

Does the Location of Directors Matter? Information Acquisition and Board Decisions

Zinat S. Alam, Mark A. Chen, Conrad S. Ciccotello,
and Harley E. Ryan, Jr.*

Abstract

Using data on over 4,000 individual residential addresses, we find that geographic distance between directors and corporate headquarters is related to information acquisition and board decisions. The fraction of a board's unaffiliated directors who live near headquarters is higher when information-gathering needs are greater. When the fraction of unaffiliated directors living near headquarters is lower, nonroutine chief executive officer (CEO) turnover is more sensitive to stock performance. Also, the level, intensity, and sensitivity of CEO equity-based pay increase with board distance. Overall, our results suggest that geographic location is an important dimension of board structure that influences directors' costs of gathering information.

I. Introduction

As delegated monitors of top management on behalf of shareholders, corporate boards of directors rely critically on information about the firm in making governance decisions. Theoretical research in corporate governance shows how a board's ability to obtain and use information is closely related to key aspects of

* Alam, zalam@fau.edu, College of Business, Florida Atlantic University, 777 Glades Rd, Boca Raton, FL 33431; Chen, machen@gsu.edu, Ciccotello, cciccotello@gsu.edu, and Ryan, cryan@gsu.edu, Robinson College of Business, Georgia State University, 35 Broad St, Atlanta, GA 30303. We thank Ken Ahern, Alex Butler, Ettore Croci, Glenn Harrison, Robert Hansen, Paul Irvine, Murali Jagannathan, Jayant Kale, Steve Kaplan, Omesh Kini, Jim Linck, Paul Malatesta (the editor), Shawn Mobbs, Harold Mulherin, Jeff Netter, Bunyamin Onal, Antoinette Schoar, Jaideep Shenoy, Paul Spindt, Venkat Subramaniam, Hongping Tan, Sheri Tice, Lingling Wang, Michael Weisbach, Tracie Woidtke, Yuhai Xuan, Tina Yang, David Yermack, and an anonymous referee; conference participants at the 2012 European Finance Association Meetings in Copenhagen, the 2011 American Finance Association Meetings in Denver, the 2011 Drexel University Conference on Corporate Governance, the 2011 University of Missouri Conference on Corporate Governance, the 2010 Center for Research in Security Prices Forum, the 2010 European Financial Management Association Asian Finance Symposium in Beijing, and the 2010 Financial Management Association Meetings in New York; and seminar participants at Bond University, Georgia State University, Louisiana State University, Tulane University, and the University of Georgia for helpful comments and suggestions. We are grateful to Daniel Greene, Hyun Kim, Huimin Li, Lin Miao, Kevin Mullally, and Hui Wang for excellent research assistance and to Satish Mudduluru for programming assistance. The authors assume responsibility for any errors.

board structure, such as size and independence (Raheja (2005), Harris and Raviv (2008)). Complementing the theoretical literature, a number of empirical studies find evidence to suggest that board size and board independence can be explained to some extent by the complexity of firms' operations and outside directors' costs of acquiring information (see, e.g., Boone, Field, Karpoff, and Raheja (2007), Coles, Daniel, and Naveen (2008), and Linck, Netter, and Yang (2008)).¹

Motivated by these studies, we examine empirically a new dimension of board structure that we expect to influence the costs of information acquisition, namely, geographic distance between directors and headquarters. Geographic distance has been shown to matter for the gathering of information in a wide variety of financial contexts, including bank lending (Petersen and Rajan (1994), (2002)), venture capital financing (Lerner (1995)), equity analysis (Malloy (2005), Bae, Stulz, and Tan (2008)), bond underwriting (Butler (2008)), investment management (Coval and Moskowitz (1999), (2001)), and regulatory enforcement (Kedia and Rajgopal (2011)). Recent research has also begun to examine the effects of geography on the structure and decisions of boards (Masulis, Wang, and Xie (2011), Knyazeva, Knyazeva, and Masulis (2013)). To date, the lack of detailed data on where individual directors reside vis-à-vis corporate headquarters has been an obstacle to extending research on board geography. In this paper, we overcome this obstacle by constructing a database of over 4,000 residential addresses of outside directors at Standard & Poor's (S&P) 1500 firms during 2004–2007.

We use the director-level residential data to construct several measures of the board's distance from headquarters. These measures allow us to investigate how board distance relates to information acquisition and board decisions. Our analysis reveals that when a firm's assets are more intangible and thus quantitative performance measures are less informative about managerial effort, the board tends to be located closer to headquarters (e.g., a larger fraction of unaffiliated directors reside within 100 km). We also find that more remote boards tie chief executive officer (CEO) dismissal decisions and CEO incentive compensation more strongly to stock price performance.²

Our analysis builds upon the premise that residing farther from headquarters increases directors' costs of obtaining certain types of information. Some kinds of information about management performance (e.g., stock prices) can be easily acquired by remote directors, but other kinds can only be obtained by directors who are in close proximity to the information source. Petersen (2004) defines "soft" information as information that cannot be codified and transferred across geographic distance. Indeed, soft information can only be acquired from personal observation or face-to-face interactions (Stein (2002), Petersen (2004)). Examples of soft information that directors might obtain include personal assessments of employees or operations, impressions from face-to-face meetings with

¹For a recent survey of the literature on boards, see Adams, Hermalin, and Weisbach (2010).

²While the two types of observable decisions that we study in this paper relate primarily to the monitoring role of the board, Adams and Ferreira (2007) show theoretically that information acquisition can also be an important part of the board's advisory role. Thus, it is plausible that a board's geographic distance from headquarters also influences how it advises corporate management.

management, or inferences about local business conditions.³ Two implications follow from the idea that distance increases directors' costs of obtaining soft information. First, in equilibrium, a board's distance from headquarters should be negatively related to firm characteristics that proxy for directors' need to acquire soft information. Second, more distant boards will tend to rely more heavily on hard, public information in making key monitoring decisions, such as whether to dismiss a CEO or how to set the CEO's compensation.

Consistent with the first implication, we find in multivariate analyses that board distance (measured as the fraction of unaffiliated⁴ directors who reside more than 100 km from firm headquarters) is negatively related to the fraction of the firm's assets consisting of intangibles. Supporting the second implication, we find that board distance is significantly related to CEO dismissal and CEO compensation decisions. In multivariate logit regressions, we document that the occurrence of nonroutine CEO turnover events is more sensitive to poor industry-adjusted stock performance when boards are farther from headquarters. In other tests, we find that greater board distances are associated with higher levels of CEO equity-based pay, more equity pay relative to other forms of compensation, and higher pay-performance sensitivities.

Our results are robust to the use of several alternative measures of board distance including i) an indicator for whether or not at least 50% of the unaffiliated directors on the board live farther than 100 km from headquarters; ii) a continuous measure based on the median distance among a board's unaffiliated directors; and iii) the fraction of unaffiliated directors who are geographically separated from headquarters by substantial driving times. We also conduct tests to rule out the possibility that our results merely reflect the influence of other factors (e.g., social ties and social interactions between the CEO and directors), CEO power and influence over director selection, the Sarbanes-Oxley Act of 2002 (SOX), regional effects, or the particular location of headquarters. Our main results hold in all of these tests, providing strong support for the view that board distance not only reflects information-gathering costs, but also shapes how directors use different types of information in their governance decisions.

A small number of contemporaneous studies also examine aspects of board geography. Masulis et al. (2011) investigate the implications of foreign directors for corporate governance and firm performance. They document that firms with foreign directors on the board pay CEOs higher compensation and have lower sensitivity of CEO turnover to performance. In addition to providing evidence on how very large geographic distances can affect monitoring by the board, their work suggests the importance of cross-country differences in accounting rules, regulations, and social and cultural norms. Knyazeva et al. (2013) show that

³For instance, Smith (1991) argues that living in Rochester provides [a shareholder] with lower-cost access to information about Eastman Kodak. He further states, "In fact . . . some of this information is jointly produced with other activities so that the marginal cost of the information is virtually zero."

⁴Throughout, we will refer to a director as "unaffiliated" if he is deemed independent under the NYSE and NASDAQ listing requirements approved by the U.S. Securities and Exchange Commission in Nov. 2003. Our purpose in using the term "unaffiliated" is to avoid confusion between actual and regulatory independence.

geographic proximity of a firm's headquarters to large pools of director talent strongly influences the firm's use of independent directors and directors with specialized expertise. Our results complement these findings by establishing that distance-related costs of information acquisition, together with proximity of headquarters to an available supply of director talent, help to determine a board's overall location relative to headquarters.

Our work is related to the broader literature on the determinants and implications of board structure. Recent work shows that a single board size or fraction of outsiders is unlikely to be optimal for all firms (Boone et al. (2007), Linck et al. (2008), and Coles et al. (2008)). We add to this strand of literature by showing that board location reflects a trade-off between director expertise and information-gathering costs, and thus no single board distance is likely to be best for all firms. Our research on board geography also extends a growing literature that explores new dimensions of board structure, such as social ties between directors and CEOs (Hwang and Kim (2009), Fracassi and Tate (2012)), links between corporate directors and mutual fund managers (Cohen, Frazzini, and Malloy (2008)), busy directors (Ferris, Jagannathan, and Pritchard (2003), Fich and Shivdasani (2006)), and directors' outside career opportunities (Booth and Deli (1996), Mobbs (2013), and Masulis and Mobbs (2011)).

The remainder of the paper is organized as follows: In Section II, we discuss our data and our approach to measuring board distance. In Section III, we conduct a multivariate analysis of board distance and test whether board distance influences CEO dismissals and CEO compensation. Section IV considers the robustness of our results and explores alternative explanations. Section V concludes.

II. Data

A. Board Distance as a Proxy for the Costs of Acquiring Information

Mace (1971) observes that directors tend to be very accomplished and busy individuals whose time is valuable. For qualified director candidates, traveling far outside of the area in which they reside to sit on a board might not be worthwhile. Merely attending meetings would be cumbersome, and informal interactions with management would tend to be very infrequent.

Building on Mace's (1971) insights, we construct measures of board distance that proxy for directors' economic costs of obtaining soft information. An important issue in this regard is how to measure individual director distances and how to aggregate them into a board-level metric. In the existing finance literature on distance and information costs, different studies measure remoteness from headquarters in different ways. These alternative approaches include, among others, the use of a continuous measure (Petersen and Rajan (1994), Lerner (1995)), an indicator for being located within the same Metropolitan Statistical Area (MSA) (Malloy (2005), Kedia and Rajgopal (2011)), an indicator for being located within the same state (Butler (2008)), and an indicator for whether distance is greater than 400 km (Malloy (2005)).

For our analysis, we require a measure of board distance that meaningfully reflects the lower information-gathering costs faced by truly "local" directors, but

one that also sufficiently captures the cross-sectional variation across the entire sample of board-year observations. The choice of distance-based measure should address three other considerations: i) Soft information is difficult to convey to other individuals and generally must be acquired directly by the user (Stein (2002), Petersen (2004)); ii) the likelihood that directors collectively acquire useful soft information will increase as the number of proximate directors increases; and iii) the impact of any single director on board decisions will decrease as the size of the board increases. These criteria suggest that the number of proximate directors required to obtain sufficient soft information for use in influencing board decisions will be proportional, at least to some extent, to the total number of directors.

Taking all these issues into consideration, we choose the fraction of unaffiliated directors who reside more than 100 km from headquarters as our primary distance measure. This measure provides sufficient cross-sectional variation, meets the proportionality requirement, and is based on a specific distance that is close enough to correspond to a higher likelihood of acquiring soft information. We also verify in the analysis that our main findings hold for other choices of distance measure, including i) a dummy variable equal to 1 if at least 50% of the unaffiliated directors on the board reside greater than 100 km from headquarters; ii) the median log-transformed distance between unaffiliated directors and headquarters (by definition, half of all unaffiliated directors reside farther than this distance); and iii) the fraction of unaffiliated directors who live beyond a 90-minute drive from headquarters.

B. Sample

To construct our data sample, we first sort all firms in the S&P 1500 as of Dec. 31, 2004, by descending market capitalization. We retain every third firm, starting with the largest. This systematic sampling helps to keep the costs of hand-collection of data manageable while ensuring that our analysis includes a wide range of firm sizes. Following the prior literature on geographic distance, we exclude firms not headquartered within the 48 contiguous United States or the District of Columbia. For each remaining firm, we gather from proxy statements the full names and ages of individuals who serve on the board of directors at least once during the 2004 to 2007 period. The resulting initial sample consists of 4,329 individuals who serve as directors at 495 firms during 2004–2007.

We use a two-stage data collection procedure, described in greater detail in the Appendix, to ascertain directors' locations of residence. In the first stage, we use publicly available data sources to determine individuals' birth dates (month, day, and year). The main sources are *PeopleFinders* (www.peoplefinders.com) and the Corporate Library's *Board Analyst* database. *PeopleFinders* is an online database that contains information on birth dates, addresses, business affiliations, and telephone numbers for the large majority of adult residents in the United States.⁵ *Board Analyst* is a machine-readable database that compiles

⁵*PeopleFinders* is compiled from various public sources, including county courthouse records, utility company records, and over 4,300 telephone directories.

proxy-statement data. Other sources for birth date information include company proxy statements, insider trading filings, Google, ZoomInfo, Wikipedia, NNDB.com, BusinessWeek.com, and Forbes.com. We are able to determine birth dates for 4,133 U.S.-based individuals (95.5% of the initial sample).⁶

In the second stage of data collection, we use individual birth dates and names to search in LexisNexis's *Person Locator* database for addresses of residence. The *Person Locator* database is compiled from public and nonpublic sources and contains over 280 million data records pertaining to over 150 million individuals who reside in the United States. Data records include full names, birth months, birth years, partial social security numbers, phone numbers, known relatives, and current and historical addresses for up to the past 30 years.⁷

The address data in *Person Locator* offer two advantages for the purposes of our study. First, the addresses include a street name, street number, and 9-digit ZIP code. This level of detail enables us to construct precise measures of distance between individual directors and corporate headquarters. Second, the addresses are residential locations rather than business locations. With the exception of a few P.O. boxes, *Person Locator* addresses represent owner-occupied housing or apartments. Other public sources for individual addresses (e.g., Securities and Exchange Commission (SEC) Form 4 insider trading filings) often report mailing addresses, but these locations, when reported, are typically business addresses or corporate headquarters that do not correspond to where a director actually resides.

To ensure that each director is correctly associated with the residential address that is current at the time the director serves on a board, we require dates of occupancy. In *Person Locator*, LexisNexis reports occupancy dates for individual addresses. In order to minimize the possibility of linking a directorship with an outdated location, we focus on the address designated as "Current" by LexisNexis, and we use the beginning date for that address to conservatively establish a time interval of residence up to Dec. 2008.⁸ When the current and second-most-recent addresses share the same ZIP code, we use the beginning date of the earlier address to further extend the time period of a director's known geographic location.

After excluding a small number of P.O. box addresses, ambiguous addresses, and addresses in Alaska or Hawaii, we have residential locations and dates of occupancy for 3,915 individuals, or 90.4% of the initial sample. We combine

⁶Although our analysis focuses on U.S.-based directors, we identify 110 directors who reside outside the United States as of Dec. 2008. In unreported tests, we confirm that including these foreign directors' locations (estimated by the geographic centers of their countries of residence) in our distance measures does not change our qualitative results.

⁷Sources for LexisNexis's address and birth date information include telephone directories, utility companies, driving records, county courthouse records, credit bureau header data, property tax assessment records, mortgages, deeds, bankruptcy filings, Uniform Commercial Code (UCC) filings, and the U.S. Post Office.

⁸An alternative approach would be to use reported occupancy dates to construct a chronological history of address changes. We do not use this approach because the reported dates may not indicate relocation dates with complete accuracy. According to LexisNexis representatives, reported beginning and ending dates for an address may lag relocation dates, since public records may not be updated immediately after an individual moves.

the location data with information in *Board Analyst* on directors' board service during 2004–2007. To ensure that our tests are not unduly influenced by firms where location data are missing for a significant fraction of directors, we require that location data must be available for at least 50% of individuals on a board in a given year.⁹ We also exclude a handful of director-year observations corresponding to deceased individuals whose names were erroneously reported in *Board Analyst* during 2004–2007. As a final data screen, we exclude financial firms (Standard Industrial Classification (SIC) codes 6000–6799) and regulated utilities (SIC codes 4910–4949). The sample consists of an unbalanced panel data set of 9,928 director-years and 393 firms. The total number of director-years does not equal the number of person-years in the sample because some individuals hold multiple directorships in a given year.

C. Data on Director and Board Distances

We use postal ZIP codes of directors' residences and firms' headquarters to compute geographic distance. We obtain ZIP codes for corporate headquarters from *Board Analyst* and proxy statements. Each ZIP code is matched to the relevant latitude and longitude coordinates as reported in the U.S. Census Bureau's *Census 2000 U.S. Gazetteer Files*. Using these latitudes and longitudes, we follow Coval and Moskowitz (1999) and compute distances as geodesic distances between two points on the Earth's surface.¹⁰

Panel A of Table 1 reports descriptive statistics for director-level distance measures. The average (median) distance between directors and headquarters is 880.8 (338.8) km. Distances exhibit considerable cross-sectional variation; the standard deviation across all director-years is 1,096.2 km. Average director distance rises steadily over the sample period, perhaps reflecting improvements in communications technologies or an increasing need for firms to seek qualified directors outside of local labor markets. Firms in the services sector (SIC 7011–8999) have more remote directors on average compared to firms in the technology sector (SIC 2830–2839, 3570–3579, 3600–3699) or manufacturing sector (SIC 3400–3569, 2000–2829). Firms located in the Western United States have an average director-to-headquarters distance of 1,192.0 km.¹¹ For the other three regions of the United States, distances are smaller, averaging between 767.2 and 839.9 km. Distances have a skewed distribution, particularly for firms in the Northeast. Figure 1 plots the 2004 year-end headquarters locations of firms with a median director distance less than 100 km and those with a median director distance greater than 100 km. Firm locations exhibit considerable variation, and

⁹This sample restriction eliminates fewer than 5% of firm-years. We verify that our main results hold in the absence of this restriction.

¹⁰We use the spherical law of cosines to approximate the distance between two locations as the great-circle distance between points on a sphere: $\text{Distance}_{a,b} = r \times \arccos[\sin(a_{\text{lat}}) \sin(b_{\text{lat}}) + \cos(a_{\text{lat}}) \cos(b_{\text{lat}}) \cos(a_{\text{long}} - b_{\text{long}})]$, where r is the Earth's approximate radius (6,378 km) and where a_{lat} , a_{long} , b_{lat} , and b_{long} are the latitudes and longitudes of the two locations (in radians).

¹¹As defined by the U.S. Census Bureau, the Western United States includes Alaska and Hawaii. The data for Table 1 and all of our tests exclude firms headquartered in these two states, but the main results are similar if we include such firms.

TABLE 1
Director- and Board-Level Measures of Distance from Headquarters

Table 1 reports summary statistics for director- and board-level measures of geographic distance from headquarters (HQ) (in km). Directors' residential locations are ascertained from the LexisNexis *Person Locator* database using individual names and birth dates identified from public sources. Distances are calculated as geodesic distances using latitudes and longitudes corresponding to ZIP codes. In Panel A, the sample consists of 9,928 director-year observations during 2004–2007. Industry sectors are defined by 4-digit SIC codes: Manufacturing (SIC 2000–2829, 3400–3569), Technology (SIC 2830–2839, 3570–3579, 3600–3699), Retail (SIC 5200–5990), Services (SIC 7011–8999), and Other. U.S. regions are as defined by the U.S. Census Bureau. Panel B reports statistics for measures of board distance for 1,393 firm-year observations over 2004–2007. Unaffiliated directors are board members who are deemed to be independent under the applicable NYSE or NASDAQ regulatory definitions. Inside directors are board members who are current employees of the firm.

	No. of Obs.	Mean	Std. Dev.	Percentiles		
				10th	50th	90th
<i>Panel A. Director-Level Distance from Headquarters (in km)</i>						
<i>By Year</i>						
2004	2,255	842.9	1,096.2	7.2	289.8	2,435.4
2005	2,557	877.4	1,096.8	8.1	335.8	2,493.6
2006	2,577	893.1	1,096.0	8.2	362.9	2,517.7
2007	2,539	905.4	1,095.6	8.0	376.6	2,519.1
2004–2007	9,928	880.8	1,096.2	7.98	338.8	2,493.6
<i>By Industry Sector</i>						
Manufacturing	2,188	792.2	940.9	6.6	338.8	2,152.2
Technology	1,579	907.2	1,175.4	12.9	296.9	2,751.6
Retail	1,253	747.1	1,046.4	7.9	129.1	2,450.5
Services	1,514	943.9	1,210.4	7.1	267.0	2,974.2
Other	3,394	947.3	1,107.8	7.1	476.4	2,578.3
<i>By Headquarters Location (U.S. Region)</i>						
Northeast	2,539	767.2	1,115.6	11.4	166.8	2,223.7
Midwest	2,630	839.9	904.4	11.3	537.4	2,294.2
South	2,800	804.4	903.9	5.2	443.0	2,002.4
West	1,959	1,192.0	1,445.4	5.3	488.6	3,808.8
<i>Panel B. Board-Level Distance from Headquarters</i>						
Median distance between headquarters and the board's unaffiliated directors (km)	1,393	842.0	818.1	26.9	663.5	1,843.6
Median distance between headquarters and the board's inside directors (km)	1,168	353.0	785.1	1.2	22.9	1,399.6
% of the board's unaffiliated directors more than 50 km from headquarters	1,393	74.6	26.2	33.3	80.0	100.0
% of the board's unaffiliated directors more than 100 km from headquarters	1,393	68.0	27.9	25.0	75.0	100.0
% of the board's unaffiliated directors more than 200 km from headquarters	1,393	62.0	28.2	20.0	66.7	83.3
% of the board's unaffiliated directors more than 400 km from headquarters	1,393	55.2	30.0	16.7	57.1	80.0
Distance between CEO and headquarters (km)	1,091	338.9	792.4	0.0	20.0	1,435.0

board distances do not appear to be systematically related to geographic regions or clustering of headquarters within states.

Panel B of Table 1 provides a summary of board-level distance from headquarters. We first report statistics on the median distance of a board's unaffiliated directors and its inside directors (directors who are currently employees of the firm). At the 50th percentile, a board's median unaffiliated director distance from headquarters is 663.5 km. By contrast, insiders live much closer to headquarters: At the 50th percentile, the median inside director distance is only 22.9 km.¹² Panel B also provides statistics on the fractions of unaffiliated directors located outside a certain radius from headquarters. At the 50th percentile, four-fifths of

¹²In 225 firm-years, available data permit the calculation of a median distance for unaffiliated directors but not for inside directors.

FIGURE 1
Corporate Headquarters Locations and Director Distance

The sample consists of 393 firms belonging to the S&P 1500 as of year-end 2004 with headquarters locations in the contiguous United States. Headquarters locations are determined from proxy statements and the Corporate Library's *Board Analyst* database. Directors' residential locations are obtained from LexisNexis *Person Locator*, and distances are calculated as geodesic distances using latitudes and longitudes corresponding to ZIP codes.

Graph A. Headquarters Locations for Firms with Median Director Distance ≤ 100 km



Graph B. Headquarters Locations for Firms with Median Director Distance > 100 km



unaffiliated directors are more than 50 km away, and two-thirds are more than 200 km away. The median CEO resides only 20 km from headquarters. However, the average CEO-to-headquarters distance is 338.9 km, and the 90th percentile is 1,435 km, suggesting that some CEOs commute long distances to headquarters or work remotely.¹³

¹³For instance, Gary Rodkin, CEO of ConAgra Foods, commutes weekly from his home in Greenwich, Connecticut, to corporate headquarters in Omaha, Nebraska, which represents a one-way distance of over 1,800 km (see "The Commuter CEO," *The Wall Street Journal*, May 22, 2006).

The nontrivial number of CEOs who reside at large distances from headquarters raises the question of whether our data accurately capture individuals' primary home residences in all cases. We do not use subjective judgment to gather street addresses from LexisNexis *Person Locator*, and we are careful to exclude a small number of instances in which an individual has two or more distinct locations reported as "current" (see the Appendix for details). Nonetheless, it is possible that some of the "current" addresses reported in *Person Locator* are in fact locations of secondary homes or vacation homes. To assess the potential importance of this type of reporting error, we re-examine cases in which our computed CEO-to-headquarters distance is greater than 500 km. In each of these cases, we search backwards in time in the CEO's LexisNexis address history for prior street addresses that are closer to headquarters. If a previous street address is available within our sample period and falls within 100 km's driving distance of headquarters, we replace the "current" address with the more proximate address. Using this modified measure of CEO distance does not qualitatively change any of our main empirical findings. Thus, while some measurement error may be present in our distance data, it is unlikely to bias our estimates.

D. Data on Firm, Board, and CEO Characteristics

We gather firm, board, and CEO-level data from various sources to examine how board distance is related to information acquisition costs and board decisions. Financial data and governance data come from Compustat, corporate proxy statements, SDC Mergers and Acquisitions, and *Board Analyst*. From Compustat, we construct two basic proxies for the relative importance of soft information. The first proxy is asset intangibility, computed as the ratio of a firm's "Other Intangible Assets" (Compustat item 352) to the total book value of assets.¹⁴ The second proxy for the need for soft information is capital intensity, computed as the ratio of net property, plant, and equipment (Net PP&E) to total assets. From Compustat, we also calculate the total number of a firm's business segments, the rate of sales growth, and the ratio of free cash flow to total assets.

From corporate proxy statements and *Board Analyst*, we collect data on unaffiliated block ownership, firm age, and board structure, as well as the age, tenure, and professional qualifications of individual directors. In addition, we gather information on CEO age, tenure, and whether or not the CEO serves as board chair. We obtain from the U.S. Census Bureau the locations of the 20 most populous MSAs in 2000 and average the latitudes and longitudes of all ZIP codes within an MSA to compute each MSA's geographic center. This allows us to measure the distance between firm headquarters and the nearest large MSA. From the U.S. Federal Aviation Administration (FAA) Web site (www.faa.gov), we gather data for computing distances between headquarters and public-use airport hubs.

Table 2 reports summary statistics for the data. The average (median) firm has total assets of \$7.59 billion (\$1.37 billion), of which 4% (2%) are intangibles

¹⁴This measure of intangibles includes blueprints, copyrights, patents and trademarks, licenses, and operating rights, but it does not include goodwill, which is usually created by the acquisition of physical assets.

and 25% (19%) are Net PP&E. The median firm has three business segments, has been involved in corporate takeover activity within the prior 3 years, and has about 19% of its common shares held by blockholders with apparent business or personal ties to the firm. Most firm headquarters are located near a top-20 MSA, but the distances vary considerably: The average distance is 124.22 km, and the standard deviation is 176.28 km. Headquarters are also typically located near airport hubs. The median board has one non-CEO insider, is comprised of 73% unaffiliated directors, meets seven times a year, and has a classified structure. Also, on the typical (i.e., median) board, 16.7% of unaffiliated directors are audit committee financial experts; 14.3% are active CEOs of other companies; none have an outside directorship; and one-third have a master of business administration (MBA) degree. The average director on the median board is about 62 years of age and has served on the board for a little over 8 years.

TABLE 2
Firm, Board, and CEO Characteristics

Table 2 reports summary statistics for firm, board, and CEO characteristics for a panel of 1,393 firm-year observations from 2004–2007. The firm-years correspond to 393 firms belonging to the S&P 1500 at year-end 2004. Residential locations of directors are ascertained from the LexisNexis *Person Locator* database. Distances are calculated as geodesic distances using latitudes and longitudes corresponding to ZIP codes. Data on firm characteristics are obtained from Compustat and *Board Analyst*. Data on board and CEO characteristics are obtained from *Board Analyst* and SEC proxy filings. For each firm-year observation, financial characteristics are measured for the most recent prior fiscal year. *Intangibles-to-assets* is the ratio of Other Intangibles to Total Assets. *Net PP&E-to-assets* is the ratio of Net Property, Plant, and Equipment to Total Assets. *Business segments* is the number of segments reported in the Compustat Segments files. *Sales growth* is the average annual rate of growth in sales over the past 3 years. *FCF-to-assets* is the ratio of Total Free Cash Flow to Total Assets. *Firm age* is the number of years since firm founding. *Prior M&A activity* is a binary variable equal to 1 if and only if the firm was involved in a merger or acquisition during the prior 3 years. *Unaffiliated blockholder ownership* is the percentage of outstanding shares held in blocks of 5% or more by shareholders with no current or past business affiliations with the firm. A large Metropolitan Statistical Area (MSA) is one that is among the 20 most populous MSAs according to the 2000 U.S. Census. An airport hub is a public-use airport accounting for 0.05% or more of U.S. passenger boardings in 2008 according to the U.S. Federal Aviation Administration. *Unaffiliated directors* are board members who are deemed independent under the applicable NYSE or NASDAQ regulatory definitions. *Number of board meetings* is the number of full board meetings that took place during the previous year.

	Firm-Years	Mean	Median	Std. Dev.
<i>Panel A. Firm Characteristics</i>				
Total assets (\$M)	1,386	7,590.7	1,374.8	40,280.9
Intangibles-to-assets	1,319	0.04	0.02	0.06
Net PP&E-to-assets	1,385	0.25	0.19	0.21
Business segments	1,388	2.89	3.0	1.79
Sales growth (%)	1,385	11.0	9.0	17.0
FCF-to-assets	1,385	0.10	0.10	0.10
Firm age (years from founding)	1,320	46.92	35.00	36.51
Prior M&A activity	1,393	0.57	1.00	0.49
Unaffiliated blockholder ownership (%)	1,373	20.40	19.01	13.62
Distance from HQ to closest large MSA (km)	1,393	124.22	38.73	176.28
Distance from HQ to closest airport hub (km)	1,393	30.24	23.96	34.06
<i>Panel B. Board and CEO Characteristics</i>				
Board size	1,393	8.9	9.0	2.2
Number of non-CEO employees on the board	1,393	1.95	1.0	2.50
% of directors who are unaffiliated	1,393	71.7	72.7	14.1
% of unaffiliated directors who are financial experts	1,393	20.2	16.7	18.2
% of unaffiliated directors who are CEOs	1,393	16.7	14.3	16.2
% of unaffiliated directors with an outside board seat	1,393	48.8	0.0	50.0
% of unaffiliated directors with an MBA degree	1,393	32.6	33.3	18.8
Classified board	1,393	0.58	1.0	0.50
Number of board meetings	1,379	7.8	7.0	3.8
Average age of directors (years)	1,393	62.4	62.3	3.8
Average director tenure on the board (years)	1,393	8.8	8.2	3.8
Non-CEO chairman	1,393	0.36	0.0	0.48
CEO age (years)	1,353	57.3	57.0	6.8
CEO tenure on the board (years)	1,351	9.7	7.0	8.1

III. Empirical Results

A. Multivariate Analysis of Board Distance

We estimate pooled firm-year regressions to examine the relation between board distance and other geographic, industry, firm, board, and CEO characteristics. If geographic distance imposes time and travel costs on directors, then the acquisition of soft information should be more hampered by distance than is the acquisition of hard information. In equilibrium, the proximity of board members to headquarters should reflect the distance-related costs of gathering soft information, the need for soft information, and other economic costs and benefits associated with having directors live near headquarters. Thus, our analysis examines whether board distance varies systematically with the nature of firms' assets and operations. The two main explanatory variables in the regressions are 3-year averages of our empirical proxies for the importance of soft information: asset intangibility and capital intensity.

When intangibles constitute a high proportion of a firm's assets, soft information acquisition by the board can become a critical input without which the board cannot fully understand management's capabilities. For instance, Jacqueline Kane, a director on the board of Comerica, Inc., discusses the need for directors to measure both "tangible" and "intangible" drivers of value, and she equates many of the latter to the human capital of management (Lawler (2009)). In contrast to intangibles, capital-intensive assets tend to give rise to information about firm operations and performance that can be quantified and transferred to distant directors. If directors on the board of a capital-intensive firm are privy to a large amount of hard information, they may not need to rely as heavily on soft information.

Other factors could also influence a firm's need for soft information. For instance, firms with high growth rates will tend to have numerous growth prospects and face a high degree of uncertainty, potentially increasing the importance of soft information. Firms with multiple divisions have a higher degree of complexity, and in the presence of an internal capital market, directors may find it useful to personally assess the credibility of various divisional managers. Raheja (2005) shows theoretically that non-CEO insiders on the board can be a key source of information for unaffiliated directors. To account for these factors, we include in the regressions the number of business segments, the 3-year average sales growth rate, and the number of non-CEO employees on the board.

The location of headquarters itself could also affect equilibrium director distances. Research shows that densely populated urban areas provide larger pools of qualified director candidates than do rural areas (Knyazeva et al. (2013)). We control for the availability of local director talent with the natural logarithm of 1 plus the distance between a firm's headquarters and the center of the nearest large MSA. Moreover, since proximity of headquarters to an airport hub might relax the constraints that out-of-town board members face regarding soft information collection, we include the log distance between a firm's headquarters and the nearest airport hub. Supply constraints in the director labor market may be particularly binding if a firm needs directors with certain types of expertise. As discussed in Knyazeva et al., firms may need to search beyond local labor

markets to find director candidates with executive experience, financial expertise, or educational credentials. We include four measures of directors' professional qualifications: the fractions of unaffiliated directors on the board who i) are deemed to be audit committee financial experts; ii) serve as CEOs of other firms; iii) are directors at other public companies; or iv) have MBA degrees.

We include several variables to control for other potential confounding effects. For example, we include firm size to capture the fact that the high demands of serving as a director of a large firm might necessitate a search for well-qualified directors beyond the vicinity of headquarters. Frequent board meetings can reduce the need for directors to interact between meetings, but at the same time they can place greater travel demands on remote directors. Thus, we control for the number of prior-year board meetings but do not hypothesize a particular direction of effect. The free cash flow of a firm (scaled by total assets) serves as a control for potential agency problems between management and shareholders. An indicator for mergers and acquisitions (M&A) activity over the prior 3 years captures the potential impact of M&A on board distance. We also control for the tenure of the CEO, whether or not a non-CEO serves as board chairman, and the firm's board size and composition.

Table 3 reports the regression results. Regression 1 shows the results for our primary measure of board distance: the fraction of unaffiliated directors who reside more than 100 km from headquarters. In regression 2, we measure distance as a binary variable equal to 1 if 50% or more of the unaffiliated directors reside more than 100 km from headquarters. In regression 3, distance is measured as the median log-transformed (km) distance between unaffiliated directors and headquarters. Regression 4 measures distance as the fraction of unaffiliated directors who live more than 90 minutes' driving time from headquarters (computed with Google Maps). Regressions 1, 3, and 4 are estimated via ordinary least squares (OLS), and regression 2 is estimated via logit. Each regression includes year dummies, dummies for the 48 Fama-French (1997) industry classifications, and dummies for manufacturing-sector firms (SIC codes 2000–2829 and 3400–3569) and service-sector firms (SIC codes 7000–8999).¹⁵ We base statistical significance on robust standard errors clustered at the firm level.

The results of the regressions provide support for the idea that distance from headquarters is systematically related to the importance of soft information. The coefficient on intangibles-to-assets is negative and significant across all four regressions. This finding is consistent with our main premise that distance from headquarters becomes especially costly when the need for soft information is high. The regressions also show why it is not typically feasible for a firm to have a board that consists entirely of local directors. In all four regressions, the coefficient estimate on the log distance between headquarters and the closest MSA is significantly positive, which suggests that firms located in smaller cities face supply constraints from the limited availability of local director talent.

¹⁵The sample size in the logit regression is slightly smaller than that in the OLS regressions due to the fact that a small number of observation outcomes do not vary within a Fama-French (1997) industry classification.

TABLE 3
Multivariate Analysis of Board Distance from Headquarters

Table 3 reports the results of multivariate regressions explaining boards' geographic distance from headquarters in terms of asset intangibility, capital intensity, and other firm, board, and CEO characteristics. In column 1, board distance is measured as the fraction of unaffiliated directors who reside more than 100 km from headquarters. In column 2, board distance is a binary variable equal to 1 if half or more of the unaffiliated directors reside more than 100 km from headquarters. Column 3 measures board distance as the median log-transformed distance (km) from headquarters of unaffiliated directors on the board. Column 4 measures board distance as the fraction of unaffiliated directors who reside more than 90 minutes' drive from headquarters. Distances are calculated using latitudes and longitudes corresponding to ZIP codes drawn from LexisNexis *Person Locator, Board Analyst*, and proxy statements. Regressions 1, 3, and 4 are estimated via OLS. Regression 2 is estimated via logit. *Intangibles-to-assets* is the 3-year average of Other Intangibles to Total Assets. *Net PP&E-to-assets* is the 3-year average ratio of Net Property, Plant, and Equipment to Total Assets. Other variables are as described in Table 2. The associated *t*-statistics or *z*-statistics, reported in parentheses, are based on robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Independent Variable	Fraction of Directors Who Live Farther than 100 km from HQ	At Least 50% of Directors Live Farther than 100 km from HQ	Median Log Distance (km) between Directors and HQ	Fraction of Directors Who Live More than 90 min Drive from HQ
	1	2	3	4
Log distance from HQ to closest large MSA (km)	0.036*** (3.75)	0.296*** (2.87)	0.198*** (3.00)	0.038*** (3.79)
Log distance from HQ to closest airport hub (km)	0.002 (0.09)	-0.151 (-0.74)	-0.121 (-1.13)	-0.002 (-0.11)
Intangibles-to-assets	-0.552** (-2.26)	-4.329** (-2.11)	-3.808** (-2.51)	-0.520** (-2.16)
Net PP&E-to-assets	0.109 (0.97)	0.811 (0.69)	0.451 (0.57)	0.177* (1.68)
Sales growth	0.071 (0.80)	0.603 (0.73)	0.821 (1.61)	0.095 (1.15)
Business segments	0.004 (0.50)	0.030 (0.34)	0.007 (0.12)	0.003 (0.37)
log(Total assets)	0.026** (2.25)	0.278** (2.00)	0.192*** (2.66)	0.034*** (2.94)
log(Company age)	0.012 (0.73)	0.208 (1.20)	0.036 (0.35)	0.008 (0.46)
FCF-to-assets	0.078 (0.71)	-1.014 (-0.83)	-0.211 (-0.33)	0.086 (0.81)
Prior M&A activity	0.067** (2.19)	0.689** (2.35)	0.247 (1.32)	0.065** (2.16)
Non-CEO chairman	-0.084*** (-2.62)	-1.045*** (-3.07)	-0.630*** (-3.42)	-0.080*** (-2.61)
log(CEO tenure)	-0.043** (-2.47)	-0.387** (-1.98)	-0.294*** (-2.64)	-0.039** (-2.33)
Board size	0.006 (0.83)	0.069 (0.91)	0.051 (1.10)	0.003 (0.39)
No. of non-CEO employees on the board	0.002 (0.09)	0.039 (0.20)	0.122 (1.05)	0.011 (0.54)
Fraction of directors who are unaffiliated	0.107 (0.92)	1.120 (1.10)	1.238* (1.66)	0.120 (1.00)
Fraction of unaffiliated directors who are financial experts	-0.024 (-0.37)	0.251 (0.35)	-0.025 (-0.06)	-0.049 (-0.74)
Fraction of unaffiliated directors who are CEOs of outside firms	0.126 (1.53)	0.664 (0.81)	0.778* (1.66)	0.132* (1.67)
Fraction of unaffiliated directors who hold an outside public directorship	-0.012 (-0.19)	-0.252 (-0.45)	-0.026 (-0.08)	0.026 (0.46)
Fraction of unaffiliated directors who hold an MBA degree	0.087 (1.18)	0.936 (1.21)	1.069** (2.48)	0.101 (1.33)
No. of board meetings	0.003 (1.32)	0.034 (1.13)	0.017 (1.25)	0.004* (1.83)
log(Unaffiliated blockholder ownership)	0.135 (1.12)	-0.548 (-0.48)	0.895 (1.24)	0.142 (1.18)

(continued on next page)

TABLE 3 (continued)
Multivariate Analysis of Board Distance from Headquarters

Independent Variable	Fraction of Directors Who Live Farther than 100 km from HQ	At Least 50% of Directors Live Farther than 100 km from HQ	Median Log Distance (km) between Directors and HQ	Fraction of Directors Who Live More than 90 min Drive from HQ
	1	2	3	4
Classified board	0.005 (0.19)	0.144 (0.50)	0.197 (1.11)	-0.010 (-0.36)
Industry dummies and year dummies	Yes	Yes	Yes	Yes
No. of obs.	1,028	976	1,028	1,028
R^2 or pseudo R^2	0.260	0.190	0.263	0.273

In all four regressions, the indicator for a non-CEO chairman has a significantly negative coefficient. We interpret this result as further support for the notion that distance affects the costs of soft information. When the CEO and chairman positions are separated, the chairmanship is a less effective conduit for the flow of information from the CEO to the board. Thus, it becomes more advantageous (for collecting soft information) if the other board members reside close to headquarters. We also find significantly negative coefficients on the log of CEO tenure, which raises the possibility that CEOs influence director nomination processes over time to bring boards closer to headquarters. We further explore in Section IV the possibility that board geography reflects CEO influence over board composition.

B. Board Distance and Nonroutine CEO Turnover

This section presents our analysis of the relation between CEO dismissal decisions and board distance. The dismissal of top management is arguably one of the most important monitoring actions that a board can take, for it can have profound, long-term effects on a firm's functioning and internal organization. As a practical matter, boards likely use a combination of hard and soft information in weighing the costs and benefits of ousting a CEO.¹⁶ If a board is geographically distant from headquarters, it may have a high cost of acquiring soft information, and thus it will tend to rely more on hard information (i.e., stock price performance) when deciding whether to dismiss top management.¹⁷

To examine whether board distance is related to the stock-price sensitivity of CEO dismissals, we focus on CEOs with tenures of 2 years or more and identify turnovers that are likely to represent board discipline. For each firm-year, we check proxy statements to determine whether the CEO at the end of the prior

¹⁶See, for example, Cornelli, Kominek, and Ljungqvist (2013), who document evidence from private equity audit reports that boards appear to use both types of information in deciding whether to retain or dismiss top management.

¹⁷Numerous studies document a relation between poor firm performance and nonroutine or forced CEO turnover. See, for example, Coughlan and Schmidt (1985), Warner, Watts, and Wruck (1988), Weisbach (1988), Gilson (1989), Blackwell, Brickley, and Weisbach (1994), Kaplan (1994), Borokhovich, Parrino, and Trapani (1996), Denis, Denis, and Sarin (1997), Huson, Parrino, and Starks (2001), and Jenter and Kanaan (2014).

fiscal year is still CEO at the end of the current fiscal year and use the S&P *Register of Corporations, Directors, and Officers* to verify departures. Following Denis et al. (1997), we use news stories and press releases to determine whether CEO turnovers were routine or nonroutine. We classify a turnover as routine if i) the departure involves a health-related reason or ii) the stated reason for the departure is normal retirement or succession and the individual is between 64 and 66 years old. All other CEO departures are nonroutine.¹⁸

The average annual frequency of nonroutine CEO turnover in the sample is 6.7%. This rate is higher than the 5.9% turnover frequency in Denis et al. (1997), but it is lower than the 7.8% annual rate in Weisbach (1988) and the 9.3% rate in Denis and Denis (1995). The turnover frequency ranges from as high as 8.4% in 2006 to as low as 5.5% in 2007.

We estimate logit models to explain nonroutine CEO turnover in terms of industry-adjusted stock performance, board distance, and other factors. The dependent variable equals 1 if a firm experiences a nonroutine CEO turnover in a given fiscal year, and 0 otherwise. Industry-adjusted return equals the firm's annual stock return over the fiscal year minus the median stock return in the same SIC 2-digit industry. Because large, urban areas provide deeper pools of potential director candidates, we include the log distance between a firm's headquarters and the nearest large MSA to control for the availability of director talent. We control for the distance between headquarters and the nearest airport hub to capture the degree to which infrastructure lowers the travel-related costs of out-of-town board members.

Other control variables include the log of total assets, board size, the log of company age, board meeting frequency in the prior year, the log of unaffiliated block holder ownership, an indicator for a staggered board, and an indicator for a non-CEO chairman. To control for potential agency problems and the need for monitoring by the board, we use free cash flow scaled by assets, the log of CEO age, and the log of CEO tenure. We also include year indicators and indicators for the 48 Fama-French (1997) industries.

Table 4 presents the results of the logit models. We base statistical significance of coefficient estimates on robust standard errors clustered at the firm level. Column 1 presents a baseline model. The coefficient for industry-adjusted stock return is -1.01 (t -statistic = -2.13), which implies that a 10-percentage-point increase in industry-adjusted return corresponds to a 9.6% decrease in the annual odds of nonroutine CEO turnover.¹⁹ The odds of nonroutine CEO turnover are positively linked to the board's meeting frequency and to the percentage of shares held by unaffiliated block holders. We find no evidence that remote boards are more likely to dismiss the CEO: The coefficient on board distance is insignificant (t -statistic = -0.35).

¹⁸Our main results are robust to using the more stringent definition of forced turnover given by Parrino (1997).

¹⁹The odds of a nonroutine CEO turnover are given by $\text{prob}(\text{turnover}) / (1 - \text{prob}(\text{turnover})) = e^{X\beta}$, where X is the vector of explanatory variables and β is the vector of coefficients. For the model in column 1, increasing the adjusted return by 10 percentage points, ceteris paribus, corresponds to multiplying the odds by $e^{-1.008 \times 0.10} = 0.904$.

TABLE 4
Board Distance and Nonroutine CEO Turnover

Table 4 reports estimated coefficients from logit regressions explaining the annual incidence of nonroutine CEO turnover in terms of board distance, stock performance, and other firm, board, and CEO characteristics. The dependent variable in each regression equals 1 if a firm experienced a nonroutine CEO turnover event during a given fiscal year, and 0 otherwise. Nonroutine CEO turnover events are defined as in Denis et al. (1997) and identified from proxy statements and news articles. Only firm-years in which the CEO has held office for more than 1 year are included. *Board distance* is the fraction of unaffiliated directors on the board who live more than 100 km from headquarters. *Industry-adjusted return* is the firm's stock return over the current fiscal year minus the contemporaneous median stock return within the same SIC 2-digit industry. *Market-adjusted industry return* is the median stock return within the firm's SIC 2-digit industry minus the contemporaneous return on the S&P 500. *Market return* is the return on the S&P 500. Geographic distances are calculated using latitudes and longitudes corresponding to ZIP codes drawn from LexisNexis *Person Locator*, proxy statements, and *Board Analyst*. *Unaffiliated Board* is a binary variable equal to 1 if and only if at least 75% of a firm's board members in a given year are unaffiliated directors. Other variables are as described in Table 2. The z-statistics (reported in parentheses) are based on robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Independent Variable	1	2	3	4
Log distance from HQ to closest large MSA	0.050 (0.51)	0.048 (0.50)	0.044 (0.46)	0.054 (0.56)
Log distance from HQ to closest airport hub	0.187 (0.94)	0.199 (0.98)	0.213 (1.05)	0.200 (1.00)
Board distance	-0.192 (-0.35)	-0.195 (-0.34)	-0.232 (-0.40)	-1.011 (-0.93)
Industry-adjusted return	-1.008** (-2.13)	0.544 (0.57)	0.415 (0.43)	0.584 (0.61)
Board distance × Industry-adjusted return		-2.340* (-1.89)	-2.828** (-2.08)	-3.087** (-2.36)
Unaffiliated Board			0.288 (0.82)	0.291 (0.82)
Unaffiliated Board × Industry-adjusted return			0.842 (0.83)	0.900 (0.86)
Market-adjusted industry return				-5.748 (-1.37)
Board distance × Market-adjusted industry return				6.451 (1.25)
Market return				-9.547 (-1.02)
Board distance × Market return				12.086 (1.06)
Board size	-0.025 (-0.31)	-0.018 (-0.22)	-0.024 (-0.29)	-0.015 (-0.18)
No. of board meetings	0.074* (1.79)	0.082* (1.90)	0.084* (1.90)	0.083* (1.83)
log(Total assets)	-0.022 (-0.17)	-0.044 (-0.34)	-0.045 (-0.34)	-0.043 (-0.33)
FCF-to-assets	-0.754 (-0.34)	-0.996 (-0.44)	-1.162 (-0.49)	-1.159 (-0.48)
Non-CEO chairman	0.250 (0.77)	0.284 (0.86)	0.336 (0.96)	0.297 (0.85)
log(CEO tenure)	-0.004 (-0.02)	-0.020 (-0.07)	0.019 (0.06)	-0.003 (-0.01)
log(CEO age)	1.332 (0.73)	1.546 (0.79)	1.548 (0.79)	1.530 (0.76)
log(company age)	0.077 (0.43)	0.086 (0.48)	0.108 (0.61)	0.107 (0.59)
log(Unaffiliated blockholder ownership)	2.674* (1.94)	2.699** (1.98)	2.497* (1.86)	2.544* (1.78)
Classified board	-0.167 (-0.55)	-0.156 (-0.51)	-0.136 (-0.44)	-0.121 (-0.40)
Industry dummies and year dummies	Yes	Yes	Yes	Yes
No. of obs.	960	960	960	960
Pseudo R ²	0.094	0.102	0.105	0.120

In column 2 of Table 4, we add an interaction between industry-adjusted performance and board distance. The estimated interaction coefficient is -2.340 (t -statistic = -1.89). Note that this coefficient estimate by itself cannot be used to calculate the effect of the distance-performance interaction on the probability of turnover. In nonlinear models, the effect of an interaction term on probabilities depends not only on the interaction coefficient, but also on other coefficients at different levels of the independent variables (see Ai and Norton (2003)). Since providing an interpretation of the interaction effect in terms of probabilities is not straightforward, we opt for a simpler interpretation in terms of odds. Column 2 shows that when the fraction of unaffiliated directors more than 100 km from headquarters is only 0.50 (corresponding to the 25th percentile), a 10-percentage-point reduction in industry-adjusted performance corresponds to a 6.5% increase in the odds of nonroutine turnover.²⁰ When the fraction of distant unaffiliated directors is 1.0 (corresponding to the 75th percentile), a 10-percentage-point reduction in stock performance increases the odds of turnover by 19.7%. Thus, the logit estimates indicate that the odds of CEO dismissal are much more sensitive to stock price performance when the board resides farther from headquarters.

The relation between board distance and the stock-price sensitivity of CEO turnover could be driven by cross-firm variation in board composition. Prior research (e.g., Weisbach (1988)) shows that CEO turnover is more sensitive to measures of firm performance for outsider-dominated boards. To check whether our results are explained by differences in board composition, we define a binary variable equal to 1 if at least 75% of the directors in a given year are unaffiliated. In column 3 of Table 4, we augment the regression with the unaffiliated board dummy and its interaction with industry-adjusted stock return. Neither of these two variables is statistically significant.²¹

The recent literature on CEO turnover shows that the likelihood of CEO dismissal may be influenced by industry or market-wide factors (Kaplan and Minton (2012), Jenter and Kanaan (2014)). In column 4 of Table 4 we augment the regression with the market-adjusted industry return (the median stock return within the 2-digit SIC industry minus the return on the S&P 500), the return on the S&P 500 itself, and interactions of these two return measures with board distance. Column 4 shows that industry performance, market performance, and their respective interactions with board distance are all insignificant. However, the interaction between board distance and firm performance remains significantly negative. These findings support the view that board distance matters for the costs of gathering soft, firm-specific information, but not for the costs of gathering industry-wide or market-wide information.

Our finding that board distance is positively associated with the sensitivity of CEO turnover to performance contrasts to some extent with the findings

²⁰This estimate includes the direct effect of the decline in performance and its interaction with board distance. Using the estimates in column 2 and setting the fraction of distant directors to 0.5, we obtain a change in odds of $e^{[0.544(-0.10) - 2.34(0.5)(-0.10)]} = 1.065$, which corresponds to a 6.5% increase in the odds of dismissal for a 10% decline in adjusted performance.

²¹Note that the proportion of outsiders on boards changed significantly between the sample period in Weisbach's (1988) study and our sample period. The median board in the earlier period had about 50% outsiders, while the median board in our sample has 85.7% outsiders.

of Masulis et al. (2011), who document that CEO turnover tends to be less performance-sensitive when a foreign director is on the board. A likely explanation for the difference in findings is that board decisions are influenced not only by social, cultural, legal, and accounting differences across national borders, but also by directors' costs of international travel, which can be much higher than costs of domestic travel. Indeed, Masulis et al. find that foreign directors tend to miss more board meetings, whereas board meeting attendance is largely unrelated to distance in our sample.²²

To gain additional insight into the economic and statistical significance of our findings, we examine how predicted turnover probabilities change with discrete changes in board distance and stock performance. For the model in column 4 of Table 4, we calculate implied probabilities when industry-adjusted performance and/or the fraction of unaffiliated directors who reside farther than 100 km from headquarters is high (equal to the 75th percentile) or low (equal to the 25th percentile), holding other independent variables at their mean values. To assess whether a change in implied probability is statistically significant at the 5% level, we approximate the asymptotic variance of the change using the delta method. Our calculations reveal a substantial difference in the performance-turnover relation for distant boards versus close boards.²³ For example, when board distance equals the 75th percentile, a drop in industry-adjusted stock return from the 75th to the 25th percentile translates into a statistically significant increase in the non-routine turnover probability from 2.59% to 5.30%. When board distance equals the 25th percentile, moving from the 75th to the 25th percentile of stock performance produces an insignificant increase in nonroutine turnover probability from 3.74% to 4.49%.

C. Board Distance and CEO Compensation

Optimal contracting models imply that when agents' actions are unobservable, principals will use costly incentive schemes that tie compensation to observable measures of output (Holmstrom (1979), Shavell (1979)). When agents' actions and inputs are harder to observe and monitor directly, principals should rely even more heavily on pay-performance schemes tied to public measures of output (Prendergast (2000), (2002)). Correspondingly, if geographic distance from headquarters reflects the costs of obtaining soft information, then we would expect more distant boards to link CEO pay more closely to stock price performance. To test this prediction, we examine the influence of board distance on several different dimensions of stock-based compensation, including the value of stock and option grants, the fraction of total pay coming from such grants, and the pay-performance sensitivity (PPS) of these compensation elements.

We obtain compensation data from the S&P ExecuComp database and fill in missing observations with data from proxy statements where available. We match

²²Within our sample, only 0.91% of directors on average fail to attend at least three-quarters of board meetings. The average proportion of directors who fail to satisfy meeting attendance standards is not statistically different for firms with above-median board distances versus firms with below-median board distances (p -value = 0.653).

²³Further details of these calculations are available from the authors.

each year's compensation data to the corresponding board data for that year. The dependent variables in our regressions measure different structural aspects of CEO pay (e.g., the level of total pay, the level of a specific pay component, or the intensity of equity-based CEO pay). Cash-based pay is the sum of salary and bonus. Equity-based pay is the sum of the values of option grants and restricted stock grants. We value options with a dividend-protected Black-Scholes (1973) model, and we use the stock price at the close of the fiscal year to value restricted stock grants. Total pay equals the sum of all reported compensation elements.

The primary explanatory variable of interest is again the fraction of unaffiliated directors who reside more than 100 km from headquarters. As in our CEO turnover analysis, we include (log-transformed) distances from headquarters to the nearest large MSA and to the nearest airport hub as geography-related control variables. To account for the potential dependence of compensation on the nature of a firm's assets, we include the 3-year average ratio of net PP&E to total assets.²⁴ We also control for industry-adjusted stock performance, firm size, free cash flow, volatility, the log of unaffiliated blockholder ownership, board size, composition, meeting frequency, classified board structure, the presence of a non-CEO chairman, CEO age, CEO tenure, and industry and year dummies.

Table 5 reports the regression results. Column 1 indicates that board distance is significantly positively related to log total pay. Log total pay is also positively related to the log of total assets (t -statistic = 8.18), which echoes the common finding in the literature that firm size is a primary determinant of CEO pay levels. In column 2, we find no evidence that the log of cash-based pay is positively associated with board distance; the coefficient on director distance is close to 0 (t -statistic = 0.97). Columns 3 and 4 present regressions for the log of 1 plus option pay and the log of 1 plus all equity-based pay. We use Tobit specifications with censoring at 0, since CEOs sometimes receive no stock options or stock grants in a given firm-year. In these regressions, the coefficients on board distance are positive and significant at the 1% level, which suggests that stock-based pay, not cash-based pay, drives the positive association between CEO total compensation and board distance.

We also examine *ex ante* measures of incentive intensity: i) the fractions of total pay derived from either option grants or equity-based grants; and ii) the sensitivities of annual grants to a given dollar change in shareholder wealth. To construct the sensitivity measure, we follow Yermack (1995) and calculate, for each option, the derivative of the option's Black-Scholes (1973) value with respect to the stock price. For a share of restricted stock, the sensitivity to stock performance is 1. We then aggregate the individual sensitivities across all options granted or shares awarded during a fiscal year, divide by the number of common shares outstanding, and multiply by 1,000 to obtain the PPS for the year. Because the raw PPS measure is highly skewed, in our PPS regressions we use the log of 1 plus PPS as the dependent variable.

²⁴Empirical evidence indicates that boards use more equity-based incentives when the nature of a firm's assets makes it difficult for outside directors to monitor managers. See, e.g., Smith and Watts (1992), Gaver and Gaver (1995), Mehran (1995), Core and Guay (1999), Bryan, Hwang, and Lilien (2000), and Ryan and Wiggins (2001).

TABLE 5
Board Distance and CEO Compensation

Table 5 presents the results of multivariate regressions that relate the level, composition, and pay-performance sensitivity (PPS) of CEO pay to board distance from headquarters and to other firm, board, and CEO characteristics. Cash-based pay is the sum of salary and bonus. Option-based pay is the Black-Scholes (1973) value (modified for dividends) of options granted during the year. Equity-based pay is the sum of option-based pay and the value of restricted share grants. Total pay is the sum of cash-based pay, equity-based pay, long-term incentive plan payouts, and other compensation. Models 1 and 2 are estimated using OLS; models 3, 4, 7, and 8 are estimated using one-sided Tobit; and models 5 and 6 are estimated using two-sided Tobit (upper and lower bounds at 1 and 0, respectively). The PPS of a CEO's option (equity) pay during a fiscal year is the approximate change in value of granted options (equity) that would correspond to a \$1,000 change in total shareholder wealth. The PPS for an individual option is computed using the partial derivative of the Black-Scholes option value (see Yermack (1995)). The PPS of a CEO's previously granted options and shares is calculated using the approximation method of Core and Guay (2002). *Board distance* is the fraction of unaffiliated directors on the board who reside more than 100 km from headquarters. Distances are calculated using latitudes and longitudes corresponding to ZIP codes obtained from LexisNexis *Person Locator*, proxy statements, and *Board Analyst*. *Industry-adjusted return* is the firm's stock return over the fiscal year minus the contemporary median stock return among firms in the same SIC 2-digit industry. *Volatility* is the annualized standard deviation of daily stock returns, calculated over a 5-year period prior to the current year. Other variables are as described in Table 2. The *t*-statistics (reported in parentheses) are based on robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Independent Variable	Level				Composition		PPS	
	Log Total Pay	Log Cash-Based Pay	Log Option-Based Pay	Log Equity-Based Pay	Option Pay/Total Pay	All Equity Pay/Total Pay	Log PPS of Option Pay	Log PPS of Equity Pay
	1	2	3	4	5	6	7	8
Board distance	0.452** (2.18)	0.174 (0.97)	2.214*** (2.97)	1.702*** (2.77)	0.171*** (3.27)	0.161*** (3.26)	1.694*** (2.80)	1.270** (2.48)
Log distance from HQ to closest large MSA	-0.052** (-2.14)	-0.031 (-1.58)	-0.125 (-0.79)	-0.205 (-1.60)	-0.009 (-0.82)	-0.017* (-1.72)	-0.170 (-1.30)	-0.227** (-2.10)
Log distance from HQ to closest airport hub	-0.006 (-0.12)	-0.069 (-1.63)	0.346 (1.23)	0.504** (2.13)	0.030 (1.49)	0.047** (2.49)	0.238 (1.04)	0.414** (2.10)
Log PPS of CEO's previously granted options and shares							0.074 (0.51)	0.061 (0.46)
Industry-adjusted return	0.117 (0.64)	0.107 (0.68)	-0.065 (-0.15)	-0.178 (-0.45)	-0.056 (-1.57)	-0.044 (-1.33)	0.498 (1.36)	0.262 (0.80)
log(Total assets)	0.364*** (8.18)	0.249*** (6.78)	0.437** (2.14)	0.394** (2.24)	0.020 (1.43)	0.028** (2.04)	-0.042 (-0.26)	-0.174 (-1.20)
log(Company age)	-0.028 (-0.68)	-0.014 (-0.43)	-0.004 (-0.02)	0.088 (0.45)	-0.025 (-1.37)	-0.010 (-0.63)	0.013 (0.06)	0.154 (0.91)
FCF-to-assets	0.840* (1.81)	0.673** (2.49)	1.858 (0.80)	-0.393 (-0.25)	0.019 (0.09)	-0.097 (-0.66)	1.930 (1.30)	0.179 (0.15)
Net PP&E-to-assets	-0.661** (-2.25)	-0.402* (-1.81)	-0.931 (-0.61)	-0.002 (-0.00)	-0.156 (-1.37)	-0.103 (-0.99)	-0.725 (-0.56)	0.528 (0.51)
Volatility	-0.283 (-0.91)	-0.132 (-0.52)	-2.254 (-1.09)	-2.317 (-1.45)	-0.160 (-1.13)	-0.076 (-0.60)	-3.843** (-2.27)	-2.955** (-2.21)
Non-CEO chairman	0.005 (0.06)	-0.004 (-0.05)	-0.123 (-0.27)	0.117 (0.33)	0.012 (0.37)	0.028 (0.97)	-0.128 (-0.34)	0.220 (0.73)
log(CEO tenure)	-0.055 (-1.26)	-0.046 (-1.27)	-0.474* (-1.67)	-0.363 (-1.62)	-0.019 (-0.96)	-0.023 (-1.26)	-0.382 (-1.48)	-0.227 (-1.08)
log(CEO age)	0.015 (0.04)	0.273 (0.88)	-3.736** (-2.10)	-2.815* (-1.94)	-0.299** (-2.34)	-0.334*** (-2.82)	-3.002** (-1.97)	-2.082* (-1.65)
Board size	0.009 (0.39)	0.004 (0.20)	-0.044 (-0.44)	0.071 (0.83)	-0.007 (-1.05)	-0.001 (-0.21)	-0.083 (-1.02)	0.022 (0.32)
Fraction of unaffiliated directors	0.493* (1.80)	0.237 (1.02)	2.792* (1.92)	2.622** (2.20)	0.222** (2.14)	0.199** (2.07)	2.060* (1.73)	2.072** (2.16)
No. of board meetings	0.011 (1.30)	0.015** (2.30)	-0.024 (-0.50)	-0.013 (-0.34)	-0.003 (-0.76)	-0.0005 (-0.16)	-0.044 (-1.01)	-0.012 (-0.37)
log(Unaffiliated blockholder ownership)	0.015 (0.05)	-0.099 (-0.44)	-2.335 (-1.34)	-0.273 (-0.19)	-0.170 (-1.40)	-0.064 (-0.57)	-1.756 (-1.23)	0.601 (0.50)
Classified board	0.042 (0.59)	0.093 (1.65)	0.588 (1.44)	0.469 (1.41)	0.026 (0.90)	0.013 (0.48)	0.689** (2.10)	0.569** (2.09)
Industry dummies and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	1,210	1,214	1,236	1,210	1,210	1,210	1,197	1,197
R ² or Pseudo R ²	0.400	0.394	0.039	0.039	0.209	0.223	0.035	0.030

Columns 5 and 6 of Table 5 present the results of regressions that explain the fractional measures of option intensity or equity-grant intensity. We use a two-sided Tobit model, since the fractional dependent variable lies between 0 and 1 and can assume the boundary values. Consistent with our expectations, both regressions show that distance is positively related (p -values < 0.01) to the fractions of option- and equity-based pay. In the regression explaining the equity fraction of total pay, firm size again has a positive and significant coefficient. Also, the log of CEO age is negatively related to both fractional pay measures, while the fraction of unaffiliated directors on the board is positively related to both pay measures.

The last two columns of Table 5 report the results of Tobit regressions that examine the effects of distance on the log PPS of option grants and the log PPS of total equity grants. Because boards may use annual option and equity grants to supplement a CEO's pre-existing stock and option holdings to target an overall level of incentives, we use the method of Core and Guay (2002) to estimate the PPS of the CEO's portfolio of previously acquired equity. We include the log transformation of this portfolio PPS as a control variable. We find that both option-grant PPS and total equity-grant PPS are positively and significantly related to board distance. Thus, the results again indicate that distant boards rely more heavily on incentives that are tied to the hard information in stock price performance.²⁵

IV. Robustness Considerations and Alternative Explanations

Our findings support the idea that distance increases directors' costs of collecting soft information and affects how boards use hard and soft information to make decisions. In this section, we perform robustness checks on our main findings and examine other possible reasons why board distance might be associated with CEO dismissal and CEO compensation.

A. Robustness Checks

Our primary measure of board distance, the fraction of unaffiliated directors who reside more than 100 km from headquarters, is straightforward to define and interpret. However, theory does not provide an exact specification of the relation between board distance and the costs of acquiring information. Thus, we re-examine our turnover and compensation results using the three alternative measures of board distance used in Table 3: i) a binary variable equal to 1 if 50% or more of the unaffiliated directors reside more than 100 km from headquarters; ii) the median log-transformed distance between a board's unaffiliated directors

²⁵Our results on CEO compensation can be compared to those of Masulis et al. (2011), who examine how the level and composition of CEO pay vary with the presence of a foreign independent director on the board. Like Masulis et al., we find that the level of CEO pay tends to increase with the board's "distance," but we also observe in our sample that PPS is greater for more distant boards. The difference in findings for PPS can be explained by the distinction between domestic remoteness and international remoteness, where the latter typically involves not only very long travel distances, but also cross-country differences in laws, accounting systems, culture, and social norms.

and headquarters; and iii) the fraction of unaffiliated directors who live more than 90 minutes' driving time from headquarters. The first three rows in Table 6 show that these alternative distance measures lead to similar results as are found in Tables 4 and 5.

TABLE 6
Robustness Checks

Table 6 presents the results of robustness tests based on the CEO turnover and CEO compensation regressions in Tables 4 and 5. Each cell displays a selected coefficient estimate from one regression along with an associated z-statistic or t-statistic in parentheses (for ease of exposition, coefficient estimates and statistics for other regressors are not reported). The regressions in column 1 are based on regression 4 in Table 4. The regressions in columns 2, 3, 4, and 5 are based on regressions 5, 6, 7, and 8, respectively, in Table 5. Board distance measures are as described in Table 3. The t-statistics and z-statistics are based on robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Robustness Check	Prob. of Nonroutine CEO Turnover	Options as Fraction of Pay	Equity as Fraction of Pay	Log PPS of Option Pay	Log PPS of Equity Pay
	Coefficient on (Board Distance × Industry-Adjusted Return)				
	1	2	3	4	5
a) Board distance (0, 1) equals 1 if 50% or more of unaffiliated directors live farther than 100 km from headquarters	-1.862* (-1.79)	0.085** (2.51)	0.076** (2.54)	0.938** (2.49)	0.695** (2.22)
b) Board distance = median log distance of unaffiliated directors from HQ	-0.440*** (-2.73)	0.033*** (3.92)	0.028*** (3.56)	0.303*** (3.17)	0.193** (2.42)
c) Board distance = fraction of unaffiliated directors more than 90 minute drive from HQ	-2.995** (-2.53)	0.169*** (3.12)	0.157*** (3.13)	1.707*** (2.75)	1.305** (2.50)
d) Control for the median of log-transformed distances between unaffiliated directors and nearest airport hubs	-3.032** (-2.36)	0.170*** (3.27)	0.159*** (3.25)	1.671*** (2.79)	1.248** (2.46)
e) Control for log(1 + CEO-to-headquarters distance)	-3.178** (-2.42)	0.174*** (3.32)	0.164*** (3.33)	1.754*** (2.95)	1.326*** (2.62)

We also consider whether directors live near airport hubs. Proximity of a director to an airport hub can lower overall travel time and relax the constraints on acquiring soft information. To examine the impact of this factor, we compute the log-transformed distance between each unaffiliated director's residential location and the nearest airport hub, and we include the board-level median of these distances as a control variable. As shown in the fourth row of Table 6, the stock-price sensitivities of CEO turnover and compensation continue to be significantly related to board distance after adding this variable to the regression specifications.

If board members are more likely to reside locally when the CEO also lives close to headquarters, our main turnover and compensation tests could confound the effects of board and CEO distance. Thus, we add the log-transformed distance between headquarters and the CEO as a control variable in our regressions.²⁶

²⁶Data on CEO residential locations are unavailable for approximately 25% of observations. To avoid a substantial reduction in sample size, we replace each missing value of the log CEO distance with a value of 0 and also include a binary variable indicating missing CEO distance data.

The results, shown in the last row of Table 6, indicate that controlling for CEO-to-headquarters distance does not alter our main results.

B. Social Connections Between Directors and the CEO

Recent research indicates that social connections between boards and top management can affect the probability of CEO turnover and the structure of CEO compensation (Hwang and Kim (2009)). If board geography simply proxies for the degree of social connections between board members and management, then our basic conclusion that distance affects directors' information-gathering costs would be unjustified. Thus, we conduct tests to verify that our findings on CEO dismissal and CEO pay are the result of differences in the costs of gathering soft information rather than differences in the extent of social ties.

Social ties could exist as a result of common backgrounds or experiences shared in the past. For instance, a director and a CEO might have attended the same schools and developed shared social networks. We focus on one observable measure of connections formed in the past, namely, the existence of a shared educational background. For each CEO and unaffiliated director, we gather from the *BoardEx* database information on undergraduate and graduate institutions attended and degrees awarded. Following Cohen, Frazzini, and Malloy (2008), (2010) and Hwang and Kim (2009), we determine whether two individuals are connected by virtue of having obtained degrees from the same school. We compute the connectedness between a board's directors and the CEO as the number of unaffiliated board members with the same alma mater as the CEO, normalized by the number of unaffiliated directors on the board for whom we have alma mater information.

Directors might also have ongoing social interactions with the CEO in the local community. For example, directors and top management might support the same charitable organizations, belong to the same social clubs, or be involved with the same athletic organizations (see Fracassi and Tate (2012) for empirical evidence on how such connections can influence corporate acquisition decisions and firm value). To examine whether local, ongoing social interactions between directors and top management might account for our findings, we define an "isolated CEO" binary variable equal to 1 if the CEO lives more than 300 km away from the nearest unaffiliated director. Since CEO locations are unavailable for a nontrivial number of observations in the sample, we replace missing values of the CEO isolation variable with 0 and define an indicator equal to 1 whenever the original data are missing.

Table 7 reports the results of turnover and compensation regressions that account for director-CEO connections. In column 1 of Panel A, we estimate a logit regression similar to regression 4 of Table 4, except that board distance and its interaction with industry-adjusted performance are replaced by our school ties variable and its interaction with performance. The coefficient on the interaction is significantly positive (p -value < 0.05), indicating that the presence of shared alma maters lowers the likelihood of CEO dismissal after poor performance. This result shows that our school ties variable is likely to be a meaningful measure of the influence of social ties on CEO dismissal decisions. In column 2, we find that

TABLE 7
Social Ties, Distance from Headquarters, and Board Decisions

Table 7 presents selected coefficient estimates from CEO turnover regressions and CEO compensation regressions that examine the effects of CEO-director social ties. Panel A presents logit regressions similar to regression 4 in Table 4 except that measures of director-CEO connections are introduced to either replace board distance and its interaction (column 1) or to augment the specification (columns 2–4). Panel B presents Tobit and two-sided Tobit regressions that are similar to regressions 5–8 in Table 5 except that the specifications are augmented by measures of director-CEO connections. *Board distance* is the fraction of unaffiliated directors on the board who live more than 100 km from headquarters. Distances are calculated using latitudes and longitudes corresponding to ZIP codes drawn from LexisNexis *Person Locator*, proxy statements, and *Board Analyst*. *Industry-adjusted return* is the firm's stock return over the fiscal year minus the contemporary median stock return across all firms in the same SIC 2-digit industry. Data on directors' and CEOs' educational backgrounds are from the *BoardEx* database. *Fraction of directors sharing CEO's alma mater* is the fraction of unaffiliated directors on the board who attended an educational institution that the CEO attended. *CEO lives far from directors* is a binary variable equal to 1 if the CEO is located more than 300 km from the closest unaffiliated director. The associated t-statistics or z-statistics (reported in parentheses) are based on robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. CEO Turnover Tests

Independent Variable	1	2	3	4
Industry-adjusted return	-1.325* (-1.79)	0.233 (0.25)	0.618 (0.62)	0.572 (0.60)
Board distance		-0.714 (-0.68)	-1.078 (-0.95)	-1.064 (-0.95)
Board distance × Industry-adjusted return		-2.784** (-2.11)	-3.466** (-2.15)	-3.252** (-2.17)
Fraction of directors sharing CEO's alma mater	-0.197 (-0.11)	-0.221 (-0.13)		
Fraction of directors sharing CEO's alma mater × Industry-adjusted return	7.938** (2.10)	7.806** (2.08)		
CEO lives far from directors			0.152 (0.34)	0.141 (0.32)
CEO lives far from directors × Industry-adjusted return			0.281 (0.73)	
CEO lives far from directors × Board distance × Industry-adjusted return				0.449 (0.34)
Industry dummies and year dummies	Yes	Yes	Yes	Yes
Other controls from Table 4 included	Yes	Yes	Yes	Yes
No. of obs.	823	823	960	960
Pseudo R ²	0.126	0.136	0.123	0.122

Panel B. CEO Compensation Tests

Independent Variable	Dependent Variable							
	Option Pay/Total Pay	Equity Pay/Total Pay	Log PPS of Option Pay	Log PPS of Equity Pay	Option Pay/Total Pay	Equity Pay/Total Pay	Log PPS of Option Pay	Log PPS of Equity Pay
	1	2	3	4	5	6	7	8
Board distance	0.160*** (2.82)	0.141*** (2.65)	1.897*** (2.89)	1.357*** (2.43)	0.187*** (3.24)	0.164*** (3.00)	1.787*** (2.73)	1.320** (2.40)
Log PPS of CEO's previously granted shares and options			-0.116 (-0.81)	-0.099 (-0.76)			0.071 (0.49)	0.058 (0.44)
Fraction of directors sharing CEO's alma mater	-0.014 (-0.08)	0.024 (0.14)	-0.304 (-0.16)	-0.399 (-0.22)				
CEO lives far from directors					0.046 (0.40)	-0.085 (-0.82)	-0.398 (-0.31)	-1.158 (-1.11)
CEO lives far from directors × Board distance					-0.071 (-0.53)	0.052 (0.43)	0.077 (0.05)	0.760 (0.63)
Industry dummies and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls from Table 5 included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	1,060	1,060	1,048	1,048	1,210	1,210	1,197	1,197
Pseudo R ²	0.219	0.221	0.040	0.035	0.210	0.227	0.035	0.031

adding the board distance variables back into the regression yields a significantly negative coefficient estimate on the distance-performance interaction, corroborating our earlier results in Table 4. Likewise, in columns 1–4 of Panel B, we verify that our compensation results are robust to controlling for shared educational backgrounds.

In column 3 of Panel A of Table 7, we add to the basic CEO turnover specification our CEO isolation variable, along with its interaction with industry-adjusted return and the indicator for missing CEO distance data. The estimates show that the turnover result from Table 4 still holds: Performance sensitivity of CEO turnover is significantly related to the fraction of unaffiliated directors who reside more than 100 km from headquarters. In column 4 of Panel A of Table 7, the interaction between CEO isolation and performance is replaced with a three-way interaction of the isolated CEO dummy, board distance, and industry-adjusted performance. The coefficient on this three-way interaction is insignificant. This result demonstrates that the performance-sensitivity of nonroutine CEO turnover is unrelated to whether the CEO is geographically isolated from directors. The last four columns in Panel B show that the effect of board distance on equity-based CEO compensation is not dependent on whether the CEO resides near directors. Collectively, these results indicate that local social interactions between CEOs and directors do not drive our results.

C. CEO Influence over Board Composition

A powerful and entrenched CEO may wield influence over the process of director nominations and appointments, and he may use this power to ensure that the process selects new directors who are friendly to his interests.²⁷ If new board appointees favored by the CEO tend to reside near headquarters, then failing to control for CEO power could give rise to a spurious relation between board distance and the performance-sensitivity of CEO turnover.

To test whether CEO influence over board composition could explain our turnover findings, we focus on unaffiliated directors who are long-tenured (i.e., who joined the board before the CEO).²⁸ Specifically, we estimate regressions similar to those in columns 1, 2, and 4 in Table 4, except that board distance is now the fraction of unaffiliated, long-tenured directors who live more than 100 km from headquarters. We exclude observations for which this board distance measure is based on a single director's distance. Using this measure largely eliminates the possibility that our results reflect CEO influence over the selection of directors. Panel A of Table 8 reports the regression results. The coefficient on board distance is significantly negative in column 3, indicating that long-tenured directors may be less inclined to dismiss the CEO when they reside far from headquarters. More importantly, the estimated coefficients in columns 2 and 3 on the interaction

²⁷Shivdasani and Yermack (1999) and Fracassi and Tate (2012), among others, present evidence suggesting that CEOs influence the selection of directors. Hermalin and Weisbach (1998) show theoretically that a CEO can gain bargaining power vis-à-vis the board over time, which can affect the board's structure and independence.

²⁸This measure is closely related to the measure of "co-opted" boards used by Coles, Daniel, and Naveen (2014).

TABLE 8
CEO Influence, Distance from Headquarters, and Board Decisions

Table 8 presents selected coefficient estimates from CEO turnover and CEO compensation regressions that are similar to those in Tables 4 and 5, except that board distances are calculated from particular subsets of the board's unaffiliated directors. In the turnover regressions (Panel A), *Board distance* is the fraction of unaffiliated directors appointed earlier than the CEO who live more than 100 km from headquarters. Regressions 1, 2, and 3 in Panel A correspond to the logit regressions in columns 1, 2, and 4 of Table 4. In the compensation regressions (Panel B), *Board distance* is the fraction of unaffiliated directors not on the compensation committee who live more than 100 km from headquarters. Regressions 1–4 in Panel B correspond to the Tobit and two-sided Tobit regressions in columns 5–8 of Table 5. In both Panels A and B, a firm-year is excluded from a regression if board distance is based on a single director's location. Distances are calculated using latitudes and longitudes corresponding to ZIP codes drawn from LexisNexis *Person Locator*, proxy statements, and *Board Analyst*. *Industry-adjusted return* is the firm's stock return over the fiscal year minus the contemporary median stock return across firms in the same SIC 2-digit industry. The associated *t*-statistics or *z*-statistics (reported in parentheses) are based on heteroskedasticity-robust standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. CEO Turnover Tests

Independent Variable	Board Distance = Fraction of Unaffiliated Directors Appointed Before the CEO Who Live More than 100 km Away		
	1	2	3
Industry-adjusted return	-0.811 (-1.41)	0.916 (1.04)	1.271 (1.30)
Board distance	-0.301 (-0.52)	-0.294 (-0.50)	-2.530*** (-2.60)
Board distance × Industry-adjusted return		-2.636** (-2.54)	-2.909** (-2.50)
Unaffiliated board			0.452 (1.03)
Unaffiliated board × Industry-adjusted return			-0.264 (-0.23)
Industry dummies and year dummies	Yes	Yes	Yes
Other controls from Table 4 included	Yes	Yes	Yes
No. of obs.	588	588	588
Pseudo R^2	0.117	0.127	0.156

Panel B. CEO Compensation Tests

Independent Variable	Board Distance = Fraction of Unaffiliated Directors Not on the Compensation Committee Who Live More than 100 km Away			
	Option Pay/ Total Pay	Equity Pay/ Total Pay	Log PPS of Option Pay	Log PPS of Equity Pay
	1	2	3	4
Board distance	0.125** (2.56)	0.119*** (2.59)	1.250** (2.18)	1.049** (2.15)
Log PPS of CEO's previously granted shares and options			0.001 (0.00)	-0.074 (-0.53)
Industry dummies and year dummies	Yes	Yes	Yes	Yes
Other controls from Table 5 included	Yes	Yes	Yes	Yes
No. of obs.	900	900	890	890
Pseudo R^2	0.202	0.224	0.040	0.039

between board distance and performance are significantly negative, which parallels the earlier findings on CEO turnover from Table 4. Thus, CEO influence over director selection does not appear to drive our main turnover results.

We next consider whether CEO influence over director selection could lead to a spurious relation between board distance and stock-based compensation. If a CEO can influence the selection of directors, he might populate the board with local directors who are willing to grant him safe, predictable, cash-based compensation in lieu of risky stock-based compensation. To explore this possibility, we recompute board distance as the fraction of unaffiliated directors not on the

compensation committee who live more than 100 km from headquarters. We again exclude observations for which board distance is based on a single director's location. Panel B of Table 8 presents the results of using this modified distance measure in our regressions of the intensity and PPS of equity-based pay. In all cases, the coefficient estimate on the board distance variable is significantly positive. This finding further supports the view that it is distance-related information costs (not CEO influence over board composition) that gives rise to the link between board distance and equity-based pay.

D. Effects of Regulatory Change: The Sarbanes-Oxley Act

In 2002, the U.S. Congress passed the Sarbanes-Oxley Act (SOX) in response to public concerns about corporate governance. SOX, in conjunction with changes in NYSE and NASDAQ listing requirements, mandated enhanced standards for the boards of U.S. public companies. Linck, Netter, and Yang (2009) document that board sizes increased following the passage of SOX as firms added outside directors to comply with new independence requirements. It is possible that our results could be the byproduct of these changes. We examine this issue by redefining board distance as the fraction of unaffiliated directors appointed prior to SOX who reside at a distance greater than 100 km from headquarters. Panels A and B of Table 9 report the results. In the turnover regressions (columns 2 and 3 of Panel A), the coefficients on the interaction between distance and performance are negative and significant. In the compensation regressions (columns 1–4 of Panel B), the coefficients on distance are positive and significant. These results reinforce our earlier findings in Tables 4 and 5. We find no evidence that SOX and related rules are responsible for our results.

E. Director Relocations

Board distances could also vary on account of directors' personal relocation decisions. For example, local or national business conditions could create a tight labor market, causing directors to move to distant labor markets to pursue other job opportunities. If relocation patterns coincide with an increase in performance expectations for CEOs, our findings of a relation between board distance and turnover sensitivity could be spurious. To check whether such an effect could be occurring, we focus on "nonmover" directors (i.e., those directors who did not relocate during the sample period). Specifically, we replicate our key turnover models with board distance measured as the fraction of unaffiliated "nonmover" directors who are more than 100 km from headquarters. As shown in columns 5 and 6 of Panel A of Table 9, the distance-performance interaction continues to have a negative and significant coefficient. Thus, our turnover findings are not simply the result of director relocations.

Kedia and Rajgopal (2009) argue that a tight labor market could result in greater use of option-based compensation to retain key employees. If economic conditions precipitate a tight labor market and simultaneously affect directors' relocation decisions, our conclusions about a relation between board distance and

TABLE 9
 Additional Tests Based on Directors Appointed Prior to SOX
 or Directors Who Did Not Relocate

Table 9 presents selected coefficient estimates from CEO turnover and CEO compensation regressions that are similar to those in Tables 4 and 5, except that board distances are calculated from particular subsets of the board's unaffiliated directors. The regressions in Panel A correspond to the logit regressions in columns 1, 2, and 4 of Table 4. The regressions in Panel B correspond to the Tobit and two-sided Tobit regressions in columns 5–8 of Table 5. In columns 1–3 of Panel A and columns 1–4 of Panel B, *Board distance* is the fraction of unaffiliated directors appointed before SOX who live more than 100 km from headquarters. In columns 4–6 of Panel A and columns 5–8 of Panel B, *Board distance* is the fraction of nonmover unaffiliated directors who live more than 100 km from headquarters. Distances are calculated using latitudes and longitudes corresponding to ZIP codes drawn from LexisNexis *Person Locator*, proxy statements, and Board Analyst. *Industry-adjusted return* is the firm's stock return over the fiscal year minus the contemporaneous median stock return across firms in the same SIC 2-digit industry. The associated *t*-statistics or *z*-statistics (reported in parentheses) are based on robust standard errors clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. CEO Turnover Tests

Independent Variable	Board Distance = Fraction of Unaffiliated Directors Appointed Before SOX Who Live More than 100 km Away			Board Distance = Fraction of Unaffiliated Directors Not Moving After 2003 Who Live More than 100 km Away		
	1	2	3	4	5	6
Industry-adjusted return	-0.992** (-2.08)	0.516 (0.68)	0.485 (0.55)	-1.007** (-2.12)	0.754 (0.76)	0.738 (0.77)
Board distance	-0.092 (-0.18)	-0.023 (-0.04)	-1.265 (-1.39)	-0.227 (-0.42)	-0.212 (-0.39)	-1.534 (-1.56)
Board distance × Industry-adjusted return		-2.363** (-2.39)	-2.850*** (-2.67)		-2.733** (-2.05)	-3.369*** (-2.69)
Unaffiliated board			0.332 (0.93)			0.307 (0.85)
Unaffiliated board × Industry-adjusted return			0.658 (0.67)			0.830 (0.86)
Industry dummies and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Other controls from Table 4 included	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	954	954	954	960	960	960
Pseudo R ²	0.088	0.097	0.116	0.095	0.105	0.128

Panel B. CEO Compensation Tests

Independent Variable	Board Distance = Fraction of Unaffiliated Directors Appointed Before SOX Who Live More than 100 km Away				Board Distance = Fraction of Unaffiliated Directors Not Moving After 2003 Who Live More than 100 km Away			
	Option Pay/ Total Pay	Equity Pay/ Total Pay	Log PPS of Option Pay	Log PPS of Equity Pay	Option Pay/ Total Pay	Equity Pay/ Total Pay	Log PPS of Option Pay	Log PPS of Equity Pay
	1	2	3	4	5	6	7	8
Board distance	0.127*** (2.75)	0.128*** (2.92)	1.018* (1.89)	0.814* (1.79)	0.169*** (3.44)	0.152*** (3.29)	1.718*** (3.02)	1.097** (2.28)
Log PPS of CEO's previously granted shares and options			0.081 (0.56)	0.065 (0.48)			0.074 (0.52)	0.060 (0.45)
Industry dummies and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls from Table 5 included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	1,201	1,201	1,189	1,189	1,210	1,210	1,197	1,197
Pseudo R ²	0.206	0.219	0.033	0.029	0.210	0.223	0.035	0.030

CEO compensation could be unfounded. To address this issue, we re-estimate our compensation regressions using the new distance measure based on nonmovers. The last four columns of Panel B of Table 9 show that all four measures of stock-based pay continue to be positively and significantly associated with board distance.

F. Geographic Locality versus Distance from Headquarters

Another possibility is that our results are driven not by distance from headquarters per se, but rather by the particular features of one or more locations or regions in our sample. In large MSAs, the ability to discern soft information by residing in the local area might be different from the case where headquarters is located in a relatively remote area. In New York City, for example, a director would need to sift the most relevant firm-specific information from a large overall pool of information. This is different from the case of a headquarters in a small town, where “everyone” might know “everyone else’s” business.

In untabulated analysis, we conduct two tests to control for the influence of locality. First, we augment our turnover and compensation regressions with binary variables to indicate the state and region in which a firm’s headquarters is located. Second, we estimate our turnover and compensation regressions after excluding firms in the two most important MSAs within our sample: New York City (59 firms and 204 firm-years) and Silicon Valley (31 firms and 107 firm-years). Our qualitative results are unchanged when we control for locality in these ways.

V. Conclusion

Research on whether geographic distance between corporate boards and headquarters matters for internal corporate governance has been hampered by the absence of data on directors’ locations. We assemble data on the residential locations of over 4,000 individual directors. The data allow us to investigate how board distance relates to information acquisition and board decisions. Our primary measure of board distance is the fraction of unaffiliated directors on the board who reside more than 100 km from corporate headquarters. This measure reflects the idea that if soft information cannot be readily shared or transferred over geographic distances, it is easier for a board to become adequately informed when more of its members are located close to headquarters. We also develop a number of alternative measures of board distance, including measures based on driving times, to ensure that our analysis is robust.

Our empirical tests reveal that directors tend to reside closer to headquarters when the intangibility of a firm’s assets (a proxy for the need to gather soft information) is high. We also find statistically significant and economically meaningful relations between board-to-headquarters distance and two major board decisions: CEO dismissals and CEO compensation. Compared to proximate boards, more distant boards are associated with a higher sensitivity of nonroutine CEO turnover to poor stock performance. Also, board distance is positively and significantly related to the level, intensity, and pay-performance sensitivity of stock-based pay. The associations we find between board decisions and board geography are consistent with the idea that distance from headquarters impairs a board’s ability to gather soft information about top management. These findings persist when we control for CEO-director social ties, CEO influence over director selection, regulatory change, director relocations, and the effects of geographic locality.

While our analysis indicates that major corporate governance decisions are related to board distance, we do not claim that having a proximate board is

necessarily superior or inferior to having a more remote board. Rather, we conclude that a board's geographic location shapes how it acquires and uses soft and hard information. Our analysis suggests that geographic location, like other observable dimensions of board structure, is an important aspect of internal governance, and incorporating this dimension into future research can lead to a better overall understanding of how boards function.

Appendix. Procedure for Gathering Data on Residential Locations

Table A1 summarizes the basic steps we use to assemble our sample of individual directors' residential locations. In the initial step, we use *PeopleFinders* in conjunction with *Board Analyst* to search for birth date information (i.e., month, day, and year) for each of the 4,329 individuals in our initial sample. Specifically, we perform key word searches in *PeopleFinders* using individuals' full names and ages. When a search yields more than one possible matching birth date in *PeopleFinders*, we attempt to cross reference other available information in that database (e.g., business affiliation, telephone number, or mailing address) with information in *Board Analyst* to resolve the ambiguity. Using the two databases together, we are able to determine unique birth dates for 3,699 individuals who have, as of Dec. 2008, a U.S. residential location. We eliminate 77 individuals who are identified as residing outside the United States as of Dec. 2008.

TABLE A1
Sample Selection Criteria for Data on Individual Locations of Residence

	No. of Individuals
Initial sample of individuals serving as board members (2004–2007)	4,329
Less:	
Individuals identified with <i>PeopleFinders</i> and <i>Board Analyst</i> as not residing in the United States (Dec. 2008)	77
Individuals identified with <i>PeopleFinders</i> , <i>Board Analyst</i> , and other data sources ^a as not residing in the United States	33
Individuals residing in the United States for whom birth date cannot be identified	86
Individuals residing in the United States for whom birth date is available	4,133
Less:	
No current address information in LexisNexis	2
One current location reported in LexisNexis; address is a P.O. box	133
Two current locations reported in LexisNexis; both addresses are P.O. boxes	41
Two current street addresses in LexisNexis with different ZIP codes and counties	36
Current street address in Alaska or Hawaii	6
Individuals with current residential location in the contiguous United States	3,915
Less:	
Financial firms and regulated utilities (SIC codes 6000–6799 and 4910–4949)	939
Final sample of individuals with current residential location in the contiguous United States as of Dec. 2008	2,976

^aOther data sources include corporate proxy statements, insider trading filings, Google, ZoomInfo, Wikipedia, NNDB.com, BusinessWeek.com, Forbes.com, and LexisNexis.

For the remaining 553 cases in the initial sample, we attempt to ascertain a birth date by obtaining additional cross-referencing information from various public sources, including company proxy statements, insider trading filings, Google, ZoomInfo, Wikipedia, NNDB.com, BusinessWeek.com, Forbes.com, and LexisNexis's public records database. Using these sources, we determine that an additional 33 individuals were residing outside the United States as of Dec. 2008. Out of the other 520 cases, 86 individuals have names

that are too common to permit matching with unique birth dates, but 434 individuals can be associated unambiguously with birth date information. Overall, then, we are able to determine birth dates for 4,133 U.S.-based individuals, or about 95.5% of the initial sample.

Next, we use birth date/name pairs to search in LexisNexis's *Person Locator* database for directors' locations of residence. The extensive coverage of LexisNexis within the United States (over 150 million adult residents) enables us to obtain address information in the overwhelming majority of cases (4,131 out of 4,133). Usually, LexisNexis reports a single current address for an individual, but occasionally two current addresses are reported. For each individual, we attempt to gather information on the current address (or addresses) as of Dec. 2008. We gather information on the street address (name and number), city, county, state, and 5-digit ZIP code. We also collect information on the earliest occupancy dates of each current address.

A small fraction of the current addresses reported in LexisNexis are not street addresses, but rather P.O. box numbers. Since it is unclear whether a given P.O. box is necessarily in close geographic proximity to a person's physical residence, we exclude these cases. In particular, we exclude 133 cases in which a single current address is reported and the address is a P.O. box number. We also exclude 41 cases in which two P.O. box locations are reported as current addresses.

Out of the remaining 3,957 individuals, 3,476 have one current street address in LexisNexis, while 481 have two current addresses (with at least one being a street address). Typically, when two current addresses are reported, they do not represent distinct physical locations. For example, the two street names may differ only slightly (e.g., one ends in "Rd" while the other ends in "Ln"), or the street addresses and ZIP codes may coincide even though the city names differ. In 323 of the 481 dual-address cases, the two ZIP codes are identical. Because our measures of distance are constructed on the basis of ZIP codes (more specifically, latitudes and longitudes), for these cases we simply retain the address with the earlier date of first occupancy. In 36 of the remaining dual-address cases, the two locations appear to be distinct (i.e., in different counties as well as in different ZIP code areas). We exclude these 36 cases from the sample because it is unclear whether one of the two addresses corresponds to a current summer or winter home. For each of the remaining dual-address cases, we keep the address with the earlier move-in date. Finally, we exclude six cases in which an individual's current residential address is within the noncontiguous portion of the United States (Hawaii or Alaska). After applying the above filters, we obtain a sample consisting of 3,915 individuals (about 90.4% of the initial sample). When we further restrict the sample to exclude financial firms and regulated utilities (SIC codes 6000–6799 and 4910–4949), we obtain a sample of 2,976 individuals with valid residential locations in the contiguous United States as of Dec. 2008.

References

- Adams, R. B., and D. Ferreira. "A Theory of Friendly Boards." *Journal of Finance*, 62 (2007), 217–250.
- Adams, R. B.; B. E. Hermalin; and M. S. Weisbach. "The Role of Boards of Directors in Corporate Governance: A Conceptual Framework and Survey." *Journal of Economic Literature*, 48 (2010), 58–107.
- Ai, C., and E. Norton. "Interaction Terms in Logit and Probit Models." *Economics Letters*, 80 (2003), 123–129.
- Bae, K.; R. Stulz; and H. Tan. "Do Local Analysts Know More? A Cross-Country Study of the Performance of Local Analysts and Foreign Analysts." *Journal of Financial Economics*, 88 (2008), 581–606.
- Black, F., and M. Scholes. "The Pricing of Options and Corporate Liabilities." *Journal of Political Economy*, 81 (1973), 637–654.
- Blackwell, D. W.; J. A. Brickley; and M. S. Weisbach. "Accounting Information and Internal Performance Evaluation." *Journal of Accounting and Economics*, 17 (1994), 331–358.
- Boone, A. L.; L. C. Field; J. M. Karpoff; and C. G. Raheja. "The Determinants of Corporate Board Size and Composition: An Empirical Analysis." *Journal of Financial Economics*, 85 (2007), 66–101.

- Booth, J. R., and D. Deli. "Factors Affecting the Number of Outside Directorships Held by CEOs." *Journal of Financial Economics*, 40 (1996), 81–104.
- Borokhovich, K. A.; R. Parrino; and T. Trapani. "Outside Directors and CEO Selection." *Journal of Financial and Quantitative Analysis*, 31 (1996), 337–355.
- Bryan, S.; L. Hwang; and S. Lilien. "CEO Stock-Based Compensation: An Empirical Analysis of Incentive-Intensity, Relative Mix, and Economic Determinants." *Journal of Business*, 73 (2000), 661–693.
- Butler, A. "Distance Still Matters: Evidence from Municipal Bond Underwriting." *Review of Financial Studies*, 21 (2008), 763–784.
- Cohen, L.; A. Frazzini; and C. J. Malloy. "The Small World of Investing: Board Connections and Mutual Fund Returns." *Journal of Political Economy*, 116 (2008), 951–979.
- Cohen, L.; A. Frazzini; and C. J. Malloy. "Sell-Side School Ties." *Journal of Finance*, 65 (2010), 1409–1437.
- Coles, J. L.; N. D. Daniel; and L. Naveen. "Boards: Does One Size Fit All?" *Journal of Financial Economics*, 87 (2008), 329–356.
- Coles, J. L.; N. D. Daniel; and L. Naveen. "Co-Opted Boards." *Review of Financial Studies*, forthcoming (2014).
- Core, J., and W. Guay. "The Use of Equity Grants to Manage Optimal Equity Incentive Levels." *Journal of Accounting and Economics*, 28 (1999), 151–184.
- Core, J., and W. Guay. "Estimating the Value of Employee Stock Option Portfolios and Their Sensitivities to Price and Volatility." *Journal of Accounting Research*, 40 (2002), 613–630.
- Cornelli, F.; Z. Kominek; and A. Ljungqvist. "Monitoring Managers: Does It Matter?" *Journal of Finance*, 68 (2013), 431–481.
- Coughlan, A. T., and R. M. Schmidt. "Executive Compensation, Management Turnover, and Firm Performance: An Empirical Investigation." *Journal of Accounting and Economics*, 7 (1985), 43–66.
- Coval, J., and T. Moskowitz. "Home Bias at Home: Local Equity Preference in Domestic Portfolios." *Journal of Finance*, 54 (1999), 2045–2073.
- Coval, J., and T. Moskowitz. "The Geography of Investment: Informed Trading and Asset Prices." *Journal of Political Economy*, 109 (2001), 811–841.
- Denis, D., and D. Denis. "Performance Changes Following Top Management Dismissals." *Journal of Finance*, 50 (1995), 1029–1057.
- Denis, D.; D. Denis; and A. Sarin. "Ownership Structure and Top Executive Turnover." *Journal of Financial Economics*, 45 (1997), 193–221.
- Fama, E. F., and K. R. French. "Industry Costs of Equity." *Journal of Financial Economics*, 43 (1997), 153–193.
- Ferris, S. P.; M. Jagannathan; and A. Pritchard. "Too Busy to Mind the Business? Monitoring by Directors with Multiple Board Appointments." *Journal of Finance*, 58 (2003), 1087–1111.
- Fich, E. M., and A. Shivdasani. "Are Busy Boards Effective Monitors?" *Journal of Finance*, 61 (2006), 689–724.
- Fracassi, C., and G. Tate. "External Networking and Internal Firm Governance." *Journal of Finance*, 67 (2012), 153–194.
- Gaver, J., and K. Gaver. "Compensation Policy and the Investment Opportunity Set." *Financial Management*, 24 (1995), 19–32.
- Gilson, S. "Management Turnover and Financial Distress." *Journal of Financial Economics*, 25 (1989), 241–262.
- Harris, M., and A. Raviv. "A Theory of Board Control and Size." *Review of Financial Studies*, 21 (2008), 1797–1832.
- Hermalin, B., and M. Weisbach. "Endogenously Chosen Boards of Directors and Their Monitoring of the CEO." *American Economic Review*, 88 (1998), 96–118.
- Holmstrom, B. "Moral Hazard and Observability." *Bell Journal of Economics*, 10 (1979), 74–91.
- Huson, M.; R. Parrino; and L. Starks. "Internal Monitoring Mechanisms and CEO Turnover: A Long-Term Perspective." *Journal of Finance*, 56 (2001), 2265–2297.
- Hwang, B., and S. Kim. "It Pays to Have Friends." *Journal of Financial Economics*, 93 (2009), 138–158.
- Jenter, D., and F. Kanaan. "CEO Turnover and Relative Performance Evaluation." *Journal of Finance*, forthcoming (2014).
- Kaplan, S. M. "Top Executives, Turnover, and Firm Performance in Germany." *Journal of Law, Economics, and Organization*, 10 (1994), 142–159.
- Kaplan, S. M., and B. Minton. "How Has CEO Turnover Changed?" *International Review of Finance*, 12 (2012), 57–87.

- Kedia, S., and S. Rajgopal. "Neighborhood Matters: The Impact of Location on Broad Based Stock Option Plans." *Journal of Financial Economics*, 92 (2009), 109–127.
- Kedia, S., and S. Rajgopal. "Do the SEC's Enforcement Preferences Affect Corporate Misconduct?" *Journal of Accounting and Economics*, 51 (2011), 259–278.
- Knyazeva, A.; D. Knyazeva; and R. Masulis. "The Supply of Corporate Directors and Board Independence." *Review of Financial Studies*, 26 (2013), 1561–1605.
- Lawler, E. "Boards as Overseers of Human Capital." *Directors and Boards*, 33 (2009), 56–59.
- Lerner, J. "Venture Capitalists and the Oversight of Private Firms." *Journal of Finance*, 50 (1995), 301–318.
- Linck, J. S.; J. M. Netter; and T. Yang. "The Determinants of Board Structure." *Journal of Financial Economics*, 87 (2008), 308–328.
- Linck, J. S.; J. M. Netter; and T. Yang. "The Effects and Unintended Consequences of the Sarbanes-Oxley Act on the Supply and Demand for Directors." *Review of Financial Studies*, 22 (2009), 3287–3328.
- Mace, M. *Directors: Myth and Reality*. Cambridge, MA: Harvard University Press (1971).
- Malloy, C. "The Geography of Equity Analysis." *Journal of Finance*, 60 (2005), 719–755.
- Masulis, R. W., and S. Mobbs. "Are All Inside Directors the Same? Evidence from the External Directorship Market." *Journal of Finance*, 66 (2011), 823–872.
- Masulis, R. W.; C. Wang; and F. Xie. "Globalizing the Boardroom: The Effects of Foreign Directors on Corporate Governance and Firm Performance." *Journal of Accounting and Economics*, 53 (2011), 527–554.
- Mehran, H. "Executive Compensation Structure, Ownership, and Firm Performance." *Journal of Financial Economics*, 38 (1995), 163–184.
- Mobbs, S. "CEOs Under Fire: The Effects of Competition from Inside Directors on Forced CEO Turnover and CEO Compensation." *Journal of Financial and Quantitative Analysis*, 48 (2013), 669–698.
- Parrino, R. "CEO Turnover and Outside Succession: A Cross-Sectional Analysis." *Journal of Financial Economics*, 46 (1997), 165–197.
- Petersen, M. A. "Information: Hard and Soft." Working Paper, Northwestern University (2004).
- Petersen, M. A., and R. G. Rajan. "The Benefits of Firm-Creditor Relationships: Evidence from Small-Business Data." *Journal of Finance*, 49 (1994), 3–37.
- Petersen, M. A., and R. G. Rajan. "Does Distance Still Matter? The Information Revolution in Small Business Lending." *Journal of Finance*, 57 (2002), 2533–2570.
- Prendergast, C. "What Trade-Off of Risk and Incentives?" *American Economic Review Papers and Proceedings*, 90 (2000), 421–425.
- Prendergast, C. "The Tenuous Trade-Off between Risk and Incentives." *Journal of Political Economy*, 110 (2002), 1071–1102.
- Raheja, C. G. "Determinants of Board Size and Composition: A Theory of Corporate Boards." *Journal of Financial and Quantitative Analysis*, 40 (2005), 283–306.
- Ryan, H., and R. Wiggins. "The Influence of Firm- and Manager-Specific Characteristics on the Structure of Executive Compensation." *Journal of Corporate Finance*, 7 (2001), 101–123.
- Shavell, S. "On Moral Hazard and Insurance." *Quarterly Journal of Economics*, 93 (1979), 541–562.
- Shivdasani, A., and D. Yermack. "CEO Involvement in the Selection of New Board Members: An Empirical Analysis." *Journal of Finance*, 54 (1999), 1829–1853.
- Smith, C. "Globalization of Financial Markets." *Carnegie-Rochester Conference Series on Public Policy*, 34 (1991), 77–96.
- Smith, C., and R. Watts. "The Investment Opportunity Set and Corporate Financing, Dividend and Compensation Policies." *Journal of Financial Economics*, 31 (1992), 263–292.
- Stein, J. "Information Production and Capital Allocation: Decentralized vs. Hierarchical Firms." *Journal of Finance*, 57 (2002), 1891–1921.
- Warner, J. B.; R. L. Watts; and K. H. Wruck. "Stock Prices and Top Management Changes." *Journal of Financial Economics*, 20 (1988), 461–492.
- Weisbach, M. S. "Outside Directors and CEO Turnover." *Journal of Financial Economics*, 20 (1988), 431–460.
- Yermack, D. "Do Corporations Award CEO Stock Options Effectively?" *Journal of Financial Economics*, 39 (1995), 237–269.