Directors from Related Industries and Management Forecast Properties:

An International Study

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Abstract

Managers cite information uncertainty as a partial explanation for their reluctance to voluntarily issue forecasts. Using an international sample of firms, we investigate whether directors with experience in a firm's customer or supply industry (directors from related industries (DRI)) reduce this information gap, and in turn, improve management forecast properties. The issue is timely as world-wide heightened concern over a variety of risks is putting a premium on DRIs. We find that firms with DRIs are more likely to issue forecasts. Moreover, if firms do issue forecasts, those firms with DRIs issue more frequent forecasts than those issued by other firms. We also find some evidence that firms issue more precise forecasts if they have DRIs. The positive effect of DRIs on forecast issuance and frequency is most pronounced for firms in high information uncertainty environments, as captured by low firm-level analysts' following and low country-level stock market information production. Our results hold in both U.S. and non U.S. sample firms, even after controlling for numerous determinants of management forecast properties. Further, influential DRIs have a more positive effect on management forecast issuance and frequency. Finally, we provide evidence that the stock market recognizes the crucial role that DRIs play in management forecasting: absolute value of cumulative announcement return around each management forecast is greater for firms with DRIs. Overall, our results suggest that DRIs play an important beneficial, but understudied, role in corporate disclosures.

Keywords: Management forecast; Directors from related industries; Voluntary information disclosure; Analysts' following

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1. Introduction

Prior research suggests that corporate governance attributes such as corporate board and ownership characteristics are associated with financial disclosure decisions (Karamanou and Vafeas, 2005). We examine, in an international setting, whether corporate directors with upstream (supplier) or downstream (customer) industry experience, hereafter referred to as "directors from related industries" (DRI), contribute to the board's advisory role by affecting management forecast issuance, frequency and precision. Management forecasts are important because there is evidence that they are the single most important determinant of quarterly return variance (Beyer, Cohen, Lys and Walther 2010)[1]. Examining an international setting is especially important as world-wide heightened concern over a wide-range of risks is putting a premium on directors' deep industry knowledge of the global supply chain (European Audit Committee Leadership Network 2014).[2]

There are two broad functions of the board of directors: (a) advise management and, (b) monitor management (e.g., Armstrong, Guay, and Weber, 2010; Brickley and Zimmermann, 2010). Corporate directors' surveys indicate the board's advisory role is very important (e.g., Demb and Neubauer, 1992; Corporate Board Member and PricewaterhouseCoopers LLP, 2008)

[1] Since the passage of Regulation Fair Disclosure (FD) in 2000, management forecasts have an incrementally significant effect on market earnings expectations (Kross and Suk 2012). Management forecasts also signal superior managerial ability in the labor market (Trueman 1986), supplement uninformative earnings (Wasley and Wu 2006), and mitigate litigation risks (Skinner 1994, 1997). Moreover, inaccurate forecasts and the decision to stop issuing earnings forecasts can be costly as they can lead to loss of reputation (Williams 1996; Hutton and Stocken 2009), stock price declines (Chen, Matsumoto and Rajgopal 2011) and shareholder lawsuits for failing to meet or beat management forecasts (Baginski, Hassell and Kimborough 2002; Cao and Narayanamoorthy 2011).

[2] To illustrate the crucial role that directors with relevant industry expertise are expected to play in forecasting, a member of the European Audit Committee Leadership Network recently made the following comment regarding directors' industry expertise: **"**We don't need technicians, but people who can look forward. We need people steeped in operations, who can say, here's a black swan – what have we done about it?"

and industry expertise is the most desirable attribute for board nominees (PWC 2012). Further, regulators, boards, and firms have increased their focus on directors' ability and background. To illustrate, on December 16, 2009, the SEC released proxy rules that require firms to "disclose for each director and any nominee for director, the particular experience, qualifications, attributes or skills that qualified that person to serve as a director." Although recent research demonstrates the benefit of experienced directors' advice within the context of operating, investing and financing decisions, there is a paucity of evidence on the value of such advice in management forecasting (e.g., Drobetz, Meyerinck, Oesch and Schmid 2014; Faleye, Hoitash and Hoitash, 2014).

There is, however, some tension as to whether DRIs improve management forecasting. DRIs might not provide any valuable advice in management forecasting because of lack of communication with management (Ferris, Jagganathan and Pritchard 2003; Larcker, So and Wang 2013). But there is ample survey evidence supporting the notion that directors provide valuable information for forecasting (e.g., Ajiyinka, Bhojraj and Sengupta 2005; Adams 2010; Agrawal and Chen 2011). For many firms, DRIs serve on the Disclosure Committee, which is charged with financial information disclosure decisions (Kwak, Ro and Suk 2012). In our sample, while DRIs constitute 14% of all director-year observations, they constitute 21% of all directors on the Disclosure Committee. Also, firms often tout directors that contribute related industry experience in director appointment announcements (Dass, Kini, Nanda, Onal and Wang 2014).

To the extent that DRIs communicate with management, we therefore expect DRIs to facilitate management forecasting in the following ways. They communicate valuable information to management which can help the firm better anticipate supply (upstream) and demand (downstream) industry changes. DRIs can use their knowledge, experience, expertise

and connections to facilitate inter-firm information transfer, as well as foster and create stable supply chain relationships (Stein 2002; McCarthy and Golicic 2001; Crook, Guinepero, Reus, Handfield and Thompson 2008; Dass et al., 2014; Larcker, So and Wang 2013). In promoting joint ventures with the right customers or suppliers, such directors enable firms to gain access to an increased supply of data about customer/supplier trends. For example, Kroger Co. only shares its detailed data about customer trends with joint venture suppliers (Monga, *Wall Street Journal*, October 12, 2014). Accordingly, we expect DRIs to have a positive effect on management forecast issuance, frequency and precision.[3]

In line with this discussion, we expect DRIs to reduce uncertainty and improve internal information quality about customer and supplier industries and, consequently encourage management to not only issue forecasts, but to also make more frequent and precise forecasts. To test these predictions, we use Standard and Poor's Capital IQ (CIQ) database for information about management forecasts, directors' background and directors' business affiliations over the period 2006 to 2013. A unique advantage of using this database to determine directors' affiliations is that we are able to capture links established through a wider range of public and private firms (both domestic and global, small and large). In other studies, data limitations restrict researchers to fewer numbers of firms.[4] This broad coverage of firms in our sample

[3] The information transmission role of DRIs is particularly important in forecasting because heightened macro-economic, industry or firm-specific uncertainty can lead managers to alter their guidance provision policy (Waymire 1985; Kim, Pandit and Wasley 2014). For example, many firms either extended the horizon of their management earnings forecasts, declined to provide guidance, or forecasted a wider range of outcomes in early 2009 (Kim et al. , 2014). Archival (Kim, Pandit and Wasley 2014) and survey (Morgan 2009) evidence show these management forecast changes are largely due to uncertainty in the overall economic environment. For example, 64% of respondents in a National Investor Relations Institute survey cited economic uncertainty as a major determinant of their inability to issue forecasts (Morgan 2009).

[4]For example, Investor Responsibility Research Center's (IRRC) *Directors* data is restricted to members of indices. Compact Disclosure is a more comprehensive database based on SEC filings of all public firms, but the database is restricted to only public firms trading in the U.S.

enables us to more fully capture directors' customer and supplier industry relationships than it is possible with more commonly used databases.

We also hand-collect data on customer and supplier industries from the 2013 IBISWORLD reports and combine this data with biographical data from CIQ to identify DRIs. Using a sample of 110,516 firm-year observations (26,703 unique firms from 110 countries), we find that firms with DRIs are more likely to issue forecasts than other firms. Moreover, if firms do issue forecasts, the forecasts of firms with DRIs are more frequent than those issued by other firms. In addition, we find some evidence that firms with DRIs have more precise forecasts. Furthermore, the positive effect of DRIs on forecast issuance and frequency is most pronounced for firms in high information uncertainty environments, as captured by low firm-level analysts' following, and low country-level stock market information production. These results hold after controlling for other board characteristics, management characteristics, and determinants of management forecast properties. Our results also hold for a U.S. and non U.S. sample. In total, our results are consistent with DRIs improving corporate disclosures by communicating relevant information to management when management has a greater need for such information.

We perform two additional sets of tests. In the first set of tests, we improve identification by determining whether the role of DRIs in management forecasting varies systematically with the influence of these directors (e.g., Rajan and Zingales 1998; Maffett 2012; DeFond and Zhang 2014). Specifically, we determine whether some DRIs have a stronger effect on management forecast properties based on the breadth of their connections and the firm's perception of their influence. We find that DRIs whose biographies contain more words, CEO DRIs, and CFO DRIs have a more positive effect on management forecast issuance and frequency. Hence, management perceives customer and supplier industry information to be more (less) valuable in

forecasting when such information is provided by highly connected (highly compensated) DRIs. In the second set of tests, we examine whether investors perceive that DRIs communicate relevant customer and supplier industry information to management and that management signals this information via forecasting. To this end, we provide evidence that the absolute value of the two-day cumulative abnormal return around each management forecast is greater for firms with DRIs. This result suggests investors perceive forecasts of firms with DRIs to be more informative than those of firms without DRIs.

A major contribution of this study is that it highlights an important channel through which management can overcome their shortcomings in forecasting. By so doing, we provide novel evidence as to why management forecasts are informative. Beyer, Cohen, Lys and Walther (2010) state that "…management forecasts are informative…it is still unclear why this is so…". Our evidence suggests one potential reason why management forecasts are informative is that they contain private information about a firm's customer and supplier industries when the firm has directors from these industries. The stronger stock market reaction to forecasts issued by firms with such directors lends credence to this explanation.[5]

In the overall context of corporate governance, we contribute to the literature that examines the effect of director industry experience on accounting outcomes. Prior studies examine either the presence of financial or accounting experts on boards and audit committees (e.g., Agrawal and Chadha (2005), DeFond, Hann, and Hu (2005), Krishnan and Visvanathan (2008), and Dhaliwal, Naiker, and Navissi (2010)) or the effect of other relevant industry experience on board effectiveness in monitoring firms' accounting measurement (Wang, Xie and Zhu 2013). We extend this research by showing that directors with related industry experience

[5] A potential alternative explanation is that DRIs improve board effectiveness in monitoring firms leading to improvements in voluntary disclosure. For brevity, we do not attempt to disentangle the advisory versus monitoring role of DRIs in this study.

from either a firm's upstream (supplier) or downstream (customer) industries improve board effectiveness in advising firms about their voluntary disclosure policy.

We also contribute to the management forecast disclosure literature. Prior studies examining the determinants of management forecast quality focus mainly on management's incentives such as litigation concerns, labor market signaling or insider trading motives. There is a paucity of research on the quality of information available to management in making its voluntary disclosure decisions (Hirst, Koonce and Venkataraman 2008). Emerging studies use internal control disclosures (Feng, Li, and McVay 2009) and enterprise systems implementation (Dorantes, Li, Peters and Richardson 2013) to proxy for the quality of information that management uses in making forecasts. We extend this literature by considering board members with profound insights about a firm's supply chain as a source of high quality information that management uses to make forecasts.

Moreover, extant research in management forecasts uses mainly single-country data, and focuses particularly on the U.S. (e.g., Baginski, Hassell and Kimborough 2002; Kato, Skinner and Kunimura 2009; Huan, Li, Tse and Tucker 2014). Similar to our study, two papers examine management forecasts around the world (Radhakrishnan, Tsang and Yang 2012; Li and Yang 2014). Distinct from these papers which examine the role of IFRS adoption, we demonstrate the role of directors' relevant industry expertise on management forecast properties. We show that DRIs increase management propensity to issue forecasts in both U.S. and non-U.S. firms.

We organize the paper in the following sections. In Section 2, we provide a literature review and develop hypotheses. Section 3 describes research methodology including sample selection and models. Section 4 presents the empirical results and discussion, and in Section 5 we provide concluding remarks.

2. Related Literature and Hypotheses Development

DRIs might not provide any valuable advice in management forecasting because of lack of communication with management induced by conflicts of interests, 'busyness', and general unwillingness to share information with management. By definition, DRIs in our study serve on at least two boards per year, which not only means they may have conflicts of interest but they are also potentially busy. Thus, DRIs may devote less time to advising each firm, leading to a trade-off between related industry expertise and advising (Ferris, Jagganathan and Pritchard 2003; Larcker, So and Wang 2013). Also, potential conflicts of interest might limit sharing of proprietary information since DRIs may likely have affiliations with competitors of firms' suppliers or customers (Baiman and Rajan 2002; Drake and Haka 2008; Li and Zhang 2008). Furthermore, directors with varied industry experience might create disruptions due to greater divergence of opinion (McCauley 1989). Finally, although our prediction of a positive effect of DRIs on forecast properties is partially based on the premise that directors frequently interact and communicate with management, prior research suggests there is information asymmetry between directors and managers (e.g., Adams and Ferreira 2007). Therefore, whether DRIs ultimately improve management forecast properties is an empirical issue. We propose two non-mutually exclusive channels through which directors with related industry experience influence management voluntary forecasts. One is an information-related channel and the other, a network-related channel.

The information-related channel is the conduit through which information from DRIs about a firm's customer and/or supplier industries flows to management (Dass et al. 2014). Particularly relevant to the forecasting process, DRIs possess a deeper understanding of competitive threats, strategic opportunities, industry dynamics, and business process innovations.

Consequently, they can enhance firms' ability to anticipate industry trends and protect against demand and supply shocks. Although industry reports can provide some useful information, it is likely to be "hard" (Stein 2002).[6] The incremental benefit of DRIs therefore lies in their provision of complementary "soft" information that stems from directors' first-hand knowledge of the firm's product market landscape. Using this reasoning, Dass et al. (2014) posit and find that firms that obtain limited information about their prospects and opportunities from other sources (e.g., firms from heterogeneous industries and firms with low stock price informativeness) are more likely to recruit DRIs.

DRIs also affect management forecast properties through a network-related channel. DRIs possess specialized negotiating skills, are capable of implementing successful knowledge sharing tactics, and are connected with key players in the firm's related supply chain industries. These attributes enable DRIs to smooth frictions firms face in trading with their supply chain partners. Dass et al. 2014 provide an excellent illustration of this point;

> "…if a DRI on the board of a chip-maker is an executive at a computer manufacturer, then the industry-specific knowledge of the DRI will allow the chip-maker to contract against contingencies that it may not have identified in the absence of the DRI. Alternatively, it is likely that the executive from the computer manufacturer is familiar with contracts written between his own firm and other chip-makers. This knowledge can then be utilized to write better contracts between the given chip-maker and its customer firms in the computers industry."[7]

Consequently, DRIs use their networks to improve existing supply chain relations and/or create new stable relations. This should help the firm better respond to economic uncertainty and crises and changes in supply and demand patterns (PWC 2012). Moreover, social influence theory posits that decision-makers are more likely to accept advice from perceived experts (Milgram

[6] Hard information is that which is easily transmissible in impersonal ways e.g., written rather than spoken. An example of: - hard information medium is an analyst research report; soft information medium is a conversation in a parking garage between an analyst and a manager.
[7] Dass et al. 2014, p9.

1983). Therefore, management is more likely to seek board input and act on such advice, when the board has DRIs (Faleye, Hoitash and Hoitash 2014).

Several studies provide empirical evidence consistent with DRIs affecting firm policies through both the information and the network channels. Crook et al. (2008) interview 46 supply-chain executives from multiple industries. They find the supply chain is more efficient when directors of the trading partners possess both broad knowledge in business and specialized global supply chain knowledge and skills. Several studies provide further support for these views by documenting that firms with shared directors spread business innovations (Haunschild 1993) and facilitate alliance formation (Gulati and Westphal 1999). Relying on the intuition that DRIs facilitate transfer of relevant information, Larcker, So and Wang (2013) document that firms with better connected boards earn superior returns and higher future growth in return on assets. These effects are more pronounced for firms that stand to benefit the most from better access to resources and reduced information asymmetry (e.g., firms with better growth opportunities and firms headquartered outside major metropolitan areas).

To summarize, information uncertainty adversely affects management's ability and thus its willingness to issue forecasts. DRIs can reduce information uncertainty because they possess knowledge about, and have strong connections with, downstream and upstream industries. This specialized knowledge enables firms to better anticipate industry trends and to better prepare for demand and supply shocks. Moreover, DRIs' strong connections with global supply chain partners enable collaboration and establishment of stable business relationships. These connections facilitate information sharing between trading partners, improve demand and supply forecasting and consequently, managerial ability to make forecasts. We formulate our hypotheses as follows:

H1: Firms with directors from related industries are more likely to:

a) **issue forecasts,**
b) **issue forecasts frequently and,**
c) **issue precise forecasts.**

Unavailability of other sources of information potentially elevates the importance of DRIs as an information channel. Accordingly, Dass et al. 2014, show that firms' whose demand levels are difficult to predict (e.g., high R&D intensity, patent grants, patent citations) are more likely to have DRIs on their board, whereas alternate information sources (e.g., high stock price informativeness) decrease this likelihood. In line with this intuition and evidence, we evaluate the strength of the positive effect of DRIs on forecast properties across situations that provide varied levels of information quality. We expect firms with fewer alternate sources of information to have an incremental need for the information advantage of DRIs. Consequently, these firms should exhibit a more pronounced positive effect of DRIs on forecast properties. Thus, we hypothesize as follows:

H2: Firms which have both directors from related industries and fewer alternate information sources are more likely to:

a) **issue forecasts,**
b) **issue forecasts frequently and,**
c) **issue precise forecasts.**

3. Sample and Research Design

3.1. Sample

We use Standard and Poors' Capital IQ (CIQ) to collect data on the background of board members and management forecast press releases for the period 2006 to 2013.[8] We use *IBISWorld* 2013 to identify upstream and downstream industries. Without requiring complete data for control variables, the sample consists of 110,516 firm-year observations from 669,700 board-firm-year observations, 26,703 firms and 111 countries.[9]

Conducting the forecast precision tests require extensive hand collection. To ease this process, we limit the sample to forecasts of firms with available Compustat data to compute control variables, December 31 fiscal year ends, and forecasts issued after the release of prior year's earnings but before the beginning of the fourth quarter (April-September). We expect forecasts made early in the year to be a more powerful sample to examine the information benefits of DRIs. As the year progresses, directors' information advantages are likely to dissipate as a result of the materialization of industry shocks and the release of interim financial reports. The final sample consists of 7,127 management forecasts made by 1,056 firms and 3,471 firm-years during the period 2006 to 2013.

We hand-collect data to determine a firm's related industries (supplier and customer industries) from 2013 *IBISWorld* reports, an independent publisher of U.S. industry research. Its 2013 annual report covers 700 different industries. Each annual report describes information that includes products and markets (e.g., supply chain industries), competitive landscape (e.g., market share concentration), industry conditions (e.g., barriers to entry, cost structure, globalization and technology and systems), and other information. To create annual reports, *IBISWorld* uses a

[8] Board data for foreign firms in CIQ is sparse before 2006.
[9] We exclude Japan because management forecasts are mandatory in this country.

variety of sources that include personal contact, surveys, government, and industry association statistics (Hui, Klasa and Yeung 2012).

For each industry group at the five-digit NAICS level, *IBISWorld* also reports supplier and customer industry linkages at the five-digit NAICS industry group level. For example, the customers for aluminum manufacturing (five-digit NAICS code: 33131) include industry groups such as car and automobile manufacturing (33611a) and ship building (33661a), while the suppliers include industry groups such as coal and natural gas power (22111a) and coal and ore wholesaling (42352).

To illustrate, Joseph Muscari is the President and Chief Executive Officer of Minerals Technologies Inc. and a director on the board of Dana Holding Corporation. Dana Holding Corporation operates in the *Motor Vehicle Parts and Accessories* industry (3714). Dana's supplier industries include the *Other Electrical Equipment and Component Manufacturing* Industries (e.g., storage batteries – SIC 3691 and primary batteries – SIC 3692). Because Minerals Technologies Inc. is from the *Storage Batteries* industry, per our classification, Joseph Muscari is a DRI with experience in Dana's supplier industry.

3.2. Models and Variable Measurements

The following model tests the three levels of Hypothesis 1:

$$FORECAST\_XTIC_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (1)$$

We use a different measure of *FORECAST_XTIC* to test each of the three measures of forecast improvement, one for each of our three hypothesized relations.[10] The first measure of *FORECAST_XTIC* is *FORECAST*, an indicator variable for whether the firm issues a forecast in

[10] All variables used in our regression models are defined in Appendix B.

that year. The second, *FREQUENT,* is an indicator variable for whether the firm issues a forecast more than once in that year. Consistent with prior literature (e.g., Ajinkya, Bhojraj, and Sengupta 2005), *PRECISE* is a categorical variable that takes the values of 3, 2, 1, and 0 for point, closed-interval/range, open-interval, and qualitative forecasts, respectively.[11] We estimate logistic regressions when *FORECAST* and *FREQUENT* are dependent variables in equation (1). When *PRECISE* is the dependent variable, we estimate the equation using Ordinary Least Squares (OLS) regression (tabulated) and multinomial logistic regression (untabulated).

We develop six measures of *DRI*. To classify board members as DRIs, we first identify each firm's primary five-digit NAICS industry group based on CIQ "Primary Industry" classification. We then collect data on the industry's supplier and customer industry groups at the two-digit, three-digit and four-digit NAICS industry group levels. We next identify the primary NAICS industry of each board member's affiliations (other boards or employments). We retain only board members that have at least two affiliations. For each focal firm, we delete industries of each director's affiliations that are equal to the focal firm's primary industry. These two procedures ensure that we do not classify DRIs based on affiliations with the focal firm and its competitors. That is, we are only interested in vertical rather than horizontal relations. In order to compute measures of DRI, we compare the industries of each director's affiliations to the focal firm's customer and supplier industries at the two-digit, three-digit and four-digit NAICS industry group levels (the proportion of DRIs declines as the industry level becomes narrower). Very broadly, a board member is a DRI if these comparisons yield a match.

[11] Examples of management forecast formats used in defining PRECISION are as follows: Point: "We anticipate EPS of $1.25"; Closed-interval: "We anticipate EPS to be between $1.02 and $1.08"; Open-interval (minimum): "We anticipate EPS of at least $1.02"; Open-interval (maximum): "We anticipate EPS of at most $1.08"; Qualitative: "We anticipate an improvement in EPS".

More specifically, the first *DRI* measure is *DDRI*, which is an indicator variable for whether the firm has a director that is employed by or serving on the board of either a firm's customer or supplier industry in any given year. A corresponding second measure, *LOGDRI,* is a count variable which is the natural logarithm of (one plus) the number of directors from related industries. The third measure, *DRIDD,* is an indicator variable for whether the firm has a director that is employed by, or serving on, the board of a firm's customer industry in any given year. Its counterpart, *LOGDRIDD,* is the natural logarithm of (one plus) the number of directors from the firm's customer industries. The fifth measure, *DRISS,* is an indicator variable for whether the firm has a director that is employed by or serving on the board of a firm's supplier industry in any given year. An associated measure, *LOGDRISS,* is the natural logarithm of (one plus) the number of directors from the firm's supplier industries. Consistent with the hypotheses that DRIs increase the likelihood, frequency and precision of forecasts, we expect α_1 to be > 0.

The set of control variables used in equation (1) mainly consist of variables that have been found in prior research to explain variation in management forecast properties. Based on prior research (e.g., Ajiyinka, Bhojraj, and Sengupta 2005), these controls include the number of directors (*LOGDIR*), change in return on assets (*CHGROA*), globalization (*FOREIGN*), intellectual property (*RD*), organizational structure changes (*RESTRUC*), firm size (*LOGMV*), operating cycle (*LOGOPCYC*), external financing (*ISSUE*), financial distress (*LOGZSCORE*), return-on-assets (*ROA*) and debt (*LEV*). We also control for industry and year fixed effects. For brevity, we include additional controls as robustness tests. These control variables include country fixed effects, analyst following (*LOGANLYST*), director's insider status (*INSIDER*), and managerial ability: financial expertise (*FINEXPERT*), information technological expertise (*ITEXPERT*) and legal expertise (*LEGALEXPERT*).

3.3. Alternate Sources of Information

To test our second hypothesis, we examine whether the positive effect of DRIs on management forecast issuance, frequency and precision is more pronounced for firms with fewer alternative sources of information. Low alternate sources of information (*ALTINFO*) are measured by both at the firm-level (*LANLYST*) and at the country level (*LINFO*). Consistent with prior literature (e.g. Shroff, Verdi and Yu 2013), a firm has fewer alternative sources of information if it has low analyst coverage (*LANLYST*). *LANLYST* is an indicator variable for whether the natural logarithm of the average number of analysts following the firm during the year is below-average. At the country-level, we rely on an aggregate measure that captures both high information demand and low information production from the stock market. Specifically, using the World Economic Forum Global Competitiveness Index, we identify firms that rank high on basic requirements.[12] Countries in this group have highly-educated users of information and a prevalence of foreign ownership, implying higher information demand. However, these countries have less efficient capital markets such that stock market production of information is low. Examples of countries meeting these criteria include United Arab Emirates, Saudi Arabia and Qatar. Overall, these countries have fewer alternative sources of information because of low stock market information production (*LINFO*).[13]

The following model provides tests of Hypothesis 2:

$$FORECAST\_XTIC_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \alpha_2 ALTINFO_{i,t} + \alpha_3 DRI_{i,t} * ALTINFO_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (2)$$

[12] Available at http://reports.weforum.org/global-competitiveness-report-2014-2015/.

[13] Hence, the benchmark comparison group consists of either countries with both low information demand and low stock market information production or those with high information demand and high stock market information production. We exclude firms operating in countries with low information demand from the treatment group because such firms are not expected to increase forecast issuance even after they obtain relevant forecasting information from DRIs.

Consistent with hypotheses H2a, H2b, and H2c, we expect α_3 to be > 0.

4. Empirical Results

4.1. Descriptive Statistics

Table 1, Panel A reports the distribution of 110,516 firm-year observations by country. United States (40,602), Canada (13,309), Australia (12,667) and the United Kingdom (9,206) have the highest number of firm-year observations with available data on directors' backgrounds.[14] This distribution is largely consistent with other studies that use international data (e.g. Radakrishnan, Tsang and Yang 2014). However, several countries have as few as 1 observation, reflecting limited CIQ coverage (or availability) of board data across countries. Of the countries with at least 1,000 firm year observations (countries in bold in Table 1, Panel A), Germany (68%), United States (42%) and Switzerland (38%) have the highest percentage of firm-years with at least one management forecast. In contrast, Canada (51%), Australia (49%) and Switzerland (48%) have the highest percentage of firm-years with at least one director from a related industry. The U.S. has 44 percent of firm-years with at least one DRI. Hence, on a cross-country basis, these statistics do not necessarily support a positive association between DRIs and management forecast likelihood. Table 1, Panel B reports the distribution of 110,516 firm-year observations by two-digit SIC industry codes. Metal mining (10), chemical and allied products (28) and business services (73) have high percentages of firm-year observations (over 8,000) and DRIs (over 36 percent). For most industries, the proportion of forecast-issuing firms is somewhat proportional to the proportion of DRIs. Hence, at the industry-level, there is some observational evidence of a positive relation between DRIs and forecast likelihood.

[14] Given the high concentration of observations in the U.S., in sensitivity tests, we conduct our analysis after excluding U.S. firms.

Table 2 reports descriptive statistics for the sample of 110,516 firm-year observations of all firms.[15] The first four columns report statistics for non U.S. firms and the next four report statistics for U.S. firms. Forecast precision (*PRECISE*) is hand-collected only for U.S. firms. The prevalence of DRIs is similar between U.S. (44%) and non-U.S (42%) firms, although statistically different. Forecast likelihood (*FORECAST*) and frequency (*FREQUENT*) are statistically higher in U.S. firms relative to firms in other countries. Most control variables are also different between U.S. and non-U.S. firms as evidenced by the tests presented in the last two columns. Specifically, the t-tests of differences in means and Wilcoxon tests for differences in medians are significant. Also, the Kolmogorov-Smirnov test for equality of distribution failed (untabulated). Hence U.S. and non-U.S. firms are different with regards to whether they issue forecasts, how frequently forecasts are issued, and whether they have DRIs. For each of these variables, non-U.S. firms are less likely compared to U.S. firms. In addition, almost all of our control variables, analyst coverage variables, and executive characteristic variables are statistically different for non-U.S. versus U.S. firms. To evaluate the sensitivity of our results to these sample differences, we exclude U.S. firms in sensitivity analysis.

Table 3 presents the correlation matrix of the variables used in the regression models. The Pearson correlations are in the top right and the Spearman correlations are in the bottom left. Using the sample of observations, all measures of directors from related industries (*DDRI*, *LOGDRI, DRIDD, LOGDRIDD, DRISS* and *LOGDRISS*) are significantly positively correlated with forecast likelihood (*FORECAST*). These results provide initial support for H1 (a).

4.2. Univariate Test Results

Table 4 presents the statistics for firms with (without) DRIs. H1 predicts a positive relation between DRI and forecast (a) likelihood, (b) frequency and (c) precision. This holds true

[15] All continuous variables are winsorized at the 1st and 99th percentile to reduce the effects of outliers.

for forecast likelihood (FORECAST) and forecast frequency (FREQUENT): the mean forecast likelihood (*FORECAST*) and forecast frequency (*FREQUENT*) for firms with DRIs is consistently higher than those for firms without DRIs, across all six measures of *DRI* – including for both DRIs from demand and supply industries. However, the results for forecast precision (*PRECISE*) are ambiguous. Firms with directors from demand (customer) industries (*DRIDD*=1) have more precise forecasts than firms without directors from demand (customer) industries (*DRIDD*=0). However, the lower forecast precision of firms with directors from supply industries (*DRISS*) offsets the *DRIDD* effect. Consequently, there is no evidence of an overall significant difference in forecast precision between firms with DRIs, regardless of industry, (*DDRI*=1) and non-DRI firms (*DDRI*=0).

4.2. Regression Results for Management Forecast Likelihood, Frequency and Precision

Table 5 reports the logistic regression results from estimating model (1) where *FORECAST_XTIC* is management forecast likelihood (*FORECAST*) and *DRI* is represented by the three indicator variables (*DDRI, DRIDD* and *DRISS*).[16] Columns 1 and 3 presents results without controls, while columns 2 and 4 show results with control variables. Consistent with H1(a) which predicts that firms with DRIs are more likely to issue forecasts, the coefficient on *DRI* is significantly positive across all measures of *DRI*. For example, in the models with controls, the coefficient on *DDRI* is (0.255, t-stat = 4.9); *DRIDD* is (0.180, t-stat = 4.4); and *DRISS* is (0.241, t-stat = 5.7). To evaluate the economic significance of DRIs on management forecast issuance, we estimate the marginal effect of *DRI* based on the estimated coefficients in the models with control variables. The marginal effect of *DRI* is 0.06 (0.04 and 0.06) for column 2 (4), indicating that the probability of forecast issuance is 6 (4 and 6) percent higher for DRI firms than for non-DRI firms. Regarding control variables, as expected, the estimated

[16] In all regressions, standard errors are two-way clustered by firm and year.

coefficients on *LOGDIR* and *FOREIGN, RD, RESTRUC, LOGMV, ISSUE* and *ROA* are significantly positive and those on *CHGROA*, *LOGOPCYC* and *LOGZSCORE* are significantly negative.

Table 6 reports the logistic regression results from estimating model (1) where *FORECAST_XTIC* is management forecast frequency (*FREQUENT*) and *DRI* is represented by the three indicator variables (*DDRI, DRIDD* and *DRISS*). Columns 1 and 3 presents results without controls, while columns 2 and 4 show results with control variables. Consistent with H1(b) which predicts that firms with DRIs are more likely to issue more than one forecast per year, the coefficient on *DRI* is largely significantly positive (*DRIDD* is not significant in the model with control variables). The marginal effect of *DDRI* (*DRISS*) is 0.02 (0.04) for column 2 (4), indicating that the probability of issuing at least two forecasts is 2 (4) percent higher for DRI firms than for non-DRI firms. There is some evidence that the results for FREQUENT are driven by the DRIs who are from supplier (upstream) industries.

Table 7 presents the OLS regression results for model (1) where *FORECAST_XTIC* is management forecast precision (*PRECISE*) and *DRI* is represented by the three indicator variables (*DDRI, DRIDD* and *DRISS*). We do not find strong evidence supporting H1(c). Although all coefficients on *DRI* have the predicted positive sign, none are significant.[17] This result might be due to limited power because the sample constitutes fewer (10%) of the sample forecast-issuing firms (3,471 out of 35,177). The results might also be due to a bias introduced in the sample selection process. Cross-sectional tests with firm-level analyst coverage reported in Table 8 provide some evidence for this explanation. Specifically, the results show the predicted positive relation between *DDRI* and forecast precision for firms with below-average analyst coverage.

[17] Results are similar when we instead use Tobit regressions.

Overall, the results in Tables 5-7 support H1 and provide evidence consistent with management's greater willingness to issue forecasts, and issue them more frequently, in firms with directors from related industries. These results relate to firms' reluctance to issue forecasts when managers have an information disadvantage and DRIs easing this reluctance.

4.3. Regression Results for Interactions with Alternate Information Sources

To test H2, using model 2, we first examine the interaction effect between *DRI* and alternative information sources (*ALTINFO*). Table 8 reports logistic regression results of forecast likelihood and frequency and OLS regression results of forecast precision, where *ALTINFO* is captured by firm-level analyst coverage (*LANLYST*). The full set of control variables are estimated in the regressions but are excluded from this table for brevity. Consistent with prior literature, firms with high analyst following are more likely to issue forecasts. Conditional on forecast issuance, firms with high analyst coverage issue more frequent and precise forecasts. Focusing on our most consistent results, the coefficient on *DRISS* is positive across all *FORECAST_XTIC* measures and its interaction with *LANLYST* is positive when the dependent variable is *FREQUENT* and *PRECISE*. This suggests that *DRI*s have a more pronounced positive effect on management forecast properties for firms with below-average analyst following. The FORECAST results for this hypothesis seem to be driven by the DRIs from demand industries, whereas the FREQUENT and PRECISE results seem to be driven by the supply-side DRIs.

Table 9 reports logistic regression results of forecast likelihood and frequency, where *ALTINFO* is captured by country-level information production (*LINFO*). Similarly, the full set of control variables are estimated in the regressions but are excluded from this table for brevity. These results are qualitatively similar to those presented in Table 8. For example, the interaction between *DDRI* and *LINFO* positively relates to forecast likelihood (0.004, t-stat=2.2) and

forecast frequency (0.007, t-stat=3.1).[18] Hence, DRIs are more valuable in forecasting when firms operate in countries with sufficient demand for information but with fewer alternative sources of information. Overall, consistent with H2, these results suggest that DRIs are incrementally valuable as sources of information about customer and supplier industries when firms' ability to obtain such information from other sources is limited.

4.4. Additional Tests

We perform two main additional sets of tests without making formal hypotheses. In the first set of tests, we determine whether some DRIs have a stronger effect on management forecast properties based on the breadth of their connections and the firm's perception of their influence. In the second set of tests, we examine whether the stock market perceives DRIs to be conduits of customer and supplier industry information via management forecasts. Specifically, we investigate differences in informativeness of management forecasts between firms with DRIs and firms without DRIs.

4.4.1. Influential Directors from Related Industries

Some DRIs might be more influential because they have a wider social network in related industries, implying greater ability to facilitate stable supply chain relationships and greater access to relevant information about customers and suppliers. For example, Fich (2005) shows that directors who are CEOs at other firms bring greater value to the board. Consistent with this evidence, Dass et al. (2014) document that CEO DRIs have a significantly larger impact on firm value/performance than non-CEO DRIs. We therefore examine whether the positive effect of DRIs on management forecast issuance, frequency and precision is more pronounced when DRIs are more influential.

[18] Untabulated analyses show that these results are mainly driven by countries with well-developed public and private institutions such as strong property rights and high intellectual property protection.

We consider three measures of DRI influence (*DRIPWR*). The first two measures of *DRI* influence measure the breadth of the DRI's connections. The first, *DRIWRDS*, is the natural logarithm number of words used in describing the DRI's biography. More words are necessary to adequately describe the connections of a director with a wider social network. A second measure, *DRICEO*, is an indicator that takes the value of one if the DRI is a CEO in another firm (other than the focal firm's own CEO), zero otherwise. Individuals with wider social connections are more likely to be appointed as CEOs (Liu 2010). Consistent with prior literature documenting a stronger influence of CFOs on financial reporting, our third measure captures CFO DRIs (e.g., Jiang, Petroni and Wang 2010). *DRICFO*, is an indicator that takes the value of one if the DRI is a CFO in another firm (other than the focal firm's own CFO), zero otherwise.

Although we describe the *DRI* influence measures at the director level, our tests are at the firm level. To transform these measures to firm-level measures, we retain the maximum. In alternative tests we use the average and separately, the sum. The following model tests DRI influence using firm-year observations with at least one DRI on the board:

$$FORECAST\_XTIC_{i,t} = \alpha_0 + \alpha_1 DRIPWR_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (3)$$

In untablulated results for tests of model (3), we find a positive effect of *DRI* influence (*DRIPWR*) on management forecast issuance and frequency when *DRIPWR* is proxied by *DRIWRDS*, *DRICEO*, and *DRICFO*. These results suggest that conditional on having a DRI; management perceives customer and supplier industry information to be more valuable in forecasting when such information is provided by highly connected DRIs.

4.4.2. Informativeness of Management Forecasts

Prior research suggests management forecasts more effectively reduce information asymmetry between managers and investors (or among investors) when they are informative about firm value. For example, Lennox and Park (2006) hypothesize that managers are more likely to issue earnings forecasts when investors perceive earnings to be more informative. Consistent with this prediction, they find that prior earnings response coefficient, a proxy for earnings informativeness, positively relates to management earnings forecast issuance. Also, Kross and Suk (2012) hypothesize that following Regulation Fair Disclosure (FD) which restricts private communication channels, and in turn increases information asymmetry between managers and analysts, management forecasts become more informative. Accordingly, they find that analysts respond more quickly, more frequently, and with larger forecast revisions to management forecasts after FD.

Following these studies, we expect a stronger stock market reaction to management forecasts issued by firms with DRIs. This expectation is consistent with investors perceiving that DRIs reduce information asymmetry by communicating credible information about customer and supplier industries via management forecasts. To test, we estimate the following OLS regression model:

$$ABCAR_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (4)$$

ABCAR is the absolute value of the two-day cumulative abnormal return around each management forecast [trading window (0, +1)]. We retain only the earliest forecast in the year for each firm. We measure *ABCAR* in three ways: size-adjusted (*ABCAR*), size-industry-adjusted and size-industry-country-adjusted. DRI measures and controls are the same as in model (1) with

a few modifications. Instead of scaling change in earnings by assets, we scale by market value of equity (*CHGROE*). Also, we measure size using natural logarithm of assets instead of market value (*LOGASSET*). Finally, prior research documents that several characteristics of prior forecasts affect market reaction to current forecasts e.g., quantitative specificity (Baginski, Conrad, and Hassell 1993) and forecast accuracy (Hutton and Stocken 2009). As data limitations preclude us from directly controlling for these characteristics, we instead control for lagged forecast (*FORECAST_LAG*). That is, *FORECAST_LAG* is an indicator variable taking the value of one if the firm issued at least one forecast in the prior year, zero otherwise.

Table 10 presents results from regressing *ABCAR* on DRI measures, *LOGDIR*, *CHGROE*, *LOGASSET,* and *FORECAST_LAG*. *ABCAR* in the first two columns are the size-adjusted CARs, the next two are the size-industry-adjusted CARs and the last two contain the size-industry-country-adjusted CARs.[19] As expected, all DRI measures (*DDRI*, *DRIDD*, and *DRISS*) are positively associated with all measures of *ABCAR*, implying a stronger stock market reaction to management forecasts issued by firms with DRIs. Hence, consistent with DRIs reducing information asymmetry about demand and supply, investors perceive management forecasts issued by firms with DRIs to be more informative about firm value, or to place more weight on this information. [20]

4.5. Sensitivity Analyses

In this section, we discuss six main sensitivity analyses. First, our hypotheses assume that there is sufficient user demand for management forecasts but management cannot meet this demand because of high uncertainty about demand and supply outlook. Logically, if there is

[19] Alternatively, we control for industry and country fixed effects in the specification presented in the first two columns of Table 10. Unreported results are qualitatively similar.

[20] Due to significant reductions in our sample size upon inclusion of all control variables, results presented in Table 9 exclude these controls. Unreported results including these controls are largely consistent with those reported in Table 9.

insufficient user demand, management would not forecast even when they possess relevant information. In untabulated analysis, we validate this assumption by adopting the widely-used identification strategy of Rajan and Zingales (1998). Essentially, we show that the interaction between DRI and high access to stock market funding significantly, positively relates to forecast issuance and frequency *only* for firms with high dependence on external funding. Moreover, consistent with the notion that equity markets have greater demand for public information than debt markets, we find a less pronounced effect of DRIs on forecast likelihood in countries with strong creditor rights.

Second, we determine the extent to which high concentration of observations in U.S. firms drive our main results. To this end, we compare the regression results of management forecast likelihood and frequency on *DRI* and control variables as presented in Tables 5 and 6 (results untabulated). In the forecast likelihood results, the coefficient on *DDRI* is 0.246 for U.S. firms versus 0.240 for non-U.S. firms; the coefficient on *DRIDD* is 0.155 for U.S. firms versus 0.191 for non-U.S. firms and the coefficient on *DRISS* is 0.276 for U.S. firms versus 0.191 for non-U.S. firms.[21] Overall, the results for both the test variables and control variables are similar to the results presented in Tables 5 and 6 for both U.S. and non-U.S. firms (both in significance and magnitude of coefficients). Hence, it does not appear that reported results are driven by the concentration of observations in U.S. firms.

Third, we run model (1) using alternative measures of *DRI*. We first use the count measures - *LOGDRI, LOGDRIDD* and *LOGDRISS*. Untabulated results are similar to the main results reported in Tables 5 to 7. In the main tests, we classify DRIs at the two-digit NAICS industry group level. We evaluate sensitivity of the main results to classification of DRIs at the three-digit and four-digit NAICS industry group level. Comparing descriptive statistics, while

[21] Only the coefficients on *DRISS* are significantly different between U.S. and non-U.S. firms.

43% of firms-years have at least one DRI using two-digit NAICS, 22% and 5% have DRIs using three-digit and four-digit NAICS, respectively. Similar numbers for demand (supply) DRIs are 16%, 5% and 2% (33%, 18% and 4%). Untabulated results using these alternative measures are similar to the main results reported in Tables 5 to 7. Moreover, the magnitudes of estimated coefficients increase as the industry groups become narrower. For example, in the regression of *FORECAST* on *DDRRI* and full set of controls as reported in Table 5, column 2, the coefficient on *DDRRI* increase from 0.255 to 0.274 to 0.309 as we move from the two-digit to the three-digit up to the four-digit NAICS, respectively. These results indicate that our main results are robust to alternative measures of directors from related industries.

Fourth, to improve sample size and for brevity, the main results are estimated without controls for analyst following (*LOGANLYST*), director insider position (*INSIDER*), managerial financial expertise (*FINEXPERT*), information technology expertise (*ITEXPERT*) and legal expertise (*LEGALEXPERT*). In unreported analyses, we include these controls as well as country fixed effects in estimating model (1) and replicating the main results presented in Tables 5 to 7.[22] The results in these tests are similar to the main results and the model fit improves. For example, in the forecast likelihood regression, the coefficient on *DDRI* is 0.215, t-stats 5.4, Pseudo R^2 of 24% compared to Table 5, column 2 counterparts of 0.255, t-stats 4.9 (Pseudo R^2 of 16%). In the forecast frequency regression, the coefficient on *DDRI* is 0.136, t-stats 3.0, Pseudo R^2 of 15% compared to Table 6, column 2 counterparts of 0.131, t-stats 2.7, Pseudo R^2 of 13%. Analyst following and the three management expertise variables have significant positive coefficients while directors that are employed with the firm have a significant negative effect on firms' propensity to issue forecasts. Therefore, reported results are robust to controls for numerous firm, director and management characteristics.

[22] No country fixed effects in the forecast precision model since the sample constitutes only U.S. firms.

Fifth, unobservable variables that determine management forecast likelihood might also affect the relation between DRIs and the frequency (*FREQUENT*) and precision (*PRECISE*) of issued forecasts. We run a Heckman selection model to address this selection bias concern. To implement this procedure, we run a probit regression of *FORECAST* on the main control variables reported in Table 5, column 2 (first-stage regression). From the first stage, we compute an Inverse Mills ratio (*IMR*) that proxies for the selection bias. The procedure requires an instrument that can be validly excluded from the regression of *FREQUENT* and *PRECISE* on their determinants (second-stage regression). We use one-year lag of *FORECAST* (*FORECAST_LAG*) as an instrument because the sticky nature of management forecasts ensure a high association between lagged forecast issuance and current forecast issuance. Conversely, lagged forecast issuance is unlikely to directly affect forecast frequency and precision.

Unreported results from the first stage regression yield an estimated coefficient on *FORECAST_LAG* of 1.454, t-stats 109.2, Pseudo R^2 of 32%. In the second stage with *FREQUENT*, *IMR* is significantly negative (-2.506, t-stats= -27.5) and the Pseudo R^2 improves to 19%, indicating that the selection bias is a genuine concern. Most importantly, consistent with the results reported in Table 6, column 2, *DDRI* is significantly positive (.105, t-stats=2.1). Results for *DRIDD* and *DRISS* are also similar to those in Table 6, column 4 and results for the precision test are similar to Table 7, columns 2 and 4.[23]

Sixth, we do several changes analysis (untabulated). First, focusing on firms with no management forecast in year t-1, we find firms are more likely to initiate management forecasts

[23] As another sensitivity test, we match firms with at least one DRI to those without a DRI on propensity scores, primary industry, year and country (propensity scores are predicted values obtained from regressing DRI on control variables in model (1)). After propensity score matching using various specifications, we are unable to declare that DRI and non-DRI firms have equal distributions using the Kolmogorov-Smirnov test. We therefore re-run model (1) including all control variables using our propensity-score-matched sample. Results are similar to reported results.

following the recruitment of DRIs. Second, following the departure of a DRI, we do not find evidence that firms immediately stop forecast issuance. A potential explanation is that firms are reluctant to stop guidance once they have pre-committed; i.e., management forecasts are sticky.

5. Conclusion

Information uncertainty adversely affects management's ability to issue forecasts. DRIs specialized knowledge about, and strong connections with, downstream and upstream industries enables firms to better anticipate industry trends and to better prepare for demand and supply shocks. We expect this attribute of DRIs to improve managerial forecasting ability. Following this intuition, this study examines the association between directors from related industries and management forecast properties.

We find that firms with DRIs are more likely to issue forecasts than other firms. Moreover, if firms do issue forecasts, firms with DRIs issue forecasts more frequents than those issued by other firms. There is some mixed evidence that forecasts are more precise for firms with DRIs. Also, the positive effect of DRIs on forecast issuance, frequency and precision is most pronounced for firms in high information uncertainty environments, as captured by low firm-level analysts' following and low country-level information production. In addition, we find that there is some evidence of different reactions depending on whether a DRI is from a demand or supply industry. We also find that influential DRIs (i.e., DRIs whose biographies contain more words, CEO DRIs, and CFO DRIs) have a more positive effect on management forecast issuance and frequency. In addition, we find firms are more likely to initiate management forecasts following the recruitment of DRIs. Finally, we provide evidence of the market relevance of management forecasts for firms with DRIs, specifically that the absolute value of the two-day cumulative abnormal return around each management forecast is greater for firms with DRIs.

Overall, the evidence provided in this paper is timely in light of recent SEC and board focus on the specific skills that directors bring to the table. This evidence supports the contention that related industry experience of individual directors has beneficial consequences for voluntary disclosure policy, as evidenced by management forecasts.

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Appendix A
Sample Selection

	Observations		
	Board-Firm-Years	Firm-years	Firms
Board data from 2006 to 2013	669,700	110,516	26,703
U.S. Firms	(271,773)	(40,602)	(9,924)
Non-U.S. Firms	397,927	69,914	16,779

The table presents the sample selection procedure. We require firms to have available compensation information for board members and non-missing SIC and NAICS codes on S&P Capital IQ. The sample begins in 2006 because Capital IQ has scant board coverage of foreign firms prior to 2006.

Appendix B
Variable Definitions

Dependent Variables (Forecast Properties)

FORECAST	= 1 (0 otherwise) if firm issues at least one forecast in year *t*.
FREQUENT	= 1 (0 otherwise) if firm issues more than one forecast in year *t*.
PRECISE	= An ordinal variable coded 3 for point forecasts, 2 for range forecasts, 1 for open ended forecasts, and 0 for all other forecasts in year *t*.

Test Variables (Measures of Directors from Related Industries)

DDRI	= 1 (0 otherwise) if board member serves as a director or as management of firms in one of the related upstream (supply) or downstream (demand) industries in year *t*.
LOGDRI	= Natural log (one plus) the number board members that serve as a director or as management of firms in one of the related upstream (supply) or downstream (demand) industries in year *t*.
DRIDD	= 1 (0 otherwise) if board member serves as a director or as management of firms in one of the related downstream (demand) industries in year *t*.
LOGDRIDD	= Natural log (one plus) the number board members that serve as a director or as management of firms in one of the related downstream (demand) industries in year *t*.
DRISS	= 1 (0 otherwise) if board member serves as a director or as management of firms in one of the related upstream (supply) industries in year *t*.
LOGDRISS	= Natural log (one plus) the number board members that serve as a director or as management of firms in one of the related upstream (supply) industries in year *t*.

Control Variables

LOGDIR	= Natural log (one plus) the number board members in year *t*.
CHGROA	= Change in pre-tax earnings divided by total assets in year *t*.
FOREIGN	= 1 (0 otherwise) if foreign tax or deferred foreign tax is non-missing in year *t*.
RD	= Research and development expense divided by total assets in year *t*.
RESTRUC	= 1 (0 otherwise) if firm discontinued operations or made acquisitions in year *t*.
LOGMV	= Natural log of market value in year *t*.
LOGAT	= Natural log of total assets in year *t*.
LOGOPCYC	= the natural log of the operating cycle of the firm in year *t.* Operating cycle is 365 multiplied by the sum of change in accounts receivable (scaled by revenue) and change in inventory (scaled by cost of goods sold).
ISSUE	= 1 (0 otherwise) if firm has positive debt, common stock or preferred stock issuances in year *t.*
LOGZSCORE	= the natural log of the firm's Z-score in year *t.* Z-score is 1.2A+1.4B+3.3C+0.6D+1.0E where: A, B, C and E are working capital, retained earnings, operating income before depreciation, and sales divided by total assets, respectively; and D is market value divided by total liabilities.
ROA	Pre-tax earnings divided by total assets in year *t*.
LEV	Liabilities divided by total assets in year *t*.

Appendix B (continued)
Variable Definitions

Firm-level Information Quality	
LOGANLYST	= the natural log of the average number of analysts following the firm in year *t.*
HIGHANLYST	= 1 (0 otherwise) if the firm has above-average *LOGANLYST* in year *t*.
Country-level Information Quality	
HANLYST	= 1 (0 otherwise) if the firm is headquartered in a country with above-average analyst coverage as reported in Shroff et al. (2013).
HTRANSP	= 1 (0 otherwise) if the firm is headquartered in a country with above-average earnings transparency as reported in Shroff et al. (2013).
HPRESS	= 1 (0 otherwise) if the firm is headquartered in a country with above-average press coverage as reported in Shroff et al. (2013).
Additional Control Variables (Board and Management Characteristics)	
INSIDER	= 1 (0 otherwise) if director has non-zero executive compensation in year *t*.
FINEXPERT	= 1 (0 otherwise) if top management has an accounting or financial educational background.
ITEXPERT	= 1 (0 otherwise) if top management has a computer or technology educational background.
LEGALEXPERT	= 1 (0 otherwise) if top management has a law degree or has held/holds the title of "Attorney", "Barrister", "Hon.", "Magistrate", "Advocate", "Judge" or "Justice".

Table 1
Sample Composition by Country and Industry

Panel A: Sample Distribution by Country

Country Name	N	*FORECAST*	*DRI*	*DRIDD*	*DRISS*	Country Name	N	*FORECAST*	*DRI*	*DRIDD*	*DRISS*
Anguilla	4	0.00%	0.00%	0.00%	0.00%	Cyprus	104	54.81%	32.69%	19.23%	13.46%
Argentina	12	8.33%	41.67%	0.00%	41.67%	Czech Republic	25	8.00%	32.00%	16.00%	16.00%
Australia	**12,667**	**25.90%**	**48.98%**	**13.09%**	**41.07%**	Denmark	215	68.84%	28.84%	13.95%	24.19%
Austria	135	69.63%	31.11%	24.44%	10.37%	Dominican Republic	3	0.00%	0.00%	0.00%	0.00%
Azerbaijan	7	42.86%	57.14%	28.57%	42.86%	Ecuador	7	0.00%	0.00%	0.00%	0.00%
Bahamas	12	25.00%	83.33%	83.33%	25.00%	Egypt	8	0.00%	0.00%	0.00%	0.00%
Bahrain	2	0.00%	0.00%	0.00%	0.00%	Estonia	7	14.29%	0.00%	0.00%	0.00%
Bangladesh	34	0.00%	14.71%	0.00%	14.71%	Falkland Islands	4	0.00%	0.00%	0.00%	0.00%
Barbados	1	0.00%	0.00%	0.00%	0.00%	Finland	464	79.74%	46.77%	15.95%	38.58%
Belgium	337	43.32%	46.29%	24.63%	28.49%	France	522	49.62%	21.46%	13.79%	13.60%
Belize	1	0.00%	0.00%	0.00%	0.00%	**Germany**	**1,946**	**67.68%**	**36.90%**	**14.80%**	**30.37%**
Bermuda	324	36.42%	65.43%	10.19%	58.33%	Gibraltar	18	61.11%	50.00%	50.00%	0.00%
Botswana	42	4.76%	19.05%	0.00%	19.05%	Greece	12	25.00%	25.00%	16.67%	8.33%
Brazil	18	22.22%	27.78%	0.00%	27.78%	Greenland	3	100.00%	0.00%	0.00%	0.00%
British Virgin Islands	59	13.56%	45.76%	1.69%	44.07%	Hong Kong	6,868	24.75%	42.82%	23.11%	28.23%
Bulgaria	39	12.82%	7.69%	0.00%	7.69%	Hungary	47	44.68%	42.55%	19.15%	31.91%
Burkina Faso	5	0.00%	40.00%	0.00%	40.00%	Iceland	16	12.50%	31.25%	31.25%	18.75%
Cambodia	13	15.38%	0.00%	0.00%	0.00%	India	5,448	5.78%	31.22%	10.22%	25.90%
Canada	**13,309**	**16.35%**	**51.19%**	**13.79%**	**43.13%**	Indonesia	21	52.38%	9.52%	0.00%	9.52%
Cayman Islands	84	29.76%	54.76%	29.76%	28.57%	Ireland	522	50.00%	51.72%	23.75%	40.23%
Channel Islands	484	13.02%	38.43%	8.68%	31.40%	Isle of Man	76	17.11%	35.53%	7.89%	27.63%
Chile	312	7.69%	27.24%	14.42%	14.74%	Israel	216	21.30%	14.35%	0.00%	14.35%
China	4,302	30.99%	29.73%	12.55%	21.36%	Italy	503	34.79%	36.58%	20.28%	26.24%
Colombia	10	30.00%	0.00%	0.00%	0.00%	Jordan	205	0.98%	21.46%	12.20%	9.76%
Croatia	5	100.00%	0.00%	0.00%	0.00%	Kazakhstan	28	17.86%	28.57%	3.57%	28.57%
Cyprus	104	54.81%	32.69%	19.23%	13.46%	Kyrgyzstan	6	0.00%	66.67%	0.00%	66.67%
Czech Republic	25	8.00%	32.00%	16.00%	16.00%	Liechtenstein	13	23.08%	15.38%	15.38%	0.00%
Denmark	215	68.84%	28.84%	13.95%	24.19%	Lithuania	7	28.57%	14.29%	0.00%	14.29%
Dominican Republic	3	0.00%	0.00%	0.00%	0.00%	Luxembourg	81	37.04%	43.21%	16.05%	38.27%
Ecuador	7	0.00%	0.00%	0.00%	0.00%	Macau	33	15.15%	51.52%	51.52%	3.03%
Egypt	8	0.00%	0.00%	0.00%	0.00%	Malawi	4	0.00%	0.00%	0.00%	0.00%
Estonia	7	14.29%	0.00%	0.00%	0.00%	Malaysia	475	26.95%	26.53%	16.84%	13.68%
Falkland Islands	4	0.00%	0.00%	0.00%	0.00%	Malta	32	12.50%	40.63%	21.88%	31.25%
Finland	464	79.74%	46.77%	15.95%	38.58%	Marshall Islands	8	50.00%	25.00%	0.00%	25.00%
France	522	49.62%	21.46%	13.79%	13.60%	Mauritius	45	4.44%	26.67%	17.78%	13.33%

Table 1 continued on next page

Table 1 (cont'd)
Sample Composition by Country and Industry

Panel A (cont'd): Sample Distribution by Country

Country Name	N	*FORECAST*	*DRI*	*DRIDD*	*DRISS*	Country Name	N	*FORECAST*	*DRI*	*DRIDD*	*DRISS*
Mexico	13	15.38%	0.00%	0.00%	0.00%	Tanzania	20	15.00%	55.00%	50.00%	5.00%
Monaco	10	40.00%	0.00%	0.00%	0.00%	Thailand	1,343	30.16%	35.96%	24.65%	16.01%
Mongolia	18	11.11%	61.11%	11.11%	61.11%	Trinidad & Tobago	4	0.00%	0.00%	0.00%	0.00%
Mozambique	5	0.00%	0.00%	0.00%	0.00%	Tunisia	1	0.00%	0.00%	0.00%	0.00%
Namibia	29	13.79%	31.03%	24.14%	13.79%	Turkey	4	0.00%	0.00%	0.00%	0.00%
Netherlands	919	46.14%	45.70%	23.61%	32.54%	Turks & Caicos Islands	1	0.00%	0.00%	0.00%	0.00%
Netherlands Antilles	10	70.00%	80.00%	0.00%	80.00%	Uganda	1	0.00%	0.00%	0.00%	0.00%
New Zealand	665	31.88%	34.29%	22.11%	15.64%	Ukraine	20	20.00%	20.00%	20.00%	0.00%
Nigeria	18	5.56%	5.56%	0.00%	5.56%	United Arab Emirates	32	25.00%	56.25%	53.13%	6.25%
Norway	694	22.05%	32.13%	12.10%	22.77%	**United Kingdom**	**9,206**	**29.74%**	**39.65%**	**16.85%**	**29.47%**
Oman	137	5.11%	29.93%	20.44%	11.68%	**United States**	**40,602**	**42.37%**	**44.12%**	**17.42%**	**35.03%**
Pakistan	13	0.00%	0.00%	0.00%	0.00%	Uruguay	6	83.33%	83.33%	0.00%	83.33%
Palestinian Authority	12	0.00%	16.67%	16.67%	0.00%	Venezuela	1	0.00%	100.00%	0.00%	100.00%
Panama	4	0.00%	75.00%	75.00%	0.00%	Vietnam	26	23.08%	0.00%	0.00%	0.00%
Papua New Guinea	55	23.64%	43.64%	25.45%	23.64%	Zambia	11	0.00%	63.64%	0.00%	63.64%
Peru	10	0.00%	80.00%	0.00%	80.00%	Zimbabwe	1	0.00%	0.00%	0.00%	0.00%
Philippines	18	5.56%	22.22%	16.67%	5.56%						
Poland	996	18.88%	22.49%	11.95%	13.76%						
Portugal	117	29.06%	30.77%	22.22%	8.55%						
Reunion	1	0.00%	0.00%	0.00%	0.00%						
Romania	1	0.00%	0.00%	0.00%	0.00%						
Russia	40	37.50%	20.00%	2.50%	17.50%						
Saudi Arabia	24	12.50%	12.50%	12.50%	0.00%						
Serbia	4	75.00%	0.00%	0.00%	0.00%						
Sierra Leone	3	100.00%	100.00%	100.00%	100.00%						
Singapore	341	33.72%	41.64%	24.05%	26.10%						
Slovakia	4	50.00%	100.00%	100.00%	0.00%						
Slovenia	85	41.18%	18.82%	10.59%	8.24%						
South Africa	1,899	27.07%	47.02%	28.01%	31.02%						
South Korea	15	40.00%	6.67%	0.00%	6.67%						
Spain	326	25.15%	23.62%	10.12%	16.87%						
Sri Lanka	6	0.00%	0.00%	0.00%	0.00%						
Sweden	1,066	20.73%	46.81%	19.23%	37.71%						
Switzerland	**1,444**	**38.09%**	**48.06%**	**17.38%**	**39.27%**						
Taiwan	25	32.00%	8.00%	0.00%	8.00%	**TOTAL**	110,516				

Table 1 continued on next page

Table 1 (cont'd)
Sample Composition by Country and Industry

Panel B: Sample Distribution by Industry

Industry Name	N	*FORECAST*	*DRI*	*DRIDD*	*DRISS*
01 Agricultural Production - Crops	276	31.52%	34.78%	22.83%	22.83%
02 Agricultural Production - Livestock	64	18.75%	26.56%	21.88%	9.38%
07 Agricultural Services	87	42.53%	65.52%	35.63%	52.87%
08 Forestry	67	22.39%	34.33%	26.87%	7.46%
09 Fishing, Hunting, & Trapping	36	25.00%	38.89%	25.00%	13.89%
10 Metal, Mining	**11,164**	**8.82%**	**75.04%**	**6.70%**	**73.92%**
12 Coal Mining	729	32.65%	39.09%	11.11%	32.92%
13 Oil & Gas Extraction	5,668	28.30%	28.11%	21.65%	9.47%
14 Nonmetallic Minerals, Except Fuels	630	14.76%	28.57%	27.46%	2.38%
15 General Building Contractors	725	37.66%	26.21%	8.41%	19.86%
16 Heavy Construction, Except Building	799	37.92%	41.30%	33.17%	19.27%
17 Special Trade Contractors	428	43.69%	41.36%	24.53%	21.03%
20 Food & Kindred Products	2,714	32.83%	29.48%	21.48%	13.23%
22 Textile Mill Products	66	48.48%	27.27%	25.76%	12.12%
23 Apparel & Other Textile Products	891	39.96%	23.23%	6.17%	18.86%
24 Lumber & Wood Products	453	29.58%	36.64%	27.37%	23.84%
25 Furniture & Fixtures	305	54.75%	66.56%	39.34%	50.16%
26 Paper & Allied Products	949	37.51%	54.48%	33.09%	42.04%
27 Printing & Publishing	1,016	43.01%	43.31%	4.82%	41.73%
28 Chemical & Allied Products	**8,665**	**30.25%**	**55.65%**	**10.18%**	**52.30%**
29 Petroleum & Coal Products	575	41.57%	18.09%	18.09%	18.09%
30 Rubber & Miscellaneous Plastics Products	1,000	33.80%	39.40%	12.10%	36.60%
31 Leather & Leather Products	271	39.48%	32.47%	18.08%	21.03%
32 Stone, Clay, & Glass Products	1,023	33.63%	42.42%	29.03%	20.04%
33 Primary Metal Industries	1,404	37.96%	41.67%	7.34%	37.11%
34 Fabricated Metal Products	1,019	43.57%	49.56%	20.71%	43.18%
35 Industrial Machinery & Equipment	4,496	39.86%	46.86%	14.52%	42.44%
36 Electronic & Other Electric Equipment	5,653	48.15%	55.30%	19.72%	48.29%
37 Transportation Equipment	1,814	40.63%	56.12%	27.40%	47.46%
38 Instruments & Related Products	3,393	45.27%	43.00%	11.88%	38.11%
39 Miscellaneous Manufacturing Industries	770	37.40%	42.34%	25.19%	27.92%
40 Railroad Transportation	134	41.04%	73.88%	58.21%	53.73%
41 Local & Interurban Passenger Transit	34	17.65%	32.35%	29.41%	2.94%
42 Trucking & Warehousing	424	42.92%	57.08%	39.62%	29.95%
43 U.S. Postal Service	17	5.88%	35.29%	35.29%	0.00%
44 Water Transportation	628	34.24%	44.90%	35.67%	16.88%
45 Transportation by Air	590	49.66%	36.44%	27.12%	19.83%
46 Pipelines, Except Natural Gas	66	28.79%	42.42%	28.79%	21.21%
47 Transportation Services	775	38.06%	36.65%	32.26%	11.61%
48 Communications	2,095	48.07%	49.64%	34.84%	28.21%
49 Electric, Gas, & Sanitary Services	2,849	40.29%	43.66%	33.56%	26.29%
50 Wholesale Trade - Durable Goods	2,140	36.45%	34.39%	30.23%	6.92%
51 Wholesale Trade - Nondurable Goods	1,360	32.35%	27.65%	22.28%	13.38%
52 Building Materials & Gardening Supplies	120	57.50%	44.17%	43.33%	10.83%
53 General Merchandise Stores	468	52.56%	26.71%	19.44%	10.26%

Table 1 continued on next page

Table 1 (cont'd)
Sample Composition by Country and Industry

Panel B (cont'd): Sample Distribution by Industry

Industry Name	N	*FORECAST*	*DRI*	*DRIDD*	*DRISS*
54 Food Stores	357	45.38%	57.14%	53.50%	14.29%
55 Automative Dealers & Service Stations	395	44.30%	40.25%	21.01%	27.59%
56 Apparel & Accessory Stores	596	64.77%	58.05%	45.81%	28.69%
57 Furniture & Homefurnishings Stores	308	57.47%	46.75%	30.19%	18.83%
58 Eating & Drinking Places	835	48.62%	10.90%	8.98%	1.92%
59 Miscellaneous Retail	1,003	47.06%	38.68%	32.90%	13.06%
60 Depository Institutions	6,613	16.62%	21.26%	10.77%	13.02%
61 Nondepository Institutions	1,339	17.33%	41.08%	7.09%	38.39%
62 Security & Commodity Brokers	2,586	24.28%	50.93%	7.12%	48.96%
63 Insurance Carriers	1,916	33.92%	66.18%	6.05%	65.08%
64 Insurance Agents, Brokers, & Service	315	33.65%	48.57%	47.94%	48.57%
65 Real Estate	3,412	23.65%	16.85%	7.47%	10.43%
67 Holding & Other Investment Offices	6,742	17.37%	26.48%	3.01%	24.56%
70 Hotels & Other Lodging Places	638	26.96%	37.46%	36.36%	3.76%
72 Personal Services	167	58.68%	43.11%	35.33%	16.77%
73 Business Services	**9,565**	**41.13%**	**36.68%**	**17.78%**	**26.86%**
75 Auto Repair, Services, & Parking	131	46.56%	48.85%	32.82%	34.35%
76 Miscellaneous Repair Services	98	23.47%	59.18%	51.02%	23.47%
78 Motion Pictures	575	25.39%	44.17%	25.74%	28.00%
79 Amusement & Recreation Services	955	27.96%	32.67%	25.45%	9.95%
80 Health Services	1,045	41.63%	37.22%	13.21%	27.18%
81 Legal Services	25	68.00%	28.00%	16.00%	28.00%
82 Educational Services	287	42.86%	18.82%	10.80%	10.10%
83 Social Services	18	22.22%	22.22%	11.11%	11.11%
84 Museums, Botanical, Zoological Gardens	4	0.00%	0.00%	0.00%	0.00%
86 Membership Organizations	20	10.00%	50.00%	50.00%	0.00%
TOTAL	110,516				

Panel A (Panel B) provides the distribution of firm-year observations by country (industry). The sample period is from 2006 to 2013 for 110,516 firm-year observations that have director characteristics and industry data on S&P Capital IQ. *FORECAST* is the percentage of forecast-issuing firms and *DRI* (*DRIDD*){*DRISS*} is the percentage of firms with directors from (demand){supply} related industries.

Table 2
Descriptive Statistics of U.S. versus Non-U.S. Firms

	Non-U.S.			U.S.			t-test	Wilcoxon
	N	**Mean**	**Med.**	**N**	**Mean**	**Med.**	**Mean**	**Med.**
Dependent Variables								
FORECAST	69,938	0.26	0.00	40,578	0.42	0.00	–56.40	–57.39
FREQUENT	17,977	0.14	0.00	17,200	0.43	0.00	–62.99	–60.11
PRECISE				3,471	2.03	2.00		
Independent Variables								
DRI	69,938	0.42	0.00	40,578	0.44	0.00	–6.49	–6.49
LOGDRI	69,938	0.43	0.00	40,578	0.47	0.00	–11.19	–9.59
DRIDD	69,938	0.16	0.00	40,578	0.17	0.00	–7.05	–7.12
LOGDRIDD	69,938	0.14	0.00	40,578	0.15	0.00	–8.05	–7.54
DRISS	69,938	0.32	0.00	40,578	0.35	0.00	–8.73	–8.77
LOGDRISS	69,938	0.32	0.00	40,578	0.35	0.00	–10.71	–10.00
Control Variables								
LOGDIR	69,938	1.78	1.79	40,578	1.95	1.95	–59.70	–68.00
CHGROA	64,351	0.01	0.00	36,310	0.00	0.00	2.60	1.66
FOREIGN	68,622	0.18	0.00	40,167	0.44	0.00	–90.69	–93.12
RD	65,821	0.01	0.00	36,705	0.05	0.00	–49.72	–80.01
RESTRUC	68,622	0.15	0.00	40,167	0.30	0.00	–55.08	–57.76
LOGMV	68,622	3.27	3.30	40,167	3.71	3.92	–25.53	–26.39
LOGAT	65,857	4.78	4.59	36,795	5.68	5.98	–52.39	–57.93
LOGOPCYC	48,256	5.36	5.41	27,986	5.02	5.18	34.57	–37.39
ISSUE	68,622	0.77	1.00	40,167	0.83	1.00	–22.15	–21.51
LOGZSCORE	59,997	1.34	1.13	31,977	0.95	1.07	35.48	22.51
ROA	65,821	–0.17	0.02	36,705	–0.32	0.01	19.20	2.54
LEV	65,822	0.54	0.44	36,707	0.84	0.59	–38.19	–71.22
Analyst Coverage								
LOGANLYST	27,563	0.65	0.00	33,394	1.01	0.69	–45.14	–42.60
HIGHANLYST	27,563	0.30	0.00	33,394	0.48	0.00	–44.36	–43.33
Executive Characteristics								
INSIDER	69,938	0.09	0.00	40,578	0.13	0.00	–18.92	–19.65
FINEXPERT	69,938	0.34	0.00	40,578	0.73	1.00	–140.00	–124.98
ITEXPERT	69,938	0.23	0.00	40,578	0.28	0.00	–17.90	–18.17
LEGALEXPERT	69,938	0.20	0.00	40,578	0.14	0.00	24.00	23.14

Table 2 presents descriptive statistics. The sample period is from 2006 to 2013 for 110,516 firm-year observations that have director characteristics and industry data on S&P Capital IQ. Please refer to Appendix A for sample selection criteria.

Table 3
Correlation Matrix

Variable	A	B	C	D	E	F	G	H	I	J	K	L
A. FORECAST		0.14	0.15	0.16	0.16	0.10	0.09	0.25	0.01	0.21	–0.01	0.19
B. DDRI	0.14		0.89	0.51	0.48	0.82	0.74	0.24	–0.01	0.11	0.06	0.11
C. LOGDRI	0.15	0.96		0.51	0.55	0.79	0.87	0.30	–0.01	0.13	0.05	0.14
D. DRIDD	0.16	0.51	0.53		0.94	0.08	0.08	0.22	**0.00**	0.10	–0.05	0.10
E. LOGDRIDD	0.16	0.51	0.53	1.00		0.09	0.08	0.25	**0.00**	0.10	–0.05	0.11
F. DRISS	0.10	0.82	0.82	0.08	0.08		0.91	0.18	–0.01	0.09	0.10	0.10
G. LOGDRISS	0.10	0.80	0.85	0.08	0.08	0.98		0.21	–0.01	0.10	0.09	0.12
H. LOGDIR	0.26	0.24	0.28	0.22	0.23	0.18	0.20		**0.00**	0.12	–0.04	0.13
I. CHGROA	0.06	–0.01	–0.01	0.02	0.02	–0.02	–0.02	0.02		**0.00**	**0.00**	**0.00**
J. FOREIGN	0.21	0.11	0.12	0.10	0.10	0.09	0.10	0.14	0.01		**0.00**	0.38
K. RD	0.14	0.11	0.11	–0.02	–0.02	0.15	0.16	0.03	0.01	0.16		0.01
L. RESTRUC	0.19	0.11	0.13	0.10	0.10	0.10	0.11	0.15	**0.00**	0.38	0.13	
M. LOGMV	0.25	0.10	0.10	0.09	0.09	0.07	0.07	0.25	**0.00**	0.10	0.04	0.04
N. LOGAT	0.38	0.16	0.19	0.24	0.24	0.08	0.09	0.60	0.05	0.28	–0.09	0.27
O. LOGOPCYC	–0.03	**0.00**	**–0.01**	–0.05	–0.05	0.03	0.03	–0.04	–0.05	0.02	0.16	–0.01
P. ISSUE	0.13	0.06	0.07	0.06	0.06	0.04	0.05	0.11	–0.02	–0.12	0.07	–0.17
Q. LOGZSCORE	–0.11	0.04	0.03	–0.09	–0.10	0.09	0.09	–0.35	0.06	–0.07	0.22	–0.11
R. ROA	0.28	0.02	0.02	0.14	0.14	–0.04	–0.05	0.25	0.34	0.21	–0.08	0.11
S. LEV	0.08	–0.07	–0.06	0.07	0.07	–0.11	–0.11	0.23	0.04	0.04	–0.03	0.12
T. LOGANLYST	0.39	0.16	0.17	0.15	0.15	0.12	0.12	0.30	0.05	0.23	0.06	0.15

Table 3 continued on next page

Table 3 (continued)
Correlation Matrix

Variable	M	N	O	P	Q	R	S	T
A. FORECAST	0.26	0.37	–0.02	0.13	–0.11	0.16	–0.06	0.40
B. DDRI	0.11	0.17	–0.01	0.06	0.06	0.04	–0.07	0.18
C. LOGDRI	0.11	0.22	–0.02	0.07	0.04	0.05	–0.07	0.20
D. DRIDD	0.10	0.24	–0.02	0.06	–0.08	0.07	–0.02	0.17
E. LOGDRIDD	0.10	0.27	–0.02	0.06	–0.09	0.08	–0.02	0.17
F. DRISS	0.08	0.10	**0.00**	0.04	0.10	0.02	–0.07	0.13
G. LOGDRISS	0.08	0.12	–0.01	0.05	0.09	0.02	–0.07	0.13
H. LOGDIR	0.26	0.60	–0.01	0.11	–0.36	0.21	–0.07	0.31
I. CHGROA	–0.02	–0.01	–0.01	–0.03	0.09	0.11	0.09	**0.01**
J. FOREIGN	0.11	0.28	0.03	–0.12	–0.08	0.12	–0.06	0.24
K. RD	–0.03	–0.20	0.04	0.05	0.23	–0.31	0.20	–0.05
L. RESTRUC	0.05	0.27	**0.00**	–0.17	–0.10	0.08	–0.01	0.16
M. LOGMV		0.37	0.01	0.15	0.06	0.18	–0.12	0.26
N. LOGAT	0.37		–0.02	0.15	–0.59	0.39	–0.15	0.51
O. LOGOPCYC	**0.00**	–0.06		0.01	**0.00**	0.04	–0.05	–0.03
P. ISSUE	0.15	0.15	**0.00**		–0.09	–0.03	0.05	0.14
Q. LOGZSCORE	0.12	–0.60	**0.00**	–0.10		–0.34	0.08	–0.15
R. ROA	0.25	0.49	–0.05	–0.01	–0.16		–0.69	0.18
S. LEV	–0.02	0.30	–0.08	0.15	–0.47	**0.00**		–0.07
T. LOGANLYST	0.30	0.49	–0.03	0.13	–0.16	0.34	0.06	

The table shows the correlation between the variables using the full sample of 110,516 firm-year observations. Pearson correlations are reported on the top right and Spearman correlations on the bottom left. All correlations are significant at least the 10% level except the correlations in bold. See Appendix B for variable definitions.

Table 4
Univariate Test Results for Management Forecast Likelihood, Frequency and Precision

	Mean DRI =1	Mean DRI=0	T-stat Diff.
Panel A: All Directors from Related Industries			
FORECAST	0.39	0.26	46.94***
FREQUENT	0.33	0.23	20.73***
PRECISE	2.03	2.04	0.81
Panel B: Directors from Demand Industries			
FORECAST	0.49	0.29	53.44***
FREQUENT	0.33	0.27	12.23***
PRECISE	2.08	2.02	2.42**
Panel C: Directors from Supply Industries			
FORECAST	0.39	0.29	32.05***
FREQUENT	0.34	0.24	20.88***
PRECISE	2.00	2.06	-2.28**

The table provides the between sample univariate test results for management forecast likelihood, frequency and precision. The sample period is from 2006 to 2013 for 110,516 firm-year observations that have director characteristics and industry data on S&P Capital IQ. Please refer to Appendix A for sample selection criteria. Dependent variables, independent variables, and control variables are defined in Appendix B.

Table 5
Logistic Regression Results for Management Forecast Likelihood

$$FORECAST_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (1)$$

Variables	Coef./T-stat 1	Coef./T-stat 2	Coef./T-stat 3	Coef./T-stat 4
DDRI	**0.789*** **	**0.255*** **		
	(25.636)	**(4.934)**		
DRIDD			**0.610*** **	**0.180*** **
			(21.866)	**(4.424)**
DRISS			**0.682*** **	**0.241*** **
			(20.108)	**(5.698)**
LOGDIR		0.638***		0.626***
		(5.882)		(5.775)
CHGROA		–0.175**		–0.174**
		(–1.995)		(–1.981)
FOREIGN		0.664***		0.661***
		(5.924)		(5.885)
RD		1.799***		1.798***
		(5.683)		(5.778)
RESTRUC		0.686***		0.678***
		(13.945)		(13.786)
LOGMV		0.147***		0.147***
		(2.880)		(2.901)
LOGOPCYC		–0.061***		–0.060***
		(–4.830)		(–4.802)
ISSUE		0.499***		0.499***
		(7.521)		(7.562)
LOGZSCORE		–0.167***		–0.166***
		(–9.016)		(–8.973)
ROA		0.823***		0.819***
		(5.633)		(5.652)
LEV		–0.017		–0.019
		(–0.514)		(–0.570)
Constant	–14.941	–2.648***	–14.532	–2.624***
	(–0.223)	(–7.149)	(–0.223)	(–7.096)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	110,512	70,327	110,512	70,327
Pseudo R^2	0.095	0.156	0.098	0.157

This table presents regression results. For each regression, the estimated coefficients are presented in the top and the two-sided t-statistics in the brackets at the bottom. Please refer to Appendix A for sample selection criteria and Appendix B for variable definitions. Standard errors are clustered by firm and year. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 6
Logistic Regression Results for Management Forecast Frequency

$$FREQUENT_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (1)$$

Variables	Coef./T-stat 1	Coef./T-stat 2	Coef./T-stat 3	Coef./T-stat 4
DDRI	**0.531*** **	**0.131*** **		
	(11.152)	**(2.747)**		
DRIDD			**0.262*** **	**–0.025**
			(5.981)	**(–0.514)**
DRISS			**0.525*** **	**0.193*** **
			(13.363)	**(4.439)**
LOGDIR		0.883***		0.880***
		(13.992)		(13.912)
CHGROA		–0.497***		–0.501***
		(–3.851)		(–3.813)
FOREIGN		0.831***		0.829***
		(17.745)		(17.462)
RD		4.376***		4.320***
		(14.660)		(14.601)
RESTRUC		0.281***		0.277***
		(6.544)		(6.530)
LOGMV		0.046		0.046
		(1.533)		(1.527)
LOGOPCYC		–0.168***		–0.169***
		(–8.535)		(–8.571)
ISSUE		0.850***		0.849***
		(7.234)		(7.248)
LOGZSCORE		–0.090***		–0.093***
		(–2.955)		(–3.022)
ROA		1.757***		1.768***
		(7.038)		(7.020)
LEV		–0.217*		–0.215*
		(–1.792)		(–1.755)
Constant	–2.076**	–4.017***	–2.074**	–4.007***
	(–2.162)	(–6.516)	(–2.160)	(–6.451)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	35,151	29,517	35,151	29,517
Pseudo R^2	0.042	0.125	0.042	0.125

This table presents regression results. For each regression, the estimated coefficients are presented in the top and the two-sided t-statistics in the brackets at the bottom. Please refer to Appendix A for sample selection criteria and Appendix B for variable definitions. Standard errors are clustered by firm and year. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 7
OLS Regression Results for Management Forecast Precision

$$PRECISE_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (1)$$

Variables	Coef./T-stat 1	Coef./T-stat 2	Coef./T-stat 3	Coef./T-stat 4
DDRI	**0.030**	**0.014**		
	(0.963)	**(0.764)**		
DRIDD			**0.035**	**0.023**
			(1.257)	**(0.950)**
DRISS			**0.022**	**0.009**
			(0.697)	**(0.322)**
LOGDIR		0.122***		0.119***
		(3.187)		(3.077)
CHGROA		–0.043		–0.041
		(–0.686)		(–0.654)
FOREIGN		–0.002		–0.003
		(–0.077)		(–0.099)
RD		–0.034		–0.028
		(–0.133)		(–0.108)
RESTRUC		–0.005		–0.005
		(–0.204)		(–0.193)
LOGMV		0.018**		0.018**
		(2.375)		(2.394)
LOGOPCYC		–0.018		–0.018
		(–1.271)		(–1.249)
ISSUE		0.115*		0.115*
		(1.930)		(1.939)
LOGZSCORE		–0.039		–0.038
		(–1.463)		(–1.430)
ROA		–0.034		–0.036
		(–0.729)		(–0.763)
LEV		–0.027		–0.029
		(–0.297)		(–0.316)
Constant	2.640***	1.322	2.640***	1.317
	(21.696)	(1.207)	(21.661)	(1.207)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	3,471	3,471	3,471	3,471
Adjusted R^2	0.056	0.064	0.056	0.064

This table presents regression results. For each regression, the estimated coefficients are presented in the top and the two-sided t-statistics in the brackets at the bottom. Please refer to Appendix A for sample selection criteria and Appendix B for variable definitions. Standard errors are clustered by firm and year. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 8

Regression Results for Management Forecast Likelihood, Frequency and Precision

$$FORECAST\_XTIC_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \alpha_2 ALTINFO_{i,t} + \alpha_3 DRI_{i,t} * ALTINFO_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (2)$$

Dependent Variable=	**FORECAST**	**FREQUENT**	**PRECISE**	**FORECAST**	**FREQUENT**	**PRECISE**
	Coef./T-stat	**Coef./T-stat**	**Coef./T-stat**	**Coef./T-stat**	**Coef./T-stat**	**Coef./T-stat**
DDRI	0.248***	0.133**	0.166***			
	(5.642)	(2.119)	(3.170)			
DDRI X LANLYST	**0.162*** **	**0.007**	**0.213*** **			
	(2.729)	**(0.103)**	**(3.316)**			
DRIDD				0.262***	–0.090	0.092
				(5.344)	(–1.058)	(1.321)
DRIDD X LANLYST				**0.282*** **	**–0.120**	**0.095**
				(3.599)	(–1.408)	(1.262)
DRISS				0.200***	0.275***	0.148***
				(4.453)	(4.692)	(2.769)
DRISS X LANLYST				**0.026**	**0.170*** **	**0.197*** **
				(0.417)	**(2.936)**	**(3.508)**
LANLYST	–1.061***	–0.442***	–0.162***	–1.053***	–0.478***	–0.153***
	(–13.381)	(–6.525)	(–2.869)	(–13.017)	(–7.661)	(–2.784)
Constant	–3.452***	–2.926***	1.234	–3.411***	–2.925***	1.202
	(–6.535)	(–8.987)	(1.162)	(–6.526)	(–9.008)	(1.152)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	43,395	22,089	3,244	43,395	22,089	3,244
Pseudo/Adjusted R^2	0.197	0.106	0.069	0.198	0.106	0.068

This table presents regression results. For each regression, the estimated coefficients are presented in the top and the two-sided t-statistics in the brackets at the bottom. Please refer to Appendix A for sample selection criteria and Appendix B for variable definitions. Standard errors are clustered by firm and year. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 9

Regression Results for Management Forecast Likelihood, Frequency and Precision

$$FORECAST\_XTIC_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \alpha_2 ALTINFO_{i,t} + \alpha_3 DRI_{i,t} * ALTINFO_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (2)$$

Dependent Variable=	**FORECAST**	**FREQUENT**	**FORECAST**	**FREQUENT**
	Coef./T-stat	**Coef./T-stat**	**Coef./T-stat**	**Coef./T-stat**
DDRI	0.151**	–0.045		
	(2.362)	(–0.626)		
DDRI X LINFO	**0.004****	**0.007*****		
	(2.206)	**(3.133)**		
DRIDD			0.041	–0.237**
			(0.630)	(–2.414)
DRIDD X LINFO			**0.006*****	**0.009****
			(2.979)	**(2.496)**
DRISS			0.203***	0.181**
			(3.311)	(2.075)
DRISS X LINFO			**0.002**	**–0.000**
			(1.002)	**(–0.099)**
LINFO	–0.028***	0.006***	–0.028***	0.008***
	(–19.208)	(2.582)	(–18.607)	(3.771)
Constant	–2.864***	–3.127***	–2.836***	–3.136***
	(–5.005)	(–11.024)	(–4.947)	(–11.025)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	59,877	26,687	59,877	26,687
Pseudo R^2	0.197	0.118	0.199	0.119

This table presents regression results. For each regression, the estimated coefficients are presented in the top and the two-sided t-statistics in the brackets at the bottom. Please refer to Appendix A for sample selection criteria and Appendix B for variable definitions. Standard errors are clustered by firm and year. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 10
Regression Results for Management Forecast Informativeness

$$ABCAR_{i,t} = \alpha_0 + \alpha_1 DRI_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (4)$$

INFOQUAL=	***ABCAR*** Coef./T-stat	***ABCAR*** Coef./T-stat	***ABCAR (Ind. Adj.)*** Coef./T-stat	***ABCAR (Ind. Adj.)*** Coef./T-stat	***ABCAR (Ind. Ctry. Adj.)*** Coef./T-stat	***ABCAR (Ind. Ctry. Adj.)*** Coef./T-stat
DDRI	**0.400*** **		**0.500*** **		**0.343*** **	
	(4.308)		**(5.266)**		**(3.757)**	
DRIDD		**0.387*** **		**0.383*** **		**0.366*** **
		(3.496)		**(3.378)**		**(3.360)**
DRISS		**0.214** **		**0.367*** **		**0.154***
		(2.300)		**(3.847)**		**(1.688)**
LOGDIR	–0.296**	–0.290**	–0.473***	–0.476***	–0.276**	–0.269**
	(–2.246)	(–2.203)	(–3.491)	(–3.518)	(–2.146)	(–2.092)
CHGROE	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(4.968)	(5.015)	(7.017)	(7.125)	(7.147)	(7.176)
LOGASSET	–0.106***	–0.111***	–0.146***	–0.150***	–0.100***	–0.106***
	(–3.741)	(–3.893)	(–5.051)	(–5.138)	(–3.636)	(–3.797)
FORECAST_LAG	0.573***	0.573***	0.964***	0.962***	0.571***	0.573***
	(6.039)	(6.040)	(9.994)	(9.968)	(6.156)	(6.170)
Constant	0.675***	0.728***	0.969***	1.027***	0.641**	0.689***
	(2.618)	(2.816)	(3.663)	(3.869)	(2.542)	(2.726)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	22,890	22,890	23,312	23,312	23,312	23,312
Adjusted R^2	0.004	0.004	0.008	0.008	0.004	0.004

This table presents regression results. For each regression, the estimated coefficients are presented in the top and the two-sided t-statistics in the brackets at the bottom. Please refer to Appendix A for sample selection criteria and Appendix B for variable definitions. Standard errors are clustered by firm and year. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.