# Do shareholders care about geography?[*]

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September 2008

## Abstract

Geography has been shown to affect the behavior of investors and analysts. We investigate the impact of geography on firm dividend policies. We argue that location influences a firm's information environment. If distance increases information asymmetries about managerial investment decisions, investors of remotely located firms will demand higher dividends. Our empirical results support the first prediction. Centrally located firms pay lower dividends and replace regular dividends with share repurchases or special dividends. Similar results are obtained for changes in dividends. Centrally located firms make more dividend cuts, raise dividends more often, and exhibit less dividend variability. Market reaction to dividend announcements is negatively related to urban location. The effect of geography on dividends is most pronounced when growth opportunities are limited.

JEL G30, G31, G35, G39

Keywords: geography, firm location, dividends, payout

[*] Anzhela Knyazeva and Diana Knyazeva acknowledge the financial support of the William E. Simon Graduate School of Business Administration. The authors are grateful to Sanjay Banerji, Avri Ravid, An Yan, participants at the Corporate Governance Luncheon at New York University and 2008 European Finance Association meeting. All errors and omissions are ours.
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## 1. Introduction

In this paper we investigate the impact of geography on dividends. Existing evidence suggests that distance increases investors' information costs. We hypothesize that location influences a firm's information environment and, as a consequence, its dividend policies. Decreased observability of managerial investment decisions in remotely located firms creates potential for value destruction. Managers are more likely to use free cash flow for empire building, resulting in less efficient investment. To compensate, investors would demand higher dividends, particularly if the firms have few growth opportunities. Alternatively, if remote location increases external financing costs, such firms may decrease payout to conserve cash. Empirically, we find that central location explains lower dividends and a preference for repurchases and special dividends, holding other factors constant. The relation between dividends and location is most pronounced for firms with few growth opportunities. Consistent results are obtained for time series properties of dividends. Centrally located firms make more cuts and fewer increases; exhibit less dividend smoothing; and experience weaker market reaction to dividend announcements.

This paper is related to recent literature on the relevance of geography for the behavior of investors, analysts, and firms. Investors prefer domestic stocks (Coval and Moskowitz, 1999; Ivkovic and Weisbenner, 2005). Mutual fund managers earn abnormal returns in local investments (Coval and Moskowitz, 2001). Local analysts have an information advantage that translates into more precise earnings forecasts and leads to more analyst following of local firms (Malloy, 2005; Bae, Stulz, and Tan, 2008). Acquirers prefer local targets and realize higher gains from local acquisitions (Kedia and Panchapagesan, 2004). Stocks of firms located in large cities are more liquid and draw higher institutional ownership (Loughran and

Schulz, 2005). Certain firm characteristics are significantly influenced by urban location. Remotely located firms delay equity offerings, use more debt (Loughran and Schulz, 2006), and facer higher costs of debt financing (Francis, Hasan, and Waisman, 2006). They also have less powerful CEOs and use less incentive pay (Francis, Hasan, John, and Waismann, 2007). Firm financing policies resemble those of nearby firms (Gao, Ng, and Wang, 2006). Firms take into account investor demand for dividends and the presence of dividend clienteles (Graham and Kumar, 2006). Dividends are higher in periods with high market dividend premium (Baker and Wurgler, 2004) and in areas with an older demographic (Becker, Ivkovic, and Weisbenner, 2007). John and Kadyrzhanova (2008) show that firms model their corporate governance practices on those of their peers in the same industry and state.

This research continues the corporate finance work on the determinants of dividend behavior of firms. One explanation for the existence of dividends despite the costs of external financing and personal taxes is signaling. Firms can mitigate adverse selection costs by revealing noisy information about future cash flows through a costly dividend signal (Miller and Rock, 1985; John and Williams, 1985; Kumar, 1988). The free cash flow theory offers another explanation. Firms with high agency costs of free cash flow pay higher dividends to constrain managers from inefficient investment and subject them to monitoring from capital markets (Easterbrook, 1984; Lang and Litzenberger, 1989; Smith and Watts, 1992). This paper is also related to the work on firm cash policies (see, e.g., Dittmar and Mahrt-Smith, 2007; Harford, Mansi, and Maxwell, 2005; Almeida, Campello, and Weisbach, 2004, etc.).

The paper contributes to existing literature by offering evidence on the role of geographic factors for firm dividend policies.

If costs of acquiring information increase with distance, a firm's location should influence information asymmetries between the firm and investors. Despite advances in technology, shareholders of remotely located firms are expected to face higher costs of obtaining information about the quality of the firm's investment projects. Decreased observability of managerial investment decisions creates potential for value destruction. Managers may use firms' cash flows to overinvest in inefficient projects. To partly mitigate the agency conflict, investors of remotely located firms may demand the payment of higher dividends. The effect should be strongest for firms with few growth opportunities, for which unobservability of managerial actions has a large impact on firm value. In contrast, shareholders of centrally located firms enjoy better information about the manager's investment decisions. Low monitoring costs decrease investor demand for regular cash dividends. Controlling for other factors, centrally located firms are expected to pay lower dividends; replace regular dividends with share repurchases or special dividends; make more dividend cuts; and engage in less dividend smoothing.

The alternative prediction emphasizes the costs of external financing for remotely located firms. If remote location increases external financing costs, firms will accumulate cash to finance future projects internally (consistent with Almazan, de Motta, Titman, and Uysal, 2008) and may also reduce costly payouts to shareholders. The prediction is a negative effect of distance on dividend payout.

Our findings are as follows. Central location contributes to lower dividends, a lower fraction of dividends in payout, and a preference for repurchases and special dividends, holding other factors constant. For instance, dividends of an average remotely located firm are 36% higher than of an average centrally located firm (the difference is 31% of the sample

average dividend). After accounting for variation in firm characteristics, the effect of remote location is 14% of the average dividend. Consistent results are obtained for time series properties of dividends a. Central location has a negative effect on dividend changes. Centrally located firms are more likely to cut or suspend dividends and less likely to increase dividends. They also exhibit less dividend smoothing and experience a less negative market reaction to dividend cuts.

Several additional considerations are relevant for our empirical tests. Geographic factors can influence institutional ownership and analyst following, which could affect information asymmetries and dividend behavior. The ability of analysts and institutional investors to produce accurate information is potentially impeded by remote location of the firms of interest. Empirically, nonurban firms have lower institutional ownership and analyst following. It is possible that geography affects dividend policy through these two channels. In addition, location can have a systematic effect on the structure of incentives and contracts within the firm, including insider ownership, equity-based pay, and entrenching charter provisions. After controlling for these characteristics, the geography effect continues to hold. Our finding cannot be explained by existing proxies for information asymmetries and agency conflicts and can be attributed to higher costs of gathering information for shareholders of remotely located firms.

The results are robust to the use of several different measures of geographic location: distance to a large (top ten or top fifty) metropolitan area, distance to an airport, location in a large metropolitan area, and metropolitan area size. The advantage of using geographic location is that it is largely predetermined for firms during our sample period (1992-2006). To

verify our results, we perform two-stage least squares and replicate the analysis using only firms that had selected their location prior to the start of our sample period.

Overall, the evidence in this paper supports the assertion that firms and their shareholders are affected by geography. Investors demand higher dividends when faced with higher monitoring costs due to remote firm location.

The rest of the paper is organized as follows. The second section discusses data and variables. The third section presents the results and robustness checks. The fourth section concludes and discusses directions for future work.

## 2. Data and variables

*Sample*

The sample period is restricted by the availability of executive compensation and insider ownership, institutional ownership, and analyst forecast data and covers 1992 through 2004. Use of a longer sample period (1971-2006) to estimate main specifications does not affect our results, as discussed later in the paper. The sample is drawn from Compustat Industrial Annual. Following conventional sample selection criteria, we exclude firms in financial and regulated utilities industries (SIC codes 6000-6999 and 4900-4999), firms located outside the US, and firms with asset size below twenty million. Tests of dividend type require the availability of CRSP data on dividend distributions. We further require the availability of data on CEO ownership and compensation from Execucomp, analyst following from I/B/E/S, and institutional ownership from CDA Spectrum.

*Geography*

We look at two main and three supplementary measures of geographic location.

First, we look at log of distance to a major metropolitan area, *Distance*, to capture the costs of distance more directly. Firms located farther away from large cities with a high concentration of investors are expected to face higher information asymmetries. Distance in miles is computed using the Great Circle Distance Formula and data on county coordinates.

Second, similarly to Loughran and Schulz (2005), we consider the effect of central (urban) location. Urban firms are firms headquartered in one of the ten largest metropolitan areas according to the 2000 Census: New York City, Los Angeles, Chicago, Washington-Baltimore, San Francisco, Philadelphia, Boston, Detroit, Dallas, and Houston, and their suburbs. We use the location of the firm's headquarters as reported in Compustat (FIPS state and county code) to create a dummy variable, *Central_Location*, equal to 1 if the firm is located in a top ten metropolitan area and 0 otherwise. The central location dummy has a negative correlation with distance and should enter with the opposite sign.

We use three additional measures of location. Besides distance to a major city, distance to the closest airport, *Distance_Airport*, can reflect the costs of conveying information to investors. Firms located farther away from airport hubs are expected to be less accessible to shareholders, hence face greater information asymmetries. We examine distance between the firm and the closest primary commercial service airport hub that services at least 0.05% of domestic revenue passenger boardings and has at least ten thousand revenue passenger boardings a year. Thus, large, medium, and small airport hubs are included.

Similarly, we expand the main distance measure to include distance to one of the top fifty domestic metropolitan statistical areas, *Distance_Top50*, identified on the basis of total population recorded in the 2000 Census.

Finally, other things given, larger metropolitan areas are expected to have more investors. Firms in large cities would on average be located closer to their shareholders and face fewer information asymmetries. The size of the metropolitan area is measured by the population rank of the metropolitan area where the firm is headquartered. Higher values are assigned to metropolitan areas with larger populations. The rank is rescaled such that the resulting variable is between 0 and 1. The variable has a positive correlation with the central location dummy.

Due to data constraints, a firm's location is defined as the location of its headquarters. This poses a potential limitation since valuable information can be gleamed from on-site evaluation of production facilities, which could be located elsewhere (in the case of firms with multiple geographic segments). However, the cost of obtaining key value-relevant soft information about the investment strategy, cash flow projections, and the skill of the top management is likely to depend on the distance to the firm's headquarters where principal decisions are made. However, the presence of multiple geographic segments need not introduce bias in a particular direction. Geographically disperse firms may have additional information asymmetries involving divisions located away from headquarters. At the same time, shareholders of multi-segment firms could be located closer to one of the firm's divisions even if the distance to headquarters is considerable.

*Dependent variables*

Dividend policy is captured using several dependent variables. The level of dividends, *Dividends*, is defined as the ratio of annual cash dividends on common stock to the market value of the firm (book value of total assets plus market value of equity minus book value of equity). In robustness checks dividend yield is defined as the ratio of dividends per share to

stock price. The likelihood of positive dividends in a given year is examined using Logit estimation. The share of dividends in payout, *Dividends/Payout*, is defined as the ratio of cash dividends on common stock to the sum of dividends and repurchases. The type of payout policy is analyzed in the Multinomial Logit framework. To define payout policy type, we combine Compustat data on repurchases and CRSP data on the types of dividend distributions. The categorical variable, *Payout Type*, is set to 0 if the firm had no payout; 1 if the firm had only share repurchases or special dividends; and 2 if the firm paid regular cash dividends to common shareholders in a given year. Special dividends include year-end or final, extra or special, or non-recurring dividends (CRSP distribution codes 1262, 1272, 1292).

In addition, we examine changes in dividends over time. The annual change in cash dividends on common stock is scaled by the previous year's market value. We use Logit estimation to examine the likelihood of dividend increases and the likelihood of dividends cuts (the latter defined only for past dividend payers).

Dividend variability, *StdDev*(*Div*), is defined as the standard deviation of regular quarterly cash dividends on common stock. The measure uses all available sample observations to generate one observation per firm. In variability regressions, sample averages of firm characteristics are used instead of firm-year observations on the right hand side. We also estimate speed of adjustment coefficients separately for centrally and non-centrally located firms. Similarly to Lintner (1956) and Fama and Babiak (1968) as well as subsequent work, we regress the difference between this year's and previous year's dividends on past dividends (which yields the speed of adjustment coefficient) and a set of controls. The degree

of persistence is defined as one minus the speed of adjustment coefficient. A lower speed of adjustment coefficient therefore corresponds to more dividend persistence.

*Explanatory variables*

The following control variables are used to predict dividend. Return on assets, defined as the ratio of EBITDA to total assets, is expected to have a positive effect on payout. Investment opportunities measured by market-to-book ratio, defined as the ratio of the firm's market value to the book value of total assets, are expected to have a negative effect on payout. Growth firms are less likely to face significant agency problems. Firms with more cash flow risk, defined as the standard deviation of cash flows over a ten-year period, are expected to have lower and more variable dividends. Larger firms are expected to have higher dividends. Firm size is measured as the log of market value. We expect firms with more tangible assets, defined as the share of property, plants and equipment in total assets, to pay out more.

We account for other variables that can be correlated with geography as well as dividend decisions. Firms with higher managerial ownership, defined as the ratio of shares held by the CEO to common shares outstanding, are expected to have fewer agency conflicts and pay lower dividends (Rozeff, 1982). CEO stock options decline in value around dividend announcements, so managers receiving incentive pay in the form of options are expected to decrease dividends and use repurchases (Fenn and Liang, 2001). We use the ratio of CEO stock options to common shares outstanding. As a robustness check, we use the ratio of new CEO option grants to firm market value. Managerial ownership and compensation data is obtained from Execucomp, beginning in 1992.

The presence of institutional blockholders can decrease information asymmetries and improve monitoring of the management, which reduces the need for a costly dividend pre-commitment (John and Knyazeva, 2007). We include the largest institutional shareholder stake in the firm. We believe this variable is better at capturing monitoring capacity compared to the sum of institutional holdings, which could be comprised of disperse stakes held by many institutional investors. In robustness checks we use the dummy for the presence of a five percent institutional blockholder. Institutional holdings are obtained from 13f filings (CDA Spectrum). A potential limitation of our variable is that it does not capture differences in investor distance to the firm. However, big-city investment management companies are among the largest institutional investors. Further, potential non-randomness in the pairings of institutional investor locations and firm locations would work against our result. If local institutions hold shares of nonurban firms, such firms will face fewer information asymmetries. This would mitigate informational differences between centrally located and nonurban firms and bias estimation against finding a significant location effect.

Analyst coverage can decrease information asymmetries faced by the firm. Existing work has shown that the information production role of analysts increases with analyst proximity to target firms (Malloy, 2005; Bae, Stulz, and Tan, 2008). Analyst coverage data is obtained from I/B/E/S. We use the log of one plus the number of one-year-ahead analyst earnings forecasts to proxy for analyst following.

Robustness checks control for the presence of debt, which can serve as a substitute for dividends. Earlier work has shown that investors in less liquid firms have a preference for high dividends (Banerjee, Gatchev, and Spindt, 2006). Our proxy for liquidity is annual share turnover, defined as the ratio of shares traded to common shares outstanding. We also control

for corporate governance using the Gompers, Ishii, and Metrick (2003) index of takeover defenses. Better governed firms pay lower dividends (John and Knyazeva, 2007). DeAngelo, DeAngelo, and Stulz (2006) find a significant effect of the firm's life cycle on dividend behavior, which can be captured by looking at retained earnings.

*Estimation*

Since industry affiliation can have a significant effect both on the choice of location (e.g., geographic clusters of refining, auto making, financial services firms) and dividend behavior, all regressions control for industry dummies at the 3-digit SIC level. The results continue to hold if we instead use Fama and French (1997) industry dummies (not reported). We also include a set of year dummies to control for time trend effects, such as the disappearance of dividends. To account for potentially non-i.i.d. error structure, we use robust standard errors with clustering at the firm level. In robustness checks we estimate the main specification using double clustering of standard errors at the firm and year level, following Petersen (2006). In addition, we estimate the main specification using Fama and MacBeth (1973) methodology.

Our analysis could be affected by the direction of causality. Several considerations mitigate this concern. First, location can be treated as a predetermined variable for the purposes of dividend analyses. Second, dividends are unlikely to drive the initial choice of location. Investment opportunities, industry affiliation, proximity of competitors, and costs of inputs are expected to have a first-order effect on the attractiveness of a given location. We have attempted to control for the determinants of dividends that could affect location, for instance, investment opportunities and industry variation. Third, to the extent to which firms with residual information asymmetries (after controlling for analyst coverage, institutional

ownership, asset tangibility, and liquidity) might self-select into central locations, they are expected to pay higher dividends, controlling for other factors. If such self-selection occurs, it would bias estimation against the finding of lower dividends among centrally located firms.

The use of firm fixed effects and first differences to address the causality concern is impractical in our case due to persistence of location, so we use two-stage least squares to verify our findings. The instruments include two continuous variables computed at the three-digit SIC industry level and two dummy variables for the firm's sector (agriculture and mining). The continuous variables are the average distance of industry firms to a large city in the year of the firm's entry and the average size of the urban segment of the firm's industry. They are intended to proxy for industry-specific benefits of central location considered by the firm's management. Urban versus rural customer base, the role of transportation costs, and differences in the costs of labor are expected to have a significant industry-level component for firms that choose their location in a given time period. While we do not have data on the year the firm was founded, we use the earliest year when the firm appeared in the Compustat sample. Agricultural and mining firms are expected to locate more often outside major cities due to the nature of the production process. It is not clear that either of the two groups of firms should have higher or lower dividends, controlling for other factors. We therefore expect the identified variables to affect dividends only through the effect of location choice.

Further, similarly to Masulis, Wang, and Xie (2007), we check whether the results hold when we only use firms that had existed prior to the start of our sample period (1992-2006). For "Pre-1992 firms", location is most likely to be a predetermined variable when we consider dividend decisions.

Summary statistics of the main variables are presented in Table 1.

[insert Table 1 approximately here]

In our sample, 53% of firms are characterized as having central location in one of ten largest cities or their suburbs. Dividends constitute on average 0.56% of the firm's market value and 49% of total payout. Approximately 30% of firms record no payout in a given year; another 20% use only share repurchases or special dividends; and 50% report positive cash dividends.

## 3. Results

The first set of results is based on univariate tests of means of dividend policy variables for centrally located (urban) and nonurban firms.

[insert Table 2 approximately here]

We find significantly lower incidence and levels of dividend payments among urban firms. Compared to urban firms, nonurban firms are 14% more likely to pay dividends. They on average pay higher dividends to common stockholders. The difference in means is highly statistically significant and represents approximately 31% of the sample average dividend. Dividends constitute a higher fraction of total payout for nonurban firms: 55% for centrally located firms versus 43% for firms located outside large cities. Among payers, centrally located firms are 24% more likely to use repurchases or special dividends as the only form of payout, as opposed to resorting to regular cash dividends. Univariate tests omit a number of determinants that can be correlated both with location and dividend behavior discussed in the previous section. We next turn to multivariate analysis.

Table 3 reports the results of our main regressions.

[insert Table 3 approximately here]

After controlling for other variables, dividend levels are positively associated with distance and negatively associated with central location. Nonurban firms pay higher dividends, ceteris paribus. The coefficients are highly statistically significant and economically important. The effect of central location on dividends is –0.078, or approximately 14% of the sample average dividend. Nonurban firms have an 8.6% higher share of dividends in total payout. Nonurban firms are also significantly less likely to rely on special dividends or share repurchases in place of regular dividends. The results show that urban firms have a lower need for dividends and prefer to avoid payout or resort to less costly infrequent payouts such as share buybacks and special dividends.

Other variables enter significantly in the main specifications. Dividends are increasing in ROA and firm size and decreasing in investment opportunities and riskiness of the firm's cash flows. Similar results hold for the share of dividends in payout although firms with large cash windfalls pay out more in the form of share repurchases. Incentive compensation is an important determinant of payout. CEOs that receive a higher fraction of their compensation in the form of stock options are reluctant to pay dividends because dividend payments lead to a decrease in the value of their option portfolio. It is also known that urban firms use more incentive pay (Francis, Hasan, John, and Waisman, 2007). Consistent with existing work, CEO stock options are found to reduce the use of dividends, but the effect of location remains highly significant.

Institutional investors play a role in producing and disseminating information about the firm and monitoring of the manager. Institutional investors are usually viewed as more sophisticated relative to the retail investor clientele. Existing work has shown that institutions prefer lower dividend payments (Grinstein and Michaely, 2005). At the same time,

institutional ownership is higher for urban firms (Loughran and Schultz, 2005). Inclusion of institutional stakes in the firm could account for this explanation. We find that institutional holdings have a negative effect on the dividend level and the likelihood of paying dividends. The geography effect cannot be explained by variation in ownership structure.

Analyst coverage can mitigate information asymmetries between the firm and its shareholders. Firms with more analyst coverage are expected to have lower dividends. Loughran and Schultz (2005) find that urban firms enjoy more analyst coverage. Malloy (2005) and Bae, Stulz, and Tan (2008) show that geographic location affects the quality of analyst forecasts. The local advantage of analysts and greater analyst following of urban firms can explain our result. Our tests show that the inclusion of analyst coverage as an explanatory variable does not override the direct effect of location.

The results presented in Table 3 suggest that the effect of geography can be attributed to differences in the ability of investors to monitor remotely located versus centrally located firms. Lower monitoring costs for shareholders of centrally located firms decrease the need for costly payout. The documented effect is only partially explained by variation in CEO incentives, institutional ownership, and analyst coverage.

The measure of geographic location used in Tables 2 and 3 could be noisy. Classification of firms on the basis of location within a short distance of a top ten metropolitan area implicitly assumes that firms located close to smaller metropolitan areas suffer a significant information disadvantage. To examine the sensitivity of our results to this assumption, we reproduce the main results of Table 3 with three alternative characteristics of geographic location: distance to a top fifty metropolitan area; distance to the closest airport; size rank of the metropolitan area in which the firm is located. These variables may provide

more insight into the range of information environments facing the firm. We expect greater distance to an airport or to a top fifty metropolitan area to increase the severity of the firm's information asymmetries. Firms located in larger metropolitan areas are expected to present lower monitoring costs.

[insert Table 4 approximately here]

The results from Table 3 are confirmed for our alternative measures of geography. Firms located farther away from airports or large metropolitan areas pay higher dividends and allocate a higher percentage of overall payout to dividends rather than share repurchases. The effect of the size of the metropolitan area in which the firm is located is similar to the effect of the binary measure of central location. The evidence in Table 4 confirms the findings obtained with the baseline measures of geography, so we will continue to use them in the remainder of our analyses.

To further interpret the documented effect of location on dividends as due to agency, we differentiate between firms with extensive and limited investment opportunities. Distance impacts the ability to shareholders to obtain information about the firm and managerial actions. The issue is particularly severe for firms with limited investment opportunities that face high agency costs. We expect central location to have the most pronounced effect on firms with low market-to-book ratios, in which decreased observability of managerial actions poses the greatest potential for value destruction, hence, reinforces the need for dividends.

[insert Table 5 approximately here]

In Column I of Panel A, we interact market-to-book ratio with distance. While the direct effect of distance on dividends is positive, the interaction term with market-to-book enters with a negative and significant sign. The relation between distance and dividends is

weakest for firms with good investment opportunities and strongest for firms with limited investment opportunities. In Columns II-V of Panel A, we estimate the main specification from Column I of Table 3 in four subsamples identified by quartiles of market-to-book ratio. Since market-to-book is used to identify subsamples, it is replaced on the right hand side by sales growth, another proxy for growth and investment prospects of the firm. Comparison of distance coefficient estimates reveals that the effect of location on dividends is statistically significant only in the bottom quartile of investment opportunities. The results have important implications for our hypothesis. While remotely located firms overall face a greater need to pay dividends, it is conditional on the lack of investment opportunities. The finding is consistent with free cash flow costs as a determinant of dividends (Lang and Litzenberger, 1989; Smith and Watts, 1992). Further, in Panel B we also examine the subsample of firms with high free cash flow costs through the prism of variation in governance. Arguably, if the monitoring the manager is particularly important for high free cash flow firms, it should be even more important for high free cash flow firms with high G index (lower governance quality). In this subset of firms, we would expect to find the greatest concern over distance and the strongest relation of distance and dividends. Indeed, while dividends at high free cash flow firms increase with distance, the effect is strongest for firms with many takeover defenses (at least ten).

Changes in dividends over time

We have examined the effect of location on the levels of dividends. Panel A of Table 6 documents the implications of geographic location for changes in dividends.

[insert Table 6 approximately here]

Consistent with the results for dividend levels, dividend changes are increasing in distance (Column I). Conversely, central location enters with a negative coefficient (Column II). The effect is economically important. Holding other factors constant, the effect of switching to a central location is -0.013, which is approximately 52% of the average change in dividends. Logit results are reported in Columns III and IV. Centrally located firms are less likely to increase or initiate dividends. They are also more likely to cut or suspend a dividend if dividends were paid in the previous period.

Analyses of dividend variability and persistence are presented in Panel B of Table 6. Firms located within a short distance from a major city exhibit more variability in regular quarterly cash dividends (Columns I and II). In Columns III and IV, the degree of dividend persistence is estimated in subsamples of urban and nonurban firms. Following earlier work, we estimate speed of adjustment as the coefficient on past dividend in the first differences dividend regression and define persistence as one minus speed of adjustment. Estimates of dividend persistence demonstrate the effect of past dividend on current dividend: 0.761 for nonurban firms and 0.716 for urban firms. On the margin, centrally located firms engage in less dividend smoothing.

Dividend announcements

Evidence in Tables 3 and 6 suggests that nonurban firms have higher dividends, make fewer dividend cuts, and increase dividends more often. The results are consistent with shareholders of remotely located firms facing more information asymmetries with respect to managerial actions, hence, expecting higher dividends. The implication is that dividend changes announced by remotely located firms should trigger a stronger market reaction. We use CRSP data on split-adjusted regular quarterly cash dividends on common shares to

identify dates of dividend increases and decreases. Market reaction is measured with the three-day cumulative abnormal return using the market model for normal returns. Since dividend decreases and increases have different magnitudes, we include interaction terms of the dividend change and firm characteristics in full sample results. We also examine market reaction to dividend decreases and dividend increases in separate subsamples.

[insert Table 7 approximately here]

Shareholders react more strongly to dividend changes by nonurban firms (Column I). The effect is driven by downward changes in dividends (Column III). Market reaction to dividend cuts (but not dividend increases) is stronger for remotely located firms, which suggests greater importance of preserving dividends for firms faced with more information asymmetries as a result of geographic factors.

*Robustness checks*

Variable definitions and additional controls

As we have seen from earlier results, the main findings are robust to the use of five alternative measures of geographic location, including distance to a top ten metropolitan area, location in a top ten metropolitan area, distance to a top fifty metropolitan area, distance to an airport, and size of the metropolitan area where the firm is located.

In Table 8 we use alternative definitions of dependent variables and introduce additional explanatory variables to check the robustness of the main dividend results.

[insert Table 8 approximately here]

Logit analysis in Column I reveals that the likelihood of being a dividend payer is also increasing in distance. The dividend findings are corroborated when we replace our main measure of dividends with dividend yield (Column II).

Additional explanatory variables are introduced in Column III. The use of the 5% blockholder dummy instead of the largest institutional shareholding does not affect the results. The alternative proxy for option compensation (annual stock option grants scaled by market value) enters with a negative and highly significant coefficient in the dividend specification but does not reverse our result. Firms that carry debt have lower dividends, which could reflect the substitution between debt and dividends as alternative bonding devices as well as the presence of dividend restrictions in debt contracts. Inclusion of the G Index to proxy for the quality of corporate governance in the firm does not weaken the effect of location on dividend behavior. Consistent with John and Knyazeva (2007), firms with more takeover defenses in their charter or bylaws adopt higher dividends and shift their total payout towards cash dividends. Consistent with DeAngelo, DeAngelo, and Stulz (2006), firms with a high share of retained earnings rather than contributed equity tend to pay higher dividends. As expected, investors in firms with less liquid stocks demand higher dividends.

Causality

Two-stage least squares results are reported in Panel A of Table 9. First stage regressions predict the choice of location with controls from the main equation and a set of instruments. The instruments were discussed in detail in the data section. The strength of the proposed instruments is supported by high first stage F-statistics.

Second stage results are consistent with our previous findings. Remotely located firms pay higher dividends.

[insert Table 9 approximately here]

In addition to two-stage least squares, we also reproduce ordinary least squares results using only firms that entered the database before the start of our sample period. Since location

changes very rarely, it is reasonable to assume that early entrants' geographic conditions are predetermined relative to such firms' dividend decisions made during our sample period, 1992-2006. The results, albeit obtained on a smaller sample, retain their significance and order of magnitude (Column II).

Sample period

Our findings are based on the 1992-2006 sample period due to requirements of data availability for the CEO ownership and compensation, institutional ownership, and analyst coverage variables. This restriction is relaxed in Panel B of Table 9, which reports results for the 1971-2006 period excluding the mentioned controls. The geography results continue to hold (Columns I-II). While we cannot directly compare the findings to those in Table 3 due to the omission of some control variables, the coefficients continue to hold.

Estimation methodology

Our main results are based on pooled estimation. Panel B of Table 9 also reports Fama-MacBeth estimates (Column III). We have used standard errors clustered at the firm level in previous tables. The results of estimation with double clustering of standard errors (at the firm and year level) are reported in Columns IV. The effects of geography on dividends continue to hold.

## Conclusion

Geography matters for corporate dividend decisions. By facilitating information production, central location decreases shareholders' costs of monitoring managerial actions. We have shown that location has a significant effect on firm dividend policy, dividend changes, dividend smoothing, and announcement returns.

Centrally located firms are less likely to pay (regular) dividends and more likely to rely on share repurchases and special dividends. Their dividends are smaller and constitute a smaller fraction of overall payout. After controlling for firm characteristics, the dividend differential due to location is approximately 14% of the sample average dividend. The percentage of dividends in payout is 8% lower for centrally located firms. We find a qualitatively similar effect for firms located closer to one of the forty-nine major metropolitan areas and firms located in larger metropolitan areas. The effect cannot be explained by increased use of equity-based incentives, higher institutional ownership, increased analyst following, greater liquidity, or improved corporate governance of centrally located firms although these variables enter with predicted signs.

Geography also affects the behavior of dividends over time. Distance has a positive effect on dividend changes. Centrally located firms decrease or suspend dividends more often, increase dividends less often, and face a weaker market reaction to dividend cuts. They also exhibit more dividend variability. The results continue to hold after various robustness checks.

This research provides new evidence that geography matters for firms and their shareholders due to its impact on the costs of monitoring. Several questions are open for future work, including the role of country differences for the effect of geography on dividend behavior and the implications of our findings for corporate financial decisions of firms with a large international investor base.

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## Table 1. Summary statistics of the main variables

The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US.

*Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *Dividends / Payout* is the ratio of cash dividends on common stock to the sum of cash dividends on common stock and repurchases. *Payout Type* is the categorical variable equal to 0 if the firm's payout is zero; 1 if share repurchases are positive but regular cash dividends on common stock are zero (CRSP, excludes special dividends with codes 1262, 1272, 1292); 2 if regular cash dividends on common stock are positive. Columns V and VI compare the likelihoods of outcomes 2 and 1.

*ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Cash* is the ratio of cash and short-term investments to total assets. *Firm_Size* is log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S).

*Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census. *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan areas or their suburbs as identified by the 2000 Census; 0 otherwise. *Distance_Top50* is log of distance in miles to the closest of the fifty largest metropolitan statistical areas as identified by the 2000 Census. *Distance_Airport* is log of distance in miles to the closest primary commercial service airport hub (an airport than has more than ten thousand revenue passenger boardings per year and accounts for at least 0.05% of revenue passenger boardings). *MSA_Size_Rank* is the rank of the metropolitan statistical area, in which the firm is located, based on population size, with higher values assigned to larger areas, rescaled to [0,1].

| | Obs. | Mean | Median | StdDev |
|---|---|---|---|---|
| Dividends | 16784 | 0.555 | 0.071 | 0.802 |
| Dividends/Payout | 11895 | 0.491 | 0.443 | 0.421 |
| ROA | 16784 | 0.140 | 0.143 | 0.112 |
| Market-to-Book | 16784 | 2.163 | 1.662 | 1.655 |
| Tangible_Assets | 16784 | 30.158 | 24.566 | 21.560 |
| Firm_Size | 16784 | 7.018 | 6.960 | 1.561 |
| StdDev_Cash_Flow | 16784 | -3.208 | -3.228 | 0.739 |
| CEO_Ownership | 16784 | 0.029 | 0.004 | 0.064 |
| CEO_Options | 16784 | 1.347 | 0.930 | 1.424 |
| Inst_Hold | 16784 | 9.136 | 8.578 | 4.423 |
| Analyst_Following | 16784 | 2.288 | 2.398 | 0.759 |
| Central_Location | 16784 | 0.528 | 1.000 | 0.499 |
| Distance | 16784 | 2.503 | 0.002 | 2.737 |
| Distance_Top50 | 16784 | 0.574 | 0.000 | 1.466 |
| Distance_Airport | 16784 | 2.483 | 2.443 | 0.708 |
| MSA_Size_Rank | 16221 | 0.924 | 0.967 | 0.118 |
| Payout Type | | | | |
| 0 = No payout, % | 4871 | 29.27% | | |
| 1 = Repurchases only, % | 3385 | 20.34% | | |
| 2 = Regular dividends, % | 8385 | 50.39% | | |

## Table 2. Univariate evidence

Two-sample t-tests of means. The null hypothesis is that the difference of the means is zero. The alternative hypothesis is that the difference of means is not zero.
The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US.
The following variables are used. *Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *D*(*Dividends > 0*) is the dummy variable equal to 1 if *Dividends* is positive; 0 otherwise. *Dividends/Payout* is the ratio of cash dividends on common stock to the sum of cash dividends on common stock and repurchases. *Payout Type* is the categorical variable equal to 0 if the firm's payout is zero; 1 if share repurchases are positive but regular cash dividends on common stock are zero (CRSP, excludes special dividends with codes 1262, 1272, 1292); 2 if regular cash dividends on common stock are positive. The frequency of outcome 2 vs. outcome 1 (outcome 0 is omitted) is reported for *Payout Type*. *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan areas or their suburbs as identified by the 2000 Census; 0 otherwise.

| | | Non-Central Location | Central Location | Diff. Means (Non-Central - Central) |
|---|---|---|---|---|
| Dividends | Mean | 0.644 | 0.475 | 0.170 *** |
| | Obs. | *7914* | *8870* | |
| D(Dividends > 0) | Mean | 0.613 | 0.471 | 0.142 *** |
| | Obs. | *7914* | *8870* | |
| Dividends / Payout | Mean | 0.548 | 0.434 | 0.113 *** |
| | Obs. | *5975* | *5920* | |
| Payout Type [Regular Div vs. Spec Div or Rep Only] | Mean | 0.337 | 0.099 | 0.238 *** |
| | Obs. | *7855* | *8786* | |

*** significant at 1%; ** significant at 5%; * significant at 10%

## Table 3. The effect of geography on dividends

Columns I-IV report Ordinary Least Squares results. Columns V and VI report Multinomial Logit results. The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US.

*Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *Dividends / Payout* is the ratio of cash dividends on common stock to the sum of cash dividends on common stock and repurchases.

*Payout Type* is the categorical variable equal to 0 if the firm's payout is zero; 1 if share repurchases are positive but regular cash dividends on common stock are zero (CRSP, excludes special dividends with codes 1262, 1272, 1292); 2 if regular cash dividends on common stock are positive. Columns V and VI compare the likelihoods of outcomes 2 and 1.

*ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Cash* is the ratio of cash and short-term investments to total assets. *Firm_Size* is log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census. *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan areas or their suburbs as identified by the 2000 Census; 0 otherwise.

Three-digit SIC industry dummies, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t(z)-statistics are reported below coefficients and italicized.

| | I | | II | | III | | IV | | V | | VI | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dividends | | Dividends | | Dividends / Payout | | Dividends / Payout | | Payout Type: Pr (Reg Div vs. Spec Div or Rep Only) | | Payout Type: Pr (Reg Div vs. Spec Div or Rep Only) | |
| ROA | 0.303 | *** | 0.296 | *** | -0.472 | *** | -0.476 | *** | 1.760 | ** | 1.730 | ** |
| | *2.94* | | *2.89* | | *-5.79* | | *-5.85* | | *2.56* | | *2.50* | |
| Market-to-Book | -0.014 | *** | -0.013 | *** | 0.008 | | 0.008 | | -0.053 | | -0.053 | |
| | *-2.83* | | *-2.79* | | *1.48* | | *1.52* | | *-1.05* | | *-1.06* | |
| Tangible_Assets | 0.002 | | 0.002 | | 0.002 | *** | 0.002 | *** | 0.015 | *** | 0.015 | *** |
| | *1.51* | | *1.45* | | *3.08* | | *3.04* | | *3.14* | | *3.07* | |
| Firm_Size | 0.096 | *** | 0.097 | *** | 0.047 | *** | 0.047 | *** | 0.614 | *** | 0.619 | *** |
| | *7.34* | | *7.42* | | *6.56* | | *6.61* | | *9.58* | | *9.66* | |
| StdDev_Cash_Flow | -0.062 | *** | -0.061 | *** | -0.060 | *** | -0.059 | *** | -0.636 | *** | -0.638 | *** |
| | *-3.66* | | *-3.64* | | *-5.60* | | *-5.58* | | *-6.96* | | *-6.95* | |
| CEO_Ownership | -0.053 | | -0.052 | | -0.002 | | -0.002 | | -1.179 | | -1.109 | |
| | *-1.01* | | *-1.00* | | *-0.22* | | *-0.16* | | *-1.48* | | *-1.38* | |
| CEO_Options | -0.055 | *** | -0.055 | *** | -0.040 | *** | -0.040 | *** | -0.282 | *** | -0.278 | *** |
| | *-6.48* | | *-6.43* | | *-8.04* | | *-7.96* | | *-6.27* | | *-6.18* | |
| Inst_Hold | -0.009 | *** | -0.009 | *** | -0.002 | | -0.002 | | -0.036 | *** | -0.036 | *** |
| | *-3.14* | | *-3.14* | | *-1.37* | | *-1.45* | | *-3.03* | | *-2.98* | |
| Analyst_Following | -0.062 | *** | -0.061 | *** | -0.080 | *** | -0.079 | *** | -0.357 | *** | -0.348 | *** |
| | *-3.17* | | *-3.12* | | *-6.54* | | *-6.44* | | *-3.54* | | *-3.44* | |
| **Distance** | **0.010** | ** | | | **0.014** | *** | | | **0.101** | *** | | |
| | ***2.09*** | | | | ***4.80*** | | | | ***4.02*** | | | |
| **Central_Location** | | | **-0.078** | *** | | | **-0.086** | *** | | | **-0.643** | *** |
| | | | ***-2.76*** | | | | ***-5.54*** | | | | ***-4.57*** | |
| Obs. | 16784 | | 16784 | | 11895 | | 11895 | | 16641 | | 16641 | |
| $R^2$ | 0.402 | | 0.403 | | 0.343 | | 0.345 | | | | | |
| Adj. $R^2$ | 0.393 | | 0.394 | | 0.329 | | 0.331 | | | | | |
| Pseudo-$R^2$ | | | | | | | | | 0.324 | | 0.325 | |

*** significant at 1%; ** significant at 5%; * significant at 10%

## Table 4. The effect of geography on dividends: alternative measures of geography and distance

Ordinary Least Squares. The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US.
*Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *Dividends / Payout* is the ratio of cash dividends on common stock to the sum of cash dividends on common stock and repurchases. *Cash* is the ratio of cash and short-term investments to total assets.
*ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Firm_Size* is log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Distance_Top50* is log of distance in miles to the closest of the fifty largest metropolitan statistical areas as identified by the 2000 Census. *Distance_Airport* is log of distance in miles to the closest primary commercial service airport hub (an airport than has more than ten thousand revenue passenger boardings per year and accounts for at least 0.05% of revenue passenger boardings). *MSA_Size_Rank* is the rank of the metropolitan statistical area, in which the firm is located, based on population size, with higher values assigned to larger areas, rescaled to [0,1].
Three-digit SIC industry dummies, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t(z)-statistics are reported below coefficients and italicized.

| | I | | II | | III | | IV | | V | | VI | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dividends | | Dividends | | Dividends | | Dividends/ Payout | | Dividends/ Payout | | Dividends/ Payout | |
| ROA | 0.307 | *** | 0.315 | *** | 0.286 | *** | -0.443 | *** | -0.445 | *** | -0.433 | *** |
| | *2.98* | | *3.03* | | *2.73* | | *-5.47* | | *-5.46* | | *-5.41* | |
| Market-to-Book | -0.013 | *** | -0.014 | *** | -0.012 | ** | 0.008 | | 0.008 | | 0.006 | |
| | *-2.83* | | *-2.87* | | *-2.55* | | *1.41* | | *1.37* | | *1.16* | |
| Tangible_Assets | 0.001 | | 0.002 | | 0.002 | | 0.002 | *** | 0.002 | *** | 0.002 | *** |
| | *1.26* | | *1.59* | | *1.49* | | *2.94* | | *3.25* | | *2.63* | |
| Firm_Size | 0.096 | *** | 0.092 | *** | 0.104 | *** | 0.045 | *** | 0.045 | *** | 0.049 | *** |
| | *7.35* | | *7.30* | | *8.01* | | *6.30* | | *6.29* | | *6.68* | |
| StdDev_Cash_Flow | -0.064 | *** | -0.064 | *** | -0.062 | *** | -0.061 | *** | -0.061 | *** | -0.061 | *** |
| | *-3.79* | | *-3.79* | | *-3.67* | | *-5.80* | | *-5.72* | | *-5.71* | |
| CEO_Ownership | -0.054 | | -0.055 | | -0.037 | | -0.002 | | -0.004 | | 0.002 | |
| | *-1.02* | | *-1.05* | | *-0.83* | | *-0.22* | | *-0.38* | | *0.19* | |
| CEO_Options | -0.055 | *** | -0.056 | *** | -0.053 | *** | -0.041 | *** | -0.042 | *** | -0.040 | *** |
| | *-6.47* | | *-6.66* | | *-6.17* | | *-8.16* | | *-8.20* | | *-7.70* | |
| Inst_Hold | -0.009 | *** | -0.007 | *** | -0.008 | *** | -0.002 | | -0.002 | | -0.001 | |
| | *-3.14* | | *-2.87* | | *-2.79* | | *-1.44* | | *-1.47* | | *-1.04* | |
| Analyst_Following | -0.059 | *** | -0.060 | *** | -0.061 | *** | -0.080 | *** | -0.082 | *** | -0.077 | *** |
| | *-3.01* | | *-3.10* | | *-3.10* | | *-6.47* | | *-6.61* | | *-5.93* | |
| **Distance_Top50** | **0.025** | *** | | | | | **0.014** | *** | | | | |
| | ***2.63*** | | | | | | ***2.67*** | | | | | |
| **Distance_Airport** | | | **0.040** | ** | | | | | **0.027** | ** | | |
| | | | ***1.97*** | | | | | | ***2.37*** | | | |
| **MSA_Size_Rank** | | | | | **-0.254** | ** | | | | | **-0.188** | *** |
| | | | | | ***-2.00*** | | | | | | ***-2.99*** | |
| Obs. | 16784 | | 16784 | | 16221 | | 11895 | | 11895 | | 11405 | |
| $R^2$ | 0.402 | | 0.401 | | 0.408 | | 0.339 | | 0.338 | | 0.345 | |
| Adj. $R^2$ | 0.394 | | 0.392 | | 0.399 | | 0.325 | | 0.325 | | 0.331 | |

*** significant at 1%; ** significant at 5%; * significant at 10%

## Table 5. Geography and dividend behavior: the effect of investment opportunities

Ordinary Least Squares. The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US. The sample in Panel B excludes observation with missing *G_Index*. *Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Firm_Size* is log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census. *G_Index* is the Gompers, Ishii, and Metrick (2003) index of takeover defenses (IRRC Governance). Three-digit SIC industry dummies, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t-statistics are reported below coefficients and italicized.

*Panel A: Subsample analysis* (*market-to-book*)

| | I | | II | | III | | IV | | V | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dividends | | Dividends by Quartile of Market-to-Book | | | | | | | |
| | Full Sample | | 1st Qtile | | 2nd Qtile | | 3rd Qtile | | 4th Qtile | |
| ROA | 0.362 | *** | 0.308 | * | 0.401 | ** | 0.474 | *** | 0.020 | |
| | *3.44* | | *1.86* | | *2.05* | | *2.96* | | *0.18* | |
| Market-to-Book | -0.008 | ** | | | | | | | | |
| | *-2.14* | | | | | | | | | |
| Gr_Sales | | | -0.074 | * | -0.192 | *** | -0.029 | | -0.037 | ** |
| | | | *-1.94* | | *-2.65* | | *-1.26* | | *-2.22* | |
| Tangible_Assets | 0.002 | | 0.002 | | 0.001 | | 0.001 | | 0.001 | |
| | *1.48* | | *1.20* | | *0.37* | | *1.03* | | *0.63* | |
| Firm_Size | 0.091 | *** | 0.042 | * | 0.093 | *** | 0.122 | *** | 0.136 | *** |
| | *7.20* | | *1.95* | | *4.81* | | *6.96* | | *6.52* | |
| StdDev_Cash_Flow | -0.062 | *** | -0.040 | | -0.074 | ** | -0.037 | | -0.052 | ** |
| | *-3.68* | | *-1.26* | | *-2.55* | | *-1.46* | | *-2.38* | |
| CEO_Ownership | -0.052 | | 0.009 | | -0.193 | | -0.145 | | -0.664 | *** |
| | *-0.99* | | *0.44* | | *-0.65* | | *-0.61* | | *-4.00* | |
| CEO_Options | -0.056 | *** | -0.045 | *** | -0.075 | *** | -0.062 | *** | -0.029 | *** |
| | *-6.60* | | *-2.70* | | *-5.66* | | *-5.45* | | *-3.52* | |
| Inst_Hold | -0.009 | *** | 0.001 | | -0.013 | *** | -0.011 | *** | -0.008 | * |
| | *-3.10* | | *0.24* | | *-2.79* | | *-3.00* | | *-1.88* | |
| Analyst_Following | -0.059 | *** | -0.032 | | -0.115 | *** | -0.079 | ** | -0.098 | *** |
| | *-3.05* | | *-1.28* | | *-3.37* | | *-2.41* | | *-3.04* | |
| **Distance** | **0.017** | *** | **0.017** | ** | **0.012** | | **0.003** | | **0.009** | |
| | ***2.63*** | | ***2.29*** | | ***1.51*** | | ***0.47*** | | ***1.39*** | |
| **Distance* Market-to-Book** | **-0.003** | ** | | | | | | | | |
| | ***-1.97*** | | | | | | | | | |
| Obs. | 16784 | | 4186 | | 4189 | | 4200 | | 4196 | |
| $R^2$ | 0.402 | | 0.372 | | 0.423 | | 0.502 | | 0.588 | |
| Adj. $R^2$ | 0.393 | | 0.338 | | 0.390 | | 0.474 | | 0.568 | |

*** significant at 1%; ** significant at 5%; * significant at 10%

*Panel B: Subsample analysis* (*market-to-book and governance mechanisms*)

| | I | | II | | III | | IV | |
|---|---|---|---|---|---|---|---|---|
| | Market-to-Book (above med.) | | Market-to-Book (below med.) | | Market-to-Book (below med.) | | Market-to-Book (below med.) | |
| | | | | | G_Index above med. | | G_Index below med. | |
| ROA | 0.187 | | 0.784 | *** | 1.176 | *** | 0.539 | *** |
| | *1.18* | | *4.40* | | *4.02* | | *2.60* | |
| Gr_Sales | -0.245 | *** | -0.372 | *** | -0.384 | *** | -0.336 | *** |
| | *-5.61* | | *-8.78* | | *-6.12* | | *-6.44* | |
| Tangible_Assets | 0.002 | | 0.001 | | 0.004 | * | 0.000 | |
| | *1.24* | | *0.84* | | *1.73* | | *-0.17* | |
| Firm_Size | 0.107 | *** | 0.075 | *** | 0.079 | *** | 0.090 | *** |
| | *5.69* | | *3.47* | | *2.97* | | *3.27* | |
| StdDev_Cash_Flow | -0.105 | *** | -0.072 | ** | -0.093 | ** | -0.029 | |
| | *-4.03* | | *-2.52* | | *-2.51* | | *-0.72* | |
| CEO_Ownership | -0.004 | * | 0.000 | | -0.008 | | 0.003 | |
| | *-1.73* | | *-0.04* | | *-1.60* | | *0.77* | |
| CEO_Options | -0.049 | *** | -0.058 | *** | -0.053 | *** | -0.057 | *** |
| | *-4.69* | | *-3.76* | | *-2.88* | | *-2.89* | |
| Inst_Block | -0.012 | *** | -0.008 | * | -0.007 | | -0.010 | ** |
| | *-3.06* | | *-1.96* | | *-1.21* | | *-2.41* | |
| Analyst_Following | -0.130 | *** | -0.078 | *** | -0.039 | | -0.124 | *** |
| | *-4.18* | | *-2.63* | | *-1.08* | | *-3.19* | |
| Distance | 0.006 | | 0.020 | *** | 0.032 | *** | 0.016 | * |
| | *0.91* | | *2.94* | | *3.46* | | *1.69* | |
| Obs. | 7519 | | 7996 | | 4001 | | 3995 | |
| $R^2$ | 0.533 | | 0.385 | | 0.467 | | 0.407 | |
| Adj. $R^2$ | 0.519 | | 0.367 | | 0.440 | | 0.375 | |

*** significant at 1%; ** significant at 5%; * significant at 10%

# Table 6. Geography and changes in dividends over time

*Panel A. Changes in dividends*

The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US. Columns I-II report Ordinary Least Squares results. Columns III-IV report Logit results.

*Change_Div* is the change in cash dividends on common stock, scaled by the market value of the firm in the previous period (book value of total assets plus market value of common equity minus book value of common equity), times 100. *Pr*(*Increase*) is the probability of an increase in cash dividends on common stock, relative to previous year's dividends; it includes increases by past payers and initiations by nonpayers. *Pr*(*Decrease*) is the probability of an decrease in cash dividends on common stock by a firm that paid dividends in the previous period; it is defined only for past payers. *ROA* is the ratio of EBITDA to total assets, times 100. *Change_Market-to-Book* is the change in the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Change_Firm_Size* is the change in log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census. *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan statistical areas as identified by the 2000 Census; 0 otherwise.

Three-digit SIC industry dummies, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t(z)-statistics are reported below coefficients and italicized.

| | I | | II | | III | | IV | |
|---|---|---|---|---|---|---|---|---|
| | Change_Div | | Change_Div | | Pr(Increase) | | Pr(Decrease) | |
| Change_ROA | 0.001 | ** | 0.001 | ** | 0.002 | ** | -0.002 | ** |
| | *2.52* | | *2.53* | | *2.49* | | *-2.40* | |
| Change_Market-to-Book | -0.001 | | -0.001 | | -0.004 | * | -0.007 | |
| | *-1.21* | | *-1.20* | | *-1.93* | | *-1.47* | |
| Tangible_Assets | 1.2E-04 | | 1.2E-04 | | 0.002 | ** | 1.4E-04 | |
| | *0.56* | | *0.56* | | *2.27* | | *0.30* | |
| Change_Firm_Size | 0.032 | *** | 0.032 | *** | -0.032 | | -0.212 | *** |
| | *3.00* | | *3.01* | | *-1.33* | | *-6.66* | |
| StdDev_Cash_Flow | -0.019 | *** | -0.019 | *** | -0.167 | *** | 0.065 | *** |
| | *-4.57* | | *-4.56* | | *-12.61* | | *6.60* | |
| CEO_Ownership | 0.001 | | 0.002 | | -0.207 | | -0.057 | |
| | *0.18* | | *0.19* | | *-1.59* | | *-0.71* | |
| CEO_Options | 4.2E-04 | | 4.4E-04 | | -0.065 | *** | 0.014 | *** |
| | *0.24* | | *0.24* | | *-7.78* | | *3.03* | |
| Inst_Hold | -0.002 | *** | -0.002 | *** | -0.009 | *** | 0.005 | *** |
| | *-3.13* | | *-3.15* | | *-5.08* | | *4.42* | |
| Analyst_Following | 0.024 | *** | 0.024 | *** | 0.096 | *** | -0.050 | *** |
| | *6.55* | | *6.57* | | *7.05* | | *-6.21* | |
| **Distance** | **0.002** | ** | | | **0.017** | *** | **-0.006** | *** |
| | ***2.56*** | | | | ***4.61*** | | ***-2.78*** | |
| **Central_Location** | | | **-0.013** | ** | | | | |
| | | | ***-2.46*** | | | | | |
| Obs. | 16740 | | 16740 | | 16740 | | 8486 | |
| $R^2$ | 0.044 | | 0.044 | | | | | |
| Adj. $R^2$ | 0.030 | | 0.030 | | | | | |
| Pseudo-$R^2$ | | | | | 0.266 | | 0.168 | |

*** significant at 1%; ** significant at 5%; * significant at 10%

*Panel B. Variability of dividends and dividend smoothing*

Ordinary Least Squares. The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US. Columns I and II use one observation per firm is used; explanatory variables are defined as sample averages for each firm (*Central_Location* is rounded to the next integer). Columns III and IV use the full panel.

*StdDev*(*Div*) is the standard deviation of regular quarterly dividends on common stock (CRSP, distribution code 1232), times 100. *Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. $\Delta Dividends_t$ is the difference between cash dividends on common stock for this year ($Dividends_t$) and previous year ($Dividends_{t-1}$).

*ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Cash* is the ratio of cash and short-term investments to total assets. *Firm_Size* is log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census. *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan statistical areas as identified by the 2000 Census; 0 otherwise. In Columns III and IV, speed of adjustment is the negative of the coefficient on $Dividends_{t-1}$; degree of persistence equals one minus the speed of adjustment.

Three-digit SIC industry dummies, year dummies (Columns III-IV), and intercept are included but not reported in the table. Robust standard errors are used. t-statistics are reported below coefficients and italicized.

| | I | | II | | III | | IV | |
|---|---|---|---|---|---|---|---|---|
| | StdDev(Div) | | StdDev(Div) | | $\Delta Dividends_t$, Central_Location = 1 | | $\Delta Dividends_t$, Central_Location = 0 | |
| ROA | 1.731 | *** | 1.662 | ** | 0.124 | *** | 0.431 | *** |
| | *2.64* | | *2.52* | | *2.90* | | *5.44* | |
| Market-to-Book | 0.135 | ** | 0.137 | ** | -0.008 | *** | -0.022 | *** |
| | *2.40* | | *2.44* | | *-4.06* | | *-4.09* | |
| Tangible_Assets | 0.030 | *** | 0.030 | *** | 0.001 | | 0.001 | * |
| | *4.68* | | *4.65* | | *1.49* | | *1.77* | |
| Firm_Size | 0.845 | *** | 0.851 | *** | 0.024 | *** | 0.007 | |
| | *9.53* | | *9.58* | | *3.86* | | *0.96* | |
| StdDev_Cash_Flow | -0.168 | | -0.169 | | -0.026 | *** | 0.004 | |
| | *-1.39* | | *-1.40* | | *-3.24* | | *0.39* | |
| CEO_Ownership | -3.806 | *** | -3.817 | *** | -0.010 | | 0.023 | |
| | *-3.09* | | *-3.10* | | *-1.06* | | *0.31* | |
| CEO_Options | -0.228 | *** | -0.226 | *** | -0.010 | *** | -0.014 | ** |
| | *-4.20* | | *-4.17* | | *-2.87* | | *-2.53* | |
| Inst_Hold | -0.078 | *** | -0.077 | *** | -0.004 | *** | -0.003 | ** |
| | *-3.15* | | *-3.10* | | *-3.27* | | *-2.05* | |
| Analyst_Following | -1.074 | *** | -1.078 | *** | 0.004 | | 0.030 | *** |
| | *-5.53* | | *-5.53* | | *0.46* | | *3.33* | |
| **Distance** | **-0.074** | *** | | | | | | |
| | ***-2.79*** | | | | | | | |
| **Central_Location** | | | **0.301** | ** | | | | |
| | | | ***2.03*** | | | | | |
| $Dividends_{t-1}$ | | | | | -0.284 | *** | -0.239 | *** |
| | | | | | *-10.54* | | *-8.96* | |
| **Degree of Persistence** | | | | | **0.716** | | **0.761** | |
| [1-Speed of Adjustment] | | | | | | | | |
| Obs. | 2091 | | 2091 | | 8848 | | 7892 | |
| $R^2$ | 0.401 | | 0.399 | | 0.192 | | 0.165 | |
| Adj. $R^2$ | 0.327 | | 0.326 | | 0.173 | | 0.141 | |

*** significant at 1%; ** significant at 5%; * significant at 10%

## Table 7. Geography and market reaction to dividend announcements

Columns I-III report Ordinary Least Squares results. The sample includes changes in split-adjusted regular quarterly cash dividends (CRSP distribution code 1232) on common shares by Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data, excluding firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US. The following variables are used. *CAR*[-1,+1] is the three-day cumulative abnormal return on the announcement of a dividend change. *Industry_CAR*(*Increases*/*Decreases*) is the industry median CAR on the announcement of a dividend increase/decrease computed at the Fama and French (1997) industry level. Δ*DIV*t is the change in quarterly dividends per share. *ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Cash* is the ratio of cash and short-term investments to total assets. *Firm_Size* is log of firm's market value. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding, times 100. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Liquidity* is share turnover defined as the ratio of the number of common shares traded to common shares outstanding. *Analysts* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan areas or their suburbs as identified by the 2000 Census; 0 otherwise. Industry dummies at the 3-digit SIC level, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t-statistics are reported to the right of coefficient estimates and italicized.

| | I | | | II | | | III | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAR [-1,+1] All Dividend Changes | | | CAR [-1,+1] Dividend Increases | | | CAR [-1,+1] Dividend Decreases | | |
| Industry_CAR(Increases) | 0.358 | *3.39* | *** | 0.659 | *6.87* | *** | | | |
| Industry_CAR(Decreases) | 0.156 | *3.04* | ** | | | | 0.962 | *25.48* | *** |
| ΔDIVt*ROA | -0.016 | *-2.63* | ** | | | | | | |
| ROA | | | | -2.8E-04 | *-1.13* | | 0.001 | *2.19* | * |
| ΔDIVt*Market-to-Book | 0.000 | *-0.01* | | | | | | | |
| Market-to-Book | | | | -0.001 | *-0.52* | | 0.002 | *0.70* | |
| ΔDIVt*Tangible_Assets | -0.063 | *-0.33* | | | | | | | |
| Tangible_Assets | | | | 0.004 | *0.78* | | 0.005 | *0.35* | |
| ΔDIVt*Cash | 0.160 | *0.35* | | | | | | | |
| Cash | | | | 0.011 | *0.73* | | -0.034 | *-0.80* | |
| ΔDIVt*Firm_Size | -0.033 | *-1.14* | | | | | | | |
| Firm_Size | | | | 0.001 | *0.47* | | 0.004 | *1.11* | |
| ΔDIVt*StdDev_Cash_Flow | -0.001 | *-0.03* | | | | | | | |
| StdDev_Cash_Flow | | | | -2.5E-04 | *-0.14* | | -0.003 | *-0.69* | |
| ΔDIVt*CEO_Ownership | 0.001 | *0.20* | | | | | | | |
| CEO_Ownership | | | | 4.0E-05 | *0.19* | | -2.7E-04 | *-0.53* | |
| ΔDIVt*CEO_Options | -0.006 | *-0.14* | | | | | | | |
| CEO_Options | | | | 0.002 | *1.39* | | 0.003 | *0.95* | |
| ΔDIVt*Inst_Hold | 0.005 | *0.93* | | | | | | | |
| Inst_Hold | | | | -3.0E-04 | *-1.45* | | -0.001 | *-1.44* | |
| ΔDIVt*Liquidity | -0.061 | *-1.13* | | | | | | | |
| Liquidity | | | | -0.005 | *-2.14* | * | 0.001 | *0.23* | |
| ΔDIVt*Analyst_Following | 0.067 | *1.01* | | | | | | | |
| Analyst_Following | | | | 1.7E-04 | *0.06* | | -0.006 | *-0.72* | |
| ΔDIVt* Central_Location | **-0.155** | ***-2.07*** | * | | | | | | |
| Central_Location | | | | **-0.002** | ***-1.13*** | | **0.013** | ***2.42*** | * |
| ΔDIVt | 0.575 | *3.12* | ** | 0.053 | *1.28* | | 0.113 | *2.27* | * |
| ΔDIVt*D(Decrease) | 0.113 | *2.01* | * | | | | | | |
| Obs. | 1436 | | | 1146 | | | 290 | | |
| $R^2$ | 0.140 | | | 0.086 | | | 0.567 | | |
| Adj. $R^2$ | 0.123 | | | 0.064 | | | 0.524 | | |

*** significant at 0.1%; ** significant at 1%; * significant at 5%

# Table 8. Robustness checks: alternative variable definitions

The sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US. Column I reports Logit results. Column II-III report Ordinary Least Squares results.
*Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *Pr*(*Dividends*>0) is the probability that the firm reports cash dividends on common stock in a given year. *Div_Yield* is the ratio of dividends per share to share price at the end of the year. *ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Firm_Size* is log of the firm's sales. *Firm*_Size(*MV*) is log of the firm's market value. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *CEO_Option_Grants* is the ratio of the value of stock option grants to the total compensation of the CEO (Execucomp), times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *D*(*5% Blockholder*) is the dummy variable equal to 1 if *Inst_Hold* is at least 5%; 0 otherwise. *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *D*(*Debt>0*) is the dummy variable equal to 1 if the firm has positive leverage; 0 otherwise. *G_Index* is the Gompers, Ishii, and Metrick (2003) index of takeover defenses (IRRC Governance). *Retained_Earnings* is the ratio of retained earnings to total assets. *Liquidity* is share turnover defined as the ratio of the number of common shares traded to common shares outstanding. *Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census.
Three-digit SIC industry dummies, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t(z)-statistics are reported below coefficients and italicized.

| | I | | II | | III | |
|---|---|---|---|---|---|---|
| | Pr(Dividends>0) | | Div_Yield | | Dividends | |
| ROA | 0.908 | *** | -0.549 | *** | 0.211 | |
| | *7.15* | | *-3.75* | | *1.52* | |
| Market-to-Book | -0.027 | *** | -0.045 | *** | -0.026 | *** |
| | *-2.89* | | *-6.11* | | *-3.02* | |
| Tangible_Assets | 0.002 | *** | 0.003 | * | 0.001 | |
| | *2.74* | | *1.80* | | *1.09* | |
| Firm_Size | 0.140 | *** | 0.224 | *** | | |
| | *11.11* | | *10.97* | | | |
| Firm_Size(MV) | | | | | 0.064 | *** |
| | | | | | *4.02* | |
| StdDev_Cash_Flow | -0.118 | *** | -0.100 | *** | -0.055 | *** |
| | *-6.68* | | *-3.89* | | *-2.69* | |
| CEO_Ownership | -0.211 | | -0.644 | ** | -0.026 | |
| | *-1.29* | | *-2.24* | | *-0.60* | |
| CEO_Options | -0.054 | *** | -0.072 | *** | | |
| | *-5.85* | | *-5.76* | | | |
| CEO_Option_Grants | | | | | -0.087 | ** |
| | | | | | *-2.02* | |
| Inst_Hold | -0.006 | *** | -0.007 | | | |
| | *-2.78* | | *-1.64* | | | |
| D(5% Blockholder) | | | | | -0.205 | *** |
| | | | | | *-5.44* | |
| Analyst_Following | -0.040 | ** | -0.142 | *** | -0.020 | |
| | *-2.03* | | *-4.43* | | *-0.78* | |
| D(Debt>0) | | | | | -0.218 | *** |
| | | | | | *-4.68* | |
| G_Index | | | | | 0.019 | *** |
| | | | | | *3.18* | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Retained_Earnings | | | | | 0.090 | *** |
| | | | | | *4.04* | |
| Liquidity | | | | | -0.079 | *** |
| | | | | | *-11.55* | |
| **Distance** | **0.021** | *** | **0.017** | ** | **0.013** | ** |
| | ***4.36*** | | ***2.16*** | | ***2.35*** | |
| Obs. | 16784 | | 16781 | | 13460 | |
| $R^2$ | | | 0.411 | | 0.436 | |
| Adj. $R^2$ | | | 0.402 | | 0.426 | |
| Pseudo-$R^2$ | 0.401 | | | | | |

*** significant at 1%; ** significant at 5%; * significant at 10%

## Table 9. Robustness checks: causality, sample period, and alternative estimation methods

Unless indicated otherwise, the sample includes Compustat Industrial firms for 1992-2006 with available CEO ownership and compensation data and excludes firms in financial (SIC 6000-6999) and regulated utilities (SIC 4900-4999) industries, firms with total assets under 20 mln., and firms incorporated outside the US.

*Dividends* is the sum of cash dividends on common stock divided by the firm's market value (book value of total assets plus market value of common equity minus book value of common equity), times 100. *ROA* is the ratio of EBITDA to total assets, times 100. *Market-to-Book* is the ratio of the firm's market value to the book value of total assets. *Tangible_Assets* is the ratio of property, plants and equipment to total assets. *Firm_Size* is log of the firm's sales. *StdDev_Cash_Flow* is log of standard deviation of ROA computed for the previous ten years. *CEO_Ownership* is the ratio of shares held by the CEO (Execucomp) to common shares outstanding. *CEO_Options* is the ratio of stock options held by the CEO (Execucomp) to common shares outstanding, times 100. *Inst_Hold* is the largest institutional shareholding in the firm (CDA Spectrum, 13f filings). *Analyst_Following* is the natural log of one plus the number of one-year-ahead EPS analyst forecasts (I/B/E/S). *Distance* is log of distance in miles to the closest of the ten largest metropolitan statistical areas as identified by the 2000 Census. *Central_Location* is the dummy variable equal to 1 if the firm is located in one of the top ten metropolitan areas or their suburbs as identified by the 2000 Census; 0 otherwise.

Three-digit SIC industry dummies, year dummies, and intercept are included but not reported in the table. Robust standard errors with clustering at the firm level are used. t-statistics are reported below coefficients and italicized.

*Panel A. Causality checks*

Column I reports two-stage least squares results. First stage regressions predict *Distance* with controls and Ind_Sales_Nonurban (three-digit SIC industry average log of net sales of nonurban firms), Ind_AvgDistance (average log of *Distance* for firms that were in the sample firm's three-digit SIC industry in the earliest year the firm was in the sample), D(Agriculture) (dummy for an agricultural firm, SIC 100-800), and D(Mining) (dummy for a mining firm, SIC 1000-1400). Column II reports OLS results for firms that entered the sample prior to 1992.

| - | I | | II | |
|---|---|---|---|---|
| | Dividends | | Dividends | |
| | 2SLS | | Pre-1992 Firms | |
| ROA | 0.446 | *** | 0.575 | *** |
| | *3.90* | | *3.42* | |
| Market-to-Book | -0.017 | *** | -0.028 | *** |
| | *-3.32* | | *-2.71* | |
| Tangible_Assets | 0.002 | ** | 0.002 | |
| | *2.13* | | *1.27* | |
| Firm_Size | 0.083 | *** | 0.069 | *** |
| | *5.74* | | *4.12* | |
| StdDev_Cash_Flow | -0.065 | *** | -0.130 | *** |
| | *-3.72* | | *-5.42* | |
| CEO_Ownership | -0.060 | | -0.030 | |
| | *-1.12* | | *-0.78* | |
| CEO_Options | -0.064 | *** | -0.070 | *** |
| | *-6.69* | | *-6.57* | |
| Inst_Hold | -0.010 | *** | -0.009 | *** |
| | *-3.62* | | *-2.85* | |
| Analyst_Following | -0.070 | *** | -0.051 | ** |
| | *-3.36* | | *-2.06* | |
| **Distance** | **-0.049** | ** | **0.005** | ** |
| | ***-2.50*** | | ***1.96*** | |
| Obs. | 16626 | | 12300 | |
| $R^2$ | 0.364 | | 0.409 | |
| Adj. $R^2$ | 0.355 | | 0.398 | |
| **First Stage** | Distance | | | |
| Ind_Sales_Nonurban | 0.057 | | | |
| | *1.11* | | | |
| Ind_AvgDistance | 1.172 | *** | | |
| | *40.15* | | | |
| D(Agriculture) | 0.981 | | | |
| | *0.42* | | | |
| D(Mining) | 4.373 | * | | |
| | *1.82* | | | |
| F-statistic | 30.32 | *** | | |

*** significant at 1%; ** significant at 5%; * significant at 10%

*Panel B. Alternative sample period and estimation methods*

Columns I-II report Ordinary Least Squares results for 1971-2006. Column III reports Fama-MacBeth results (Fama and MacBeth, 1973) for 1992-2006. Column IV reports Ordinary Least Squares results with clustering of standard errors at the firm and year level (Petersen, 2006) for 1992-2006.

| | I | | II | | III | | IV | |
|---|---|---|---|---|---|---|---|---|
| | Dividends | | Dividends | | Dividends | | Dividends | |
| | Sample Period: 1971-2006 | | | | Fama-MacBeth | | Double Clustering of S.E. | |
| ROA | 0.724 | *** | 0.742 | *** | -0.146 | *** | 0.303 | ** |
| | *11.60* | | *11.94* | | *-6.36* | | *2.26* | |
| Market-to-Book | -0.022 | *** | -0.022 | *** | 0.032 | *** | -0.014 | ** |
| | *-4.93* | | *-5.09* | | *11.77* | | *-2.30* | |
| Tangible_Assets | 0.002 | ** | 0.001 | ** | -0.003 | *** | 0.002 | |
| | *2.41* | | *2.07* | | *-27.04* | | *1.56* | |
| Firm_Size | 0.110 | *** | 0.111 | *** | -0.040 | *** | 0.096 | *** |
| | *16.73* | | *17.08* | | *-25.52* | | *6.96* | |
| StdDev_Cash_Flow | -0.056 | *** | -0.057 | *** | 0.022 | *** | -0.062 | *** |
| | *-5.25* | | *-5.39* | | *8.90* | | *-3.73* | |
| CEO_Ownership | | | | | 0.101 | *** | -0.053 | |
| | | | | | *6.45* | | *-0.94* | |
| CEO_Options | | | | | -0.002 | * | -0.055 | *** |
| | | | | | *-1.81* | | *-5.78* | |
| Inst_Hold | | | | | 1.0E-04 | | -0.009 | *** |
| | | | | | *0.34* | | *-2.78* | |
| Analyst_Following | | | | | 0.032 | *** | -0.062 | *** |
| | | | | | *13.92* | | *-3.16* | |
| **Distance** | **0.012** | *** | | | **-0.005** | *** | **0.010** | ** |
| | ***3.50*** | | | | ***-25.21*** | | ***2.19*** | |
| **Central_Location** | | | **-0.083** | *** | | | | |
| | | | ***-4.17*** | | | | | |
| Obs. | 100671 | | 102744 | | 16784 | | 16784 | |
| $R^2$ | 0.306 | | 0.303 | | 0.366 | | 0.402 | |
| Adj. $R^2$ | 0.304 | | 0.302 | | 0.366 | | 0.393 | |

*** significant at 1%; ** significant at 5%; * significant at 10%