concentrated Holdings by Outsiders and the Number of Analysts

As noted in the introduction, we argue that concentration of outside shareholdings

influences analyst following. This conjecture could be justified by a number of papers in the

theoretical literature, but the discussion in this section draws on the model in Diamond (1984). In

particular, he builds a model in which multiple outsiders lend to an entrepreneur in the presence

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[1] In addition to the Herfindahl index, we examine the ownership of the top one and the top five insiders and institutional shareholders with the largest holdings in a firm. We find that the results are robust to this alternative specification of concentration.

[2] A blockholder is defined as an owner of a beneficial interest of five percent or more of a firm's outstanding shares. This percentage represents a significant investment on the part of a single investor and the SEC requires the filing of a special report (Form 13D) upon the acquisition of five percent or more of the firm's shares.

of asymmetric information. This leads to incentive problems and a decision by outsiders to either each pay a fixed cost to produce information to monitor the entrepreneur themselves or to delegate the monitoring task to an intermediary. While Diamond discussed the demand for intermediary services by lenders, the analysis extends to the case in which the principals are outside security holders of the firm. Specifically, in the context of our paper, outside shareholders can be considered as the principals. They are concerned with whether to produce information to monitor the firm's management themselves or to delegate it to outside agents, in this case financial analysts.[3]

Viewing analysts as information intermediaries is also consistent with the analysis of Jensen and Meckling (1976), who suggest that security analysis activities could reduce agency costs associated with the separation of ownership and control as well as with the work by Ramakrishnan and Thakor (1984), who model diversified information brokers such as Standard & Poor's, Value Line, Moody's credit bureau, and consultants as financial intermediaries. These intermediaries acquire and process information, and their output is information. Similarly, financial analysts could also be considered information intermediaries and the theory of financial intermediation could be applied to the relationship between outside holdings and analyst following.

Offsetting the incentive by an outsider to not pay the fixed cost and thereby delegate monitoring to analysts are the well known incentive problems with intermediaries or information producers in general. In this case, the conflict may arise from the fact that analysts not only provide research services but also help the firms employing them in attracting business for other services offered by the intermediary (such as underwriting). An analyst trying to attract underwriting business may be motivated to provide more positive information about the issuing firms. For example, La Porta (1996) and Rajan and Servaes (1997) indicate that firms with

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[3] In a cover story (May 18, 1987), *Business Week* highlighted several instances of monitoring by institutions and large shareholders.

highest analysts' forecasts of long-term growth in earnings have the lowest subsequent stock price performance. Dechow, Hutton and Sloan (1996) suggest that the possible motivation for this is analysts' incentives to provide more optimistic information about their underwriting clients.[4]

Thus, considering the fixed costs of information production and the possible incentive problems between shareholders and analysts, we argue that a higher concentration of institutional shareholdings makes it likely that the institutional owners will produce information themselves rather than delegating the task to analysts.

2.2 Concentrated Holdings by Insiders and the Number of Analysts

Earlier findings by Bhushan (1989) and Moyer et al. (1989) suggest that analyst following declines as the average percentage of the firm held by insiders increases. Insiders have ready access to non-public information and do not depend on analysts to provide them information about their firm. As insider holdings increase, holdings of noninsiders decline. Consequently, they argue that the holdings of those who might need analyst services decline. These ideas are consistent with agency cost argument presented by Jensen and Meckling (1976). They argue that as management ownership rises, the managers are less likely to indulge in non-value maximizing objectives. So, the information needs of outside stockholders decline.

A similar result could be generated by the signaling model in Leland and Pyle (1977), who argue that increased shareholdings by managers provide a positive signal to the market concerning firm value, which again reduces the need for outside information. Indeed, it is precisely because risk averse insiders have less than fully diversified portfolios, or have "concentrated" holdings in their firm, that provides the positive signal concerning value in the

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[4] The business press provides some evidence regarding the existence of such behavior. For example, see the *Wall Street Journal*, July 2, 1996, Some stock analysts are finding themselves in great demand and in the land of big bucks. This article mentions that "…Many firms will also compensate analysts for their help in attracting new stock issues…Of course, some money managers grumble that the big emphasis on new-issue fees taints the research results if analysts try to avoid saying anything negative about their underwriting clients…".

Leland and Pyle model. However, with multiple managers, the average shareholdings of insiders may not provide a sufficient statistic for determining how incentive problems change as the distribution of shareholdings between insiders and outsiders changes. One could imagine, for example, a situation where the total holdings by insiders is large, but each individual insider owns a small share of the firm and, therefore, may have an objective function that is inconsistent with value maximization. By focusing on the effects of the concentration of insider holdings on analyst following, we are able to more clearly test the hypotheses in Jensen and Meckling (1976) and Leland and Pyle (1977) that insider holdings are associated with a lower demand for outside information; in this case the demand for analysts.

In summary, our main hypothesis is that the number of analysts following a firm will, *ceteris paribus*, be negatively related to the concentration of ownership, be it by insiders or outsiders. Before proceeding to the data, we first review some of the alternative measures of concentration to be used for the purpose of testing the robustness of our results. We then discuss some of the control variables to be employed in the empirical tests.

2.3 Alternative and Control variables

Measures of concentration

Our main proxy for the concentration of shareholdings is the Herfindahl index of institutional investor holdings (representing the vast majority of large outside shareholders) and a similar Herfindahl index for holdings by insiders. The two Herfindahl index values are calculated by summing the squared percentage of shares controlled by the five institutions and the five insiders, respectively, with the largest holdings in the firm. We are constrained by the data to use the holdings of the top five institutional shareholders instead of the top five outsiders, in general, who may include institutional as well as individual shareholders. Ownership data is reported only for those investors who belong to one or more of the following: categories: institution, insider, or blockholder. Thus, we do not know if any of the top five outsiders is an individual. However, the

Herfindahl index based on institutional holdings is likely to be a fair representation of concentration of outside shareholdings since the majority of large outside shareholders are institutions.

As a check on the robustness of our results, we also employ some other measures of concentration that have been used in the literature. One of these measures is simply the percentage of the firm held by institutions and insiders with the largest holdings of shares in the firm.[5] We also use an alternative proxy for concentration of outside holdings, which is not limited to institutional shareholders and includes individual outsiders as well. This proxy is the percentage of the firm held by outsider blockholders, where a blockholder is defined as an individual or group owning more than five percent of a firm's outstanding shares.[6]

Control variables

In our empirical tests, we attempt to control for other variables that may be associated with determining the number of analysts following a given firm. In this section we draw on earlier work to explain why these control variables make sense in the context of our tests.

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[5] Studies that analyze issues of ownership by large shareholders include Shliefer and Vishny (1986) and Agrawal and Mandelker (1990). Shliefer and Vishny develop a model of corporate control according to which the value of the firm increases with an increase in the ownership of the largest shareholder. Agrawal and Mandelker examine the role of large shareholders in monitoring managers when they propose antitakeover charter amendments. They analyze several measures of institutional ownership concentration, including the percentages owned by the one, two, and five institutions with the largest holdings in a firm. Their results suggest that a higher percentage of ownership by the largest institutional owners would result in better monitoring.

[6] Two relevant studies that discuss five-percent blockholdings are McConnell and Servaes (1990) and Brous and Kini (1994). McConnell and Servaes do not find a significant relationship between corporate value and blockholdings. They suggest that the lack of the relationship may be because they do not distinguish among the different types of blockholders, and some blockholders, such as those related to the corporate founder, may be passive investors. Brous and Kini study the monitoring role of institutional owners by relating the level of institutional ownership to stock market returns in periods where announcements of equity issues take place. They acknowledge that institutional blockholders may be effective monitors, but do not explore this issue further.

Firm size

Previous studies that have focused on institutional holdings, probably the largest potential group of concentrated outside shareholdings, and analyst following (Bhushan, 1989; Moyer, et al., 1989; Chung et al., 1995; Chung and Jo, 1996) have found a positive relation between firm size and analyst following. These authors argue that there is a greater demand for information about large firms since the aggregate potential gains to investors from having access to better information are higher for these firms. *Ceteris paribus*, greater demand for information about larger firms would result in greater demand for analysts.[7] Accordingly, we expect a positive relation between size and analyst following.

Leverage

Following Moyer et al. (1989), we control for the proportion of debt financing used in a firm's capital structure. Based on the potential agency cost argument, Moyer et al. (1989) suggest that a higher debt ratio implies lower managerial discretion over free cash flows, thereby reducing the need for externally generated information. Thus, we expect a negative relationship between debt financing and analyst following.

Return variability

Some previous studies have examined the effect of variability of firm's returns on analyst following. The results have been mixed. For example, Bhushan (1989) finds a significant positive relationship while O'Brien and Bhushan (1990) find a significant negative relationship between the variability of returns and analyst following.[8] These mixed results could be due to two opposite effects of return variability on analyst following. On the one hand, since the value of information about a more volatile firm is higher, the demand for information about such firms would be

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[7] Since analysts have greater incentives to follow large firms, aggregate supply is also likely to be higher.
[8] Moyer et al. (1989) employ annual earnings per share volatility over a five-year period as a measure of firm volatility. They find a positive but insignificant relationship between analyst following and volatility.

greater and analysts would have greater incentives to follow them. Thus, analyst following is likely to be a positive function of return variability. On the other hand, if the cost of information acquisition increases substantially as uncertainty increases, analyst following may turn out to be inversely related to return volatility measures. Regardless of which effect dominates, we will attempt to control for this source of risk by employing a proxy for return variability.

Correlation between firm and market returns

Bhushan (1989) argues that for a given level of information costs relating to macro variables, the marginal information acquisition cost will be lower if the correlation between firm and market returns is higher. Accordingly, we control for the correlation between firm return and market return, and expect a positive relationship between our proxy and the number of analysts.

Firm diversification

Following Bhushan (1989) and Ferris and Sarin (1996), we control for the extent of diversification of the firm. Greater difficulty and increased costs associated with information acquisition for diversified firms are likely to result in a reduced level of following by analysts. On the other hand, if there is a greater need for information concerning more diversified firms, then the demand for analyst following could be higher for such firms. Thus, the effect of firm diversification on analyst following is not obvious.

Number of shares outstanding

O'Brien and Bhushan (1990) argue that analyst following is likely to increase with an increase in the number of shares outstanding. The number of shares outstanding is a proxy for the size of the potential investor base, and therefore the benefits of analyst information should be greater for firms with a higher number of shares outstanding.

Number of institutional stockholders

Bhushan (1989) finds a positive relationship between analyst following and number of institutional owners, and suggests that this result could be interpreted as greater demand for and supply of analysts for firms with more institutional owners. Accordingly, we control for the number of institutions holding the firm's stock.

Industry effects

It is likely that the costs of information acquisition are lower for firms in certain industries. It is also likely that there is higher demand for information about firms belonging to certain industries. For example, Moyer et al. (1989) argue that due to deposit insurance, banks and savings institutions may adopt more risky strategies, and investors may demand more information to monitor the management of these firms. Therefore, we also control for industry effects by including dummy variables in the regressions.

3. Sample design and data description

3.1 Data sources

Ownership data are obtained from the Disclosure database. This database provides detailed institutional, insider, and five-percent beneficial ownership data. The ownership data in the Disclosure database is the same as the ownership data gathered from SEC filings and published by CDA/Spectrum. The number of analysts following a firm is obtained from the Institutional Brokers Estimate System (I/B/E/S) data included in the Disclosure database. The data regarding firm characteristics, including size, leverage and the degree of diversification, are also obtained from the Disclosure database. The Center for Research in Security Prices at the University of Chicago (CRSP) tapes are used to obtain the data regarding firm and market returns.

3.2 Sample construction

Table 1 provides some details of the sample selection procedure. The sample is constructed for the year 1995. To be included in the sample, firms had to have data available on Disclosure and I/B/E/S databases, as well as on CRSP tapes. Only firms with a financial year ending on December 31 are included in the sample. We exclude any firm with missing ownership data for institutions and insiders or for one or more control variables. Only firms followed by more than one analyst are included in the sample.[9]

3.3 Description of variables

We measure the number of analysts that follow a firm as those who provided forecasts for the firm's earnings per share for the 1995 financial year on June 15, 1995 (NAL). Since only those firms whose financial year ends in the fourth quarter are included, these forecasts are approximately two-quarters-ahead forecasts. The data regarding the number of analysts that provided forecasts for the firm's earnings per share for 1996 on June 15, 1995, are also collected. There is no significant difference between the number of analysts providing forecasts for the years 1995 and 1996, and the results reported in this paper are based on the number of analysts who provided forecasts for the firm's earnings per share for the 1995 financial year.

We measure the concentration of insider and outside shareholdings using the Herfindahl index of ownership concentration. This measure has been used in earlier studies such as Demsetz and Lehn (1985). We construct the Herfindahl index of insider ownership concentration by summing the squared percentage ownership of the five insiders with the largest shareholdings in that firm. The ownership data is reported only for those investors who are either an institution, an insider, or a blockholder, implying that the stockholdings of noninsiders with

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[9] An earlier version of this paper examined issues related to dispersion of analyst opinion. Consistent with other studies such as Chung et al. (1995) and Chung and Jo (1996), only those firms that are followed by at least two analysts are included so that the dispersion of analyst opinion could be measured for each sample firm.

less than five percent holdings are not reported unless the owner is an institution. Thus, it is not possible to construct the Herfindahl index of ownership concentration for outsiders, in general, since it is possible that one or more of the top five outside shareholders is neither an institution nor a blockholder. We are therefore constrained to use the Herfindahl index of institutional investor holdings. Since the majority of large shareholders are institutions, this measure is likely to be a fair representation of concentration of outside shareholdings.

As an alternative measure of concentration by outsiders, we use the blockholdings of these shareholders. This measure offers the advantage of accounting for any blockholdings by non-institutional outsiders. To construct this measure, we start with blockholdings based on the SEC filing procedures, which define a blockholder as a direct owner of a beneficial interest of five percent or more of a firm's outstanding shares. Several studies, including Agrawal and Mandelker (1990), Bethel et al. (1998), and McConnell and Servaes (1990), have used this definition. However, some of the blockholders, as defined by the SEC, reflect insider interests. Therefore, as in Bethel et al. (1998), we exclude from the blockholdings any owners who are directors or officers of the firm. We also eliminate all those blockholders who have the same last names as any of the officers or directors. Thus, the variable PERBLOCK represents the percentage of the firm's shares owned by the noninsider five-percent blockholders. NUMBLOCK is the number of these noninsider five-percent blockholders.

The size of the firm is measured as the natural log of the market value of firm's equity (LMVE). A proxy for the extent of debt financing used by the firm is given by the ratio of long term debt to equity (DEBT). The extent of diversification of a firm is measured by the number of its four-digit SIC codes (CODES). The variability of a firm's return is measured by the variance of daily returns of the firm during the year 1994 (RETVAR).[10] The correlation between firm and market returns is measured by the coefficient of determination of the above regression (RSQ).

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[10] A second measure, designed to capture the idiosyncratic return volatility, provided similar results and is omitted from the empirical section of the paper.

Following Bhushan (1989), industry differences are controlled for by classifying the sample firms in six industry groups based on the firm's primary SIC code. The selected industry groups (two-digit SIC codes in parentheses) are mining (10-14), construction and manufacturing (15-39), transportation, communication and other public utilities (40-49), wholesale and retail trade (50-59), finance, insurance and real estate (60-67), and services (70-96). Five dummy variables are used, so the effect of the sixth industry group is captured in the intercept term.

LSHARES is the log of the number of firm's shares outstanding. LNINST is the log of the number of institutions holding the firm's stock. The variable PERINSD denotes the total percentage of shares owned by insiders.

3.4 Descriptive statistics

Table 2 provides descriptive statistics for the sample. For each variable, we report the mean, median, standard deviation, twenty-fifth and seventy-fifth percentiles, and maximum values.

The sample firms are followed by an average of 10.5 analysts, with a maximum following of 41. The average market value of the equity of a sample firm is $2,562 million while the median market value is $534 million, suggesting that the distribution of asset values is not symmetric. On average, the sample firms have 2.9 four-digit SIC codes.

The mean (median) insider holdings in a firm are 17 percent (8.4 percent). One-fourth of the sample firms display insider holdings of more than 25.9 percent. The median values of the insider ownership variables are considerably lower than the mean values, suggesting that the distribution of holdings reflect, in part, a small number of insiders with very large positions. On average, a sample firm has 2.8 noninsider blockholders. The average holdings of noninsider blockholders are 21.5 percent. In a quarter of the sample firms noninsider blockholders own more than 31.6 percent of the firm.

4. Empirical results

4.1 Correlation structure

We first examine the correlation structure among the variables. Table 3 presents the correlation matrix for selected independent variables. First, we note that all variables, except leverage and the Herfindahl index of institutional holdings, are strongly correlated with the size of the firm. Specifically, the total variance of firm returns is negatively correlated with size, while the degree of correlation between firm and market returns is positively correlated with size. As expected, the correlation coefficients indicate that larger firms tend to be more diversified, have more shares outstanding, and have a greater number of institutional investors.

The concentration of ownership by insiders is negatively correlated with the size of firm and the degree of correlation between firm and market returns, and positively correlated with the variability of firm returns. These results are consistent with the findings of Demsetz and Lehn (1985). They study a sample of 511 firms for 1980, and find that ownership tends to be less concentrated in larger firms, and more concentrated in firms with higher control potential; that is, in firms with noisier environments. The number and percentage of noninsider blockholders are also negatively correlated with the size of firm and the degree of correlation between firm and market returns, and positively correlated with the variability of firm returns.

The number of institutions with holdings in a firm is positively correlated with size and the degree of correlation between firm and market returns, and is negatively correlated with the variability of firm returns. This result supports other findings, by Badrinath, Gay, and Kale (1989), that institutions prefer to invest in larger firms and tend to avoid firms with higher volatility. The number of institutional investors is also positively correlated with the number of four digit SIC codes and the number of shares outstanding.

4.2 Concentrated ownership and analyst following: Regression Based Tests

We use, despite some debate in the literature regarding the endogeniety of holdings, a simple OLS based framework in order to investigate the effects of ownership variables on analyst following.[11] We report the results of the OLS regression of analyst following on the concentration of ownership in Table 4.[12] Columns 1 and 2 report the results that include concentration measures for both insiders and institutional investors as calculated using Herfindahl indices. We focus on institutions here because of data availability and the fact that institutions are by far and away the largest group of concentrated shareholders other than the management of the firm. The results support the idea that increased concentration, by either insiders or outsiders, results in a lower number of analysts following the firm.[13] Consistent with our hypothesis that concentration and average percentages exert independent influences on analyst following, we find that, as documented in earlier studies, analyst following decreases with an increase in percentage of insider ownership, whereas it increases with an increase in the number of institutional investors holding shares in the firm.

Columns 3 and 4 show that, as hypothesized, the coefficient of concentration of outside ownership is negative and statistically significant, whether measured as the percentage held or number of outside blockholders. This negative relationship between analyst following and concentration of outside shareholdings supports our argument that when outside ownership is concentrated, in house analysis or other sources of information substitute for the services of outside analysts. Taken together, the results in Table 4 suggest that our hypothesis concerning

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[11] An alternative is to use a simultaneous equations approach such as that employed by O'Brien and Bhushan (1991). However, as argued by McNichols (1991), there are econometric and theoretical concerns in using this approach for analyst following and institutional ownership.

[12] Since past studies have produced mixed results regarding the effect of variability of firm returns on analyst following, we run the regressions using two different proxies for the variability of firm returns. Qualitatively, the results are independent of the proxy used.

[13] We also run the regressions by replacing the Herfindahl indices with the percentage of the firm held by the institutions and the insiders with the largest shareholdings in the firm. Specifically, we examine top one as well as top five institutions and insiders. As expected, we find fewer analysts following firms in which the maximal institutional and insider holdings are high. We do not provide these results for the sake of brevity.

the relationship between the concentration of holdings and the number of analysts following a given firm is not inconsistent with these data.

4.3 Control variables

In Table 4, all the control variables have the hypothesized signs. There is a greater analyst following for larger firms. This is consistent with the argument that the demand for information is higher for larger firms.[14] Analyst following declines as leverage increases, suggesting that the monitoring activities of debt holders lead to a reduced need for external information.

We also find that analyst following is higher for firms with higher than average variability of returns. The interpretation of this relationship is that the higher value of information concerning firms with greater return variability more than offsets the higher costs of information production. The results also indicate that fewer analysts follow firms whose returns have a low correlation with our proxy for the market, supporting the argument that information acquisition costs are higher for such firms. The coefficient on the number of four-digit SIC codes is negative and statistically significant, reflecting the greater difficulty and increased costs associated with information acquisition for diversified firms. As expected, we find analyst following to be positively related with the number of shares outstanding.

5. Concluding comments

In this paper we argue that when the holdings in a firm are concentrated, there is less need for the production of outside information. We empirically test this argument by examining the effect of concentration of shareholdings, on the part of both insiders and outsiders, on the

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[14] In an earlier version of the paper, we also examine the dispersion of analyst opinion. We use the coefficient of variation of analyst forecast as the proxy for dispersion, and find that dispersion is less for larger firms. This may reflect the greater availability of public information for larger firms. We also find higher dispersion for firms with a higher variability of returns. We do not find any relation between dispersion and institutional ownership variables, and therefore exclude the analysis of dispersion from this version of the paper.

number of analysts following the firm. Consistent with our hypothesis, we find a negative relationship between analyst following and concentration of ownership. Moreover, we find that these results are robust across a number of different proxies for concentration.

Thus, this paper provides strong and consistent empirical support for the argument that outsiders with concentrated holdings are likely to substitute for other sources of information by providing their own in-house analysis. Since most of the concentrated ownership positions in our sample are those held by institutions, one can view these results as helping to refine Bhushan's (1989) conclusion that institutions do not perform in-house analysis that can substitute for the services of outside analysts. Moreover, we also find that concentrated holdings by insiders are associated with lower analyst following, a result consistent with the signaling theory of LeLand and Pyle (1977) as well as the theory of moral hazard between insiders and outsiders discussed by Jensen and Meckling (1976).

In this paper, we distinguish only between inside and outside shareholders and those with concentrated holdings vs. those with diffuse holdings. However, while some outside shareholders may use information primarily for monitoring of management, some may need information only for trading, while others may be entirely passive investors. A finer classification scheme of outside shareholders might reveal some interesting results, and we leave that investigation for future work.

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Table 1
Sample selection procedure

Number of firms on Disclosure and I/B/E/S databases, with financial year ending on December 31, and followed by at least one analyst	2,683
Subtract:	
Firms followed by only one analyst	455
Firms with missing values for one or more control variables	700
Firms with missing details of ownership	105
Firms not available on CRSP tapes, or some ambiguity	151
Firms with one or more days of data missing on CRSP tapes	94
Final sample	1,178

Table 2
Descriptive Statistics

Panel A: Dependent variable and control variables

NAL is the number of analysts that follow a firm. MVE is the size of the firm, measured by the market value of firm's equity in $ million. DEBT is the ratio of long term debt to equity. The variability of the return of a firm is measured by two alternate proxies. RETVAR is the variance of the daily total returns, and RESVAR is the variance of the daily idiosyncratic returns. RSQ is the correlation between firm and market returns as measured by the coefficient of determination of the OLS regression of the daily firm return on the daily return on the value-weighted market portfolio. CODES is the number of four-digit SIC codes corresponding to the firm. SHARES is the number of shares outstanding. NINST is the number of institutions holding the firm's stock. PERINSD denotes the total percentage of firm owned by insiders.

Variable	Mean	Median	Std. Dev.	Q1	Q3	Max.
NAL	10.47	8.00	8.45	4.00	14.00	41.00
MVE * 10^{-3}	2.56	0.53	7.32	0.17	1.79	98.40
DEBT	0.56	0.45	4.48	0.14	0.88	34.95
RETVAR * 10^{3}	0.67	0.42	0.68	0.22	0.87	4.69
RESVAR * 10^{3}	0.63	0.39	0.67	0.20	0.82	4.69
RSQ	0.08	0.06	0.07	0.02	0.12	0.43
CODES	2.87	2.00	1.80	2.00	4.00	7.00
SHARES * 10^{-3}	66.37	26.05	134.22	11.98	64.46	1696.56
NINST	129.64	82.00	140.15	39.00	159.50	888.00
PERINSD	16.98	8.38	20.62	1.49	25.93	99.99

Table 2 (continued)

Panel B: Industry-wise distribution of sample firms

Industry	Firms	Industry	Firms
Mining	83	Wholesale & retail trade	92
Construction & manufacturing	472	Finance, ins. & real estate	199
Transportation, communication, and other public utilities	205	Services	127

Panel C: Ownership concentration variables

HI-INST and HI-INSD are the Herfindahl index of institutional and insider ownership concentration, respectively. They are calculated by summing the squared percentage of shares controlled by the five institutions and the five insiders, respectively, with the largest holdings in the firm. PERBLOCK is the total percentage of firm owned by the noninsider 5-percent blockholders of the firm. NUMBLOCK is the number of the noninsider 5-percent blockholders.

Variable	Mean	Median	Std. Dev.	Q1	Q3	Max.
HI-INST	156.04	101.04	283.98	45.70	187.54	6484.78
HI-INSD	308.40.	8.20	824.20	0.20	179.00	7962.60
PERBLOCK	21.47	17.15	19.23	6.64	31.57	99.99
NUMBLOCK	2.80	2.00	2.21	1.00	4.00	16.00

Table 3
Pearson correlation coefficients

LMVE is the log of the market value of firm's equity in $ million. DEBT is the ratio of long term debt to equity. RETVAR is the variance of the daily total returns. RSQ is the correlation between firm and market returns as measured by the coefficient of determination of the OLS regression of the daily firm return on the daily return on the value-weighted market portfolio. CODES is the number of four-digit SIC codes corresponding to the firm. LSHARES is the log of number of shares outstanding. LNINST is the log of the number of institutions holding the firm's stock. PERINSD denotes the total percentage of firm owned by insiders. PERBLOCK is the total percentage of firm owned by the noninsider 5-percent blockholders of the firm. NUMBLOCK is the number of the noninsider 5-percent blockholders. HI-INST and HI-INSD are the Herfindahl index of institutional and insider ownership concentration, respectively. They are calculated by summing the squared percentage of shares controlled by the five institutions and the five insiders, respectively, with the largest holdings in the firm.

Variable	LMVE	DEBT	RETVAR	RSQ	CODES	LSHARES	LNINST	PERINSD	PERBLOCK	NUMBLOCK	HI-INST
DEBT	-0.00										
RETVAR	-0.58	-0.05									
RSQ	0.68	0.02	-0.38								
CODES	0.50	0.02	-0.35	0.32							
LSHARES	0.92	-0.01	-0.41	0.61	0.44						
LNINST	0.93	-0.02	-0.57	0.69	0.48	0.85					
PERINSD	-0.33	0.01	0.31	-0.28	-0.26	-0.28	-0.40				
PERBLOCK	-0.20	0.03	0.17	-0.17	-0.12	-0.18	-0.17	-0.03			
NUMBLOC	-0.19	0.03	0.11	-0.10	-0.09	-0.20	-0.09	-0.08	0.73		
HI-INST	-0.04	0.01	-0.01	-0.09	-0.03	-0.05	-0.04	-0.01	0.20	0.15	
HI-INSD	-0.12	0.04	0.13	-0.17	-0.13	-0.09	-0.22	0.60	-0.03	-0.14	-0.02

Correlation coefficients with an absolute value of more than 0.08 are two-tailed significant at the 1% level.

Table 4
Regressions of analyst following on
concentration of shareholdings

This table presents the results of OLS regressions of analyst following (NAL) on variables representing concentration of shareholdings and control variables. Two-digit SIC code-based industry dummy variables are included in the regressions to control for possible industry effects. The results are based on 1,178 observations.

Variable	Expected Sign	(1)	(2)	(3)	(4)
Intercept		-43.958 (-20.89)***	-43.460 (-20.53)***	-42.110 (-20.25)***	-41.449 (-19.70)***
Herfindahl index of institutional ownership concentration (HI-INST) * 10^{-3}	-	-0.895 (-1.79)**	-0.903 (-1.82)**		
Herfindahl index of insider ownership concentration (HI-INSD) * 10^{-3}	-	-0.615 (-4.56)***	-0.375 (-2.28)*		
Percentage of firm owned by noninsider blockholders (PERBLOCK)	-			-0.017 (-2.52)***	
Number of noninsider blockholders (NUMBLOCK)	-				-0.139 (-2.56)**
Log of market value of firm's equity in $ million (LMVE)	+	2.041 (6.49)***	2.062 (6.50)***	1.963 (6.41)***	1.887 (6.21)***
Ratio of long term debt to equity (DEBT)	-	-0.026 (-2.16)	-0.026 (-2.35)	-0.026 (-2.22)	-0.026 (-2.24)
Variance of daily total returns (RETVAR) * 10^3	+ or -	1.119 (5.04)***	1.173 (5.21)***	1.233 (5.42)***	1.222 (5.42)***
Correlation between firm and market returns (RSQ)	+	10.697 (3.51)***	10.620 (3.51)***	10.966 (3.65)***	11.212 (3.73)***
Number of four-digit SIC codes (CODES)	+ or -	-0.264 (-2.71)***	-0.281 (-2.86)***	-0.285 (-2.91)***	-0.279 (-2.84)***
Log of number of shares outstanding (LSHARES)	+	1.526 (4.95)***	1.515 (4.95)***	1.489 (4.88)***	1.455 (4.76)***
Log of number of institutions holding the firm's stock (LNINST)	+	2.200 (5.74)***	2.113 (5.36)***	2.238 (6.06)***	2.405 (6.61)***
Percentage of insider ownership (PERINSD)	-		-0.018 (-2.37)**	-0.029 (-4.46)***	-0.029 (-4.44)***
F-value		238.42***	223.61***	239.36***	239.12***
Adjusted R^2 (%)		73.85	73.94	73.93	73.91

Asterisks indicate two-tailed significance at 1% (***), 5% (**), and 10% (*) levels.