Business group affiliation, price informativeness, and asymmetric corporate disclosure: International Evidence

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Abstract

We provide international evidence that stock price informativeness is lower for business-group affiliated companies than stand-alone ones, especially in cases when the ultimate owner is able to utilize opaque disclosure policy to achieve private gains, when a business group is large and has multiple layers, and in countries with weak legal enforcement. However, we find that stock price informativeness increases down the pyramidal chain where the affiliates at the bottom are more transparent to maximize their growth and investment opportunities. Further, this lower informativeness appears to arise since business-group organizational structure provides insiders with tools to extract rent by managing outside investors' expectations downwards as evidenced by the lower frequency of negative jumps in returns (news worse than expected) and higher frequency of positive jumps in returns (news better than expected). As a result, the affiliates capture positive unexpected cash flows by hoarding good news.

Keywords: Business group; Stock price informativeness; Opaqueness; Firm-specific return variation; Positive price jump; Negative price jump; Stock price crash.

JEL classification codes: G12; G14; G15; G32; G38; N20

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Abstract

We provide international evidence that stock price informativeness is lower for business-group affiliated companies than stand-alone ones. The lower price informativeness for the affiliates is more pronounced in cases when insiders are able to utilize opaque policy to achieve private gains, when business group are large and have multiple layers, and in countries with a higher tunneling risk, as captured by weak legal enforcement. However, we find that stock price informativeness increases down the pyramid chain where the affiliates at the bottom are more transparent to maximize their growth and investment opportunities. Further, business-group organizational structure provides insiders with tools to extract rent by managing outside investors' expectations downwards as evidenced by the lower frequency of negative jumps in returns (news worse than expected) and higher frequency of positive jumps in returns (news better than expected). As a result, the affiliates capture positive unexpected cash flows by hoarding good news.

1. Introduction

A central role of financial markets is to provide informationally efficient prices. Voluminous research investigates how stock price informativeness is affected by two major factors: (i) firm-specific attributes, such as disclosure policy, analyst coverage, cross-listing, financial contracts, corporate governance, and reporting transparency; and (ii) country-level institutional features, such as property rights protection, quality of government, and legal origin.[1] However, there is limited empirical evidence regarding whether an organizational form influences the flow of firm-specific information to the market and if so, how. A business group, a type of an organizational structure, comprises several legally independent firms that are linked through formal ownership and social interactions and allows the member firms to coordinate their efforts in the product and/or input markets (Khanna and Rivkin, 2001; Khanna and Yafeh, 2007). These

[1] See, for example, Morck, Yeung, and Yu (2000); Piotroski and Roulstone (2004); Chan and Hameed (2006); Jin and Myers (2006); Ferreira and Laux (2007); Foucault and Gehrig (2008); Fernandes and Ferreira (2009; and Hutton, Marcus, and Tehranian (2009).

business groups, which are prevalent in many countries outside the United States,[2] are often characterized as having a divergence between ownership and control rights, cross-shareholdings and ownership pyramids (Kim and Yi, 2006; Bae, Kang, and Kim, 2002).[3]

A growing body of literature documents both a bright side and a dark side of the business group. While the business group can facilitate corporate investment and innovation projects via cross subsidization of these projects within a group ("value-increasing theory"), in particular in the emerging market where financing frictions are greater, the business group also increases tunneling risk through the wedge between control and ownership rights ("tunneling theory")(e.g., Belenzon and Berkovitz, 2010; Belenzon, Berkovitz, and Rios, 2012; Masulis, Pham, and Zein, 2011, 2014; Gopalan, Nanda, and Seru, 2007, 2014; Ang, Masulis, Pham, and Zein, 2015). To evaluate and reconcile these two competing theories, we study whether firms affiliated with a business group (hereafter, *affiliated firms or affiliates*) differ systematically from independent firms that do not belong to a business group (hereafter, *stand-alone firms or stand-alones*) in terms of their disclosure strategies and price informativeness. So far, little is known about the role of business group as an organizational structure in relation to the level of price informativeness of affiliated firms compared to that of stand-alone firms (Almeida and Wolfenzon, 2006; Masulis, Pham, and Zein, 2011). To fill this void, we address the following core research question: whether, and to what degree, is the price informativeness of affiliated firms different from that of stand-alone firms and how does the group ownership structure affects the affiliates' price informativeness? We further examine whether business-group affiliation has an effect on a firm's asymmetric disclosure strategy with respect to good and bad news. For this purpose, we compare the likelihood of positive return jumps (as good news are withheld or released

[2] The percentage of listed firms belonging to business groups ranges from 2.03% in the United States to 20.18% in Sri Lanka. In terms of market capitalization, firms affiliated with a business group control 3.14% of the total market capitalization in the U.S. and as much as 52.40% in Singapore. Moreover, affiliated firms represent more than 20% of the total market capitalization in their domiciled country in a majority of our sample countries. These statistics are based on our sample discussed later in the section allotted to data description.

[3] Business groups are called Conglomerates in US, Giye Jituan in China, Business Houses in India, Grupos Economicos in Latin America, Keiretsu in Japan, Chaebol in South Korea, and Holdings in Turkey.

in a delayed manner) and negative return jumps or crash risk (as bad news are released in a timelier manner) between affiliates and stand-alones.

As noted earlier, our first question focuses on whether firm-specific return variation or stock price informativeness is higher for affiliates than for stand-alones. On one hand, belonging to a business group can have an adverse effect on firms' price efficiency because inside managers of affiliated firms (relative to those of stand-alone firms) have the better ability and greater means to manage the flow of firm-specific information to the market to their advantage at the expense of outside shareholders. For example, Jin and Myers (2006) show that insiders manage outsiders' expectation downward to capture and appropriate unexpected cash flow. One way for the inside managers to seize unexpected cash flow, i.e., cash flows beyond the level expected by outside investors, is to adopt an opaque disclosure policy, for example, by not disclosing all firm-specific information, which adversely influences stock price informativeness (Jin and Myers, 2006). The economic and social ties that are ingrained among affiliated firms within the same business group help inside managers to pursue an opaque disclosure policy more easily and effectively, compared to the disclosure policy of stand-alone firms.[4] In a single country context, several studies show that a group-affiliated firm engages more aggressively in opportunistic earnings management as well as tunneling activities (Bae and Jeong, 2007; Bertrand, Mehta, and Mullainathan, 2002; Bae, Kang, and Kim, 2002; Joh, 2003; Baek, Kang, and Lee, 2006; Kim and Yi, 2006). On the other hand, the effect of group affiliation on price efficiency can be positive. Affiliated firms are highly visible because of their size and economic importance in many countries. Their high visibility leads to intense scrutiny and extensive coverage by the media, analysts, and other stakeholders. In such an environment, hoarding firm-specific information, once detected, will lead to more severe reputation damages and higher litigation costs. These

[4] We acknowledge that the business-group organization itself has the disadvantage that firm-specific information is difficult to gather because of the complex intra-business-group network (Cohen and Lou, 2012; Li, Richardson, and Tuna, 2014; Huang, 2015). Anecdotal evidence shows that insiders intentionally fail to disclose relevant firm-specific information to outsiders for their own advantage (e.g., see footnote 10). We provide systematic empirical evidence that the lower stock-price informativeness of affiliates is at least partially due to insiders' intentions to act in their own interests.

costs are likely to be even greater to the affiliates than to the stand-alones, because the ties among affiliates can engender the information spillover or contagion effect; an affiliate's disclosure of firm-specific information, whether bad or good news, can easily trigger similar effects on other affiliates in the same group. Bae, Cheon and Kang (2008) find that the announcement of an increase (decrease) in earnings by a group-affiliated firm has a positive (negative) impact on the abnormal returns for other non-announcing member firms. Thus, belonging to a business group can serve as a self-disciplining mechanism, and as a result, group-affiliated firms may be more transparent, forcing managers to release more firm-specific information.[5] In such a case, one would expect affiliated firms to exhibit higher stock price informativeness, i.e., greater firm-specific return variation, than stand-alone firms. Given these two opposing predictions, we aim to provide large-sample, systematic evidence on the directional effect of group affiliation on price informativeness.

Our second question focuses on whether affiliated firms differ in their tendency to withhold or release certain types of information from outside investors, i.e., positive versus negative news. If poor protection of investors' property rights allows insiders to capture part of the firm's cash flows and outside investors observe all market-wide information but part of firm-specific information, insiders capture more when the hidden firm-specific information is positive and less when it is negative (Jin and Myers, 2006). Thus, insiders have an incentive to manage outsiders' expectation downwards by disclosing more bad news (or accelerating its release) and/or by withholding more positive news (or releasing it in a delayed manner). This asymmetric disclosure incentive leads us to observe a lower frequency of negative jumps (as bad news are released in a timelier manner) and a higher frequency of positive jumps (as good news are withheld or released in a delayed manner).[6]

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[5] Khanna and Rivkin (2001) and Khanna and Palepu (2000) argue that group reputation substitutes for underdeveloped legal and regulatory mechanisms that leave outside minority shareholders vulnerable to expropriation risks and information asymmetries.

[6] The market punishes a company relatively the same regardless of whether the firm just misses its earnings mark or falls well below it but delivering positive earnings surprises has been "a rigged race." ("Companies routinely steer analysts to deliver earnings surprises," by Thomas Gryta, Serena Ng and Theo Francis, The Wall Street Journal,

We expect that this asymmetric disclosure behavior is more prominent for group-affiliated firms than for stand-alone firms for the following reasons. First, group-affiliated firms might have stronger incentives to release bad news and withhold good news to discourage new entrants from entering their product markets for the interest of all member firms and to monopolize their own business (Darrough and Stoughton, 1990; Wagenhofer, 1990). Second, group affiliated firms are under greater political scrutiny and releasing good news would invite adverse political actions against both disclosing and non-disclosing member firms by politicians and regulators (Watts and Zimmerman 1986). Thus, group affiliated firms would minimize these political costs by disclosing more bad news than good news or by released bad (good) news in a timelier (delayed) manner. Third, the reputation and litigation costs associated with hoarding firm-specific information are, in general, greater for group-affiliated firms than for stand-alone firms. Since the reputation and litigation risks are asymmetrically higher for bad news than good news, managers of affiliated firms have stronger incentives for timely releases of bad news than good news (Skinner, 1994, 1997) or to absorb more negative firm-specific news through cross-subsidization among affiliated firms within the same group. In either way, the likelihood of experiencing negative jumps in the stock return distribution is smaller for firms that belong to a business group (that asymmetric disclosure incentives) than for stand-alone firms (that do not have asymmetric disclosure incentives). However, hiding good news beyond a certain threshold becomes impossible or prohibitively costly. Once the total amount of hidden good news crosses over the threshold point, the hidden good news accumulated over time is revealed to the market all at once, causing a large-scale increase in firm-specific returns or a positive jump. An important testable implication here is that firms belonging to a business group are likely to exhibit a lower frequency of negative jumps (or

August 4, 2016.). For example, the article notes that before announcing earnings in April 2016, AT&T's investor-relations employees encouraged analysts to look back at an executive's comments that suggested revenue might be hurt because some customers were waiting longer to upgrade their mobile phones. The average estimate of all 22 firms following AT&T fell $323 million in three weeks. AT&T wound up reporting $40.54 billion in quarterly revenue, beating the lowered target by $76 million.

crashes) and a higher frequency of positive jumps in their firm-specific return distributions, compared to stand-alone firms.

We test the above hypotheses using firm-level data from 38 countries around the world for the period of 2002 to 2011. We match group-affiliated firms to stand-alone ones by country, year, and industry group based on Campbell (1996). We categorize the affiliates into quintiles based on size (market capitalization) and select the stand-alones from within the same size quintile. Among the multiple stand-alone firms meeting the country, year, industry, and size matching criteria, we select the firm with the book-to-market rank that is closest to that of the sample affiliate.

Our results reveal the following. First, we find that affiliated firms have lower price informativeness, compared with stand-alone ones, as reflected in less firm-specific stock price variation.[7] This finding suggests that, overall, affiliated firms disclose less firm-specific relevant information to market participants, as compared to those of stand-alone firms. We further find that these results become insignificant for firms with low tunneling risk, as captured by those domiciling in countries with strong legal enforcement or those located at the bottom of pyramidal ownership structures with high growth opportunities.

Second, Masulis et al. (2011) illustrate that firms at the bottom of pyramidal structures are typically young and risky with high growth potential. As such, they face higher financial frictions to finance their high growth investment projects, and are thus expected to be the greatest beneficiary of the internal capital market created by the business group. These firm managers are less likely to forgo their net positive present value projects by being opaque and engaging in dysfunctional behavior, as net costs of being opaque may outweigh the associated benefit (e.g., private gains they can achieve). We also find that members in the group with the vertically integrated structures (a.k.a., pyramidal structures) exhibit higher price informativeness. This result is consistent with Masulis et al. (2011) showing that investment intensity is

[7] If we net out the effects of stock market movements, stock prices respond only to information that is firm-specific and not anticipated by the market participants. The more the firm-specific information is reflected in a firm's stock price, the more informative the stock price is said to be for the firm (Roll, 1988).

greater for firms held in pyramidal rather than in horizontal structures, largely due to the financing advantages of the former. These investment opportunities increase the benefit of being transparent. Second, we find that the affiliated firms have fewer negative firm-specific jumps (or crashes) and more positive firm-specific jumps relative to the stand-alone ones.[8] This finding suggests that affiliated firms tend to (i) disclose good news less frequently or release it in a delayed manner and/or (ii) release *unexpected* bad news more frequently or release it in a timelier manner. As a result, affiliated firms tend to be more opaque or less transparent than stand-alone ones. Stated another way, the former are better able to absorb negative news than the latter, for example, via cross-subsidization among affiliates within the same group.

Third, our results are also consistent with the view that business-group organizational structure through its social and economic ties among affiliates provides controlling insiders with tools to better manage outside shareholders' expectations downward: If good news arrives that outside investors cannot see, insiders of affiliated firms are better able to capture a portion of cash flows unexpected by outsiders than those of stand-alone firms (Jin and Myers, 2006). In short, the above results are in line with the view that a business group, as a form of complex networking organizational structure, facilitates controlling insideres of affiliated firms extracting private control benefits at the expense of outsider stakeholders.

In addition to the cross-sectional evidence, several anecdotal evidence supports our claim on insiders of affiliates tend to withhold bad news as well as good news. As for the unexpected bad news holding, for example, managers of Samsung Corporation which is the largest business group, *chaebol*, in South Korea, dump the loss of eSamsung to other affiliates to conceal the ultimate owner's failure in the electronic business.[9] Managers of Hyundai Motor Corporation, another large South Korean business group, exploited

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[8] In the literature on stock price crash risk, the likelihood of observing extreme negative outliers in the distribution of firm-specific returns (after netting out market-wide common returns) is called negative-jump risk, negative-tail risk or stock-price-crash risk. In this paper, these three terms are used interchangeably. Similarly, the likelihood of observing extreme positive outliers is called positive-jump risk, positive-tail risk, or simply jump risk. These three terms are also used interchangeably in the current manuscript.

[9] In another anecdotal example, Lee Jay-Yong, the successor-in-heir of Samsung Group tycoon Lee Kun-Hee, "launched his e-business with the boom of Internet business in late 1990s, but the business folded after the Internet bubble burst. Lee junior unloaded his dot-com failure to several Samsung Group subsidiaries by selling his stake in e-

the complexity and opacity of the business group to capture unexpected cash flows and extract rent; they use the captured cash flows as bribery with the objective of influencing public officials. [10] As for the good news hoarding, we observe that positive jumps typically occurred in the quarterly or annual earnings announcement week, supporting the contention that these business groups successfully hide positive unexpected cash flows to consume private benefits of control. When the hidden good news accumulated over time comes out all at once, it generates a large positive stock price jump. For example, immediately after the stock price jump in Hyundai Motor Corporation, a news article reported that the president at Kia Motors was likely to avoid jail in the bribery scandal that swamped Kia and its parent, Hyundai Motor, because prosecutors were afraid that jailing the son of the Hyundai tycoon Chung would further jeopardize the survival of Hyundai, Korea's largest automaker (*Knight-Ridder Tribune Business News*, 2006, "LexisNexis® Academic").

Finally, the results of our further analyses enrich and buttress our main findings in the following ways. Firstly, we find that short-window market reactions to positive earnings announcements are significantly stronger for the affiliates than for the stand-alones. This finding supports the view that managers of affiliated firms tend to withhold good news to downward adjust future earnings that are expected by the market, which in turn helps them capture positive cash flows that are unexpected by outside stakeholders.[11] Thus, when they release this good news via earnings releases, the market reacts more intensely to this positive earnings news, because it is not only more credible but also more informative. Secondly, for affiliated firms,

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Samsung. To pay for Lee's failure, Samsung Group affiliates raised tens of billions of won by exploiting in-house stock transactions. Despite the failure, which caused financial damage to minority shareholders of the Samsung Group affiliates involved, Lee still serves a prominent role in Samsung Electronics." "There is a secret document revealing that Chin recommended Samsung Group alter board conference minutes to hide Samsung's losses for Lee Jay-Yong's dot-com failure" (*Korea Times*, March 8, 2003, "LexisNexis® Academic").

[10] "There were fresh charges Friday against his father, Hyundai's chairman and the key decision maker over Kia's $1.2 billion investment in West Point. Korean prosecutors on Friday said ….Hyundai Chairman Chung Mong-Koo, is to blame for creating a company slush fund to influence public officials, Reuters reported." (*Knight-Ridder Tribune Business News*, June 10, 2006, "LexisNexis® Academic").

[11] Good-news hoarding allows inside managers to adjust the expectations of outsiders downward about firm performance, which makes it easier or less costly for them to capture cash flows when unexpected good news arrives.

analyst forecast error and analyst forecast dispersion are greater in good-news periods relative to bad-news periods, in line with our contention that managers of affiliated firms have a propensity to conceal positive news, presumably to divert unanticipated cash flows (not expected by outsiders) at the expense of outside stakeholders. Hoarding good news exacerbates analysts' forecast quality during good-news periods. Our results are, overall, robust to a series of sensitivity tests, including a two-stage simultaneous estimation approach, to address concerns regarding endogeneity, controlling for alternative explanations such as dual-class structure, family ownership, and accounting opacity.

Our study contributes to the literature in several ways. First, it adds to the literature on the business group as an organizational structure by providing large-sample, firm-level, international evidence regarding the impact of business-group affiliation on a firm's price informativeness and disclosure pattern. To our knowledge, our study is the first to show that stock price is less informative for firms belonging to a business group as compared to stand-alone firms.[12]

Second, our study also relates to a strand of literature on asymmetric disclosure behavior, i.e., the incentives of managers to withhold certain types of news, favorable versus unfavorable (Healy and Palepu, 2001). There is considerable evidence that managers have an incentive to hide bad news for various reasons, such as career concerns, reputation concerns, compensation schedules, and empire building (Nagar, Nanda, and Wysocki, 2003; Ball, 2009; Kothari, Shu, and Wysocki, 2009).[13] We note, however, that the evidence regarding good-news withholding is scarce. Recent studies show that managers tend to withhold good news and accelerate the release of bad news prior to stock-option-award periods (Yermack, 1997; Aboody and Kasznik, 2000). Concerns about litigation risk, reputation losses, and agency costs associated with the

[12] Unlike prior studies that have examined the costs and benefits of business groups in terms of their internal markets (e.g., Belenzon, Berkovitz, and Rios 2012; Masulis, Pham, and Zein, 2011; Gopalan, Nanda, and Seru, 2007, 2014) and risk sharing (Khanna and Yafeh, 2005; Kali, 2003), our study focuses on the impact of the business group organizational structure on a firm's stock price informativeness.

[13] For example, managers' career concerns and stock-option-related incentive contracts can play a role in shaping the asymmetric flow of firm-specific information in the market; insider managers will attempt to hide bad news, while expediting the release of good news to investors.

deviation between control rights and cash flow rights also incentivize managers to reveal bad news and withhold good news (Kasznik and Lev, 1995; Skinner, 1994, 1997; Baginski, Hassell, and Kimbrough, 2002; Jiang, Kim, and Pang, 2013). Our study provides another reason why insiders of group-affiliated firms have an incentive to hide and accumulate good news within the firm and accelerate the release of bad news: Business group organization structure enables insiders of affiliate firms to absorb bad news at a lower cost, and incentivizes them to withhold good news as a means of managing outsiders' expectation about firm performance downward, which, in turn, helps insiders appropriate a portion of positive cash flows unexpected by outsiders.

2. Literature review and hypotheses

This section reviews the related literature and makes testable predictions. First, we develop our hypothesis that relates the effect of business-group affiliation on stock price informativeness. Then, we advance our predications on the influence of business-group affiliation on asymmetric disclosures with respect to good news and bad news, respectively.

2.1. Business-group affiliation and firm-specific information flows

A business group, a common organizational structure outside U.S., is composed of legally independent firms connected by formal ownership and informal social ties to take coordinated actions (Khanna and Rivkin, 2001; Khanna and Yafeh, 2007). It can be viewed as a network organization which facilitates risk-sharing and internal coordination among member firms.[14] Firms can "…share a brand name, raise capital jointly, lobby bureaucrats and politicians together, recruit managers as a group, and pool resources to invest in new ventures" and can "exchange resources internally" (Khanna and Rivkin, 2001; p.48).

On one hand, the formal and informal connections among member firms can create spillover and

[14] Business-group formation in a sense re-defines the boundaries of a firm that traditionally performed as an independent entity.

contagion effects produced by the actions of one member firm on the rest of the member firms. For example, if an affiliated firm is not performing well, is in distress, or under litigation and such negative information reaches the marketplace, the rest of the firms within the group will also be affected adversely.[15] This negative spillover effect can propagate reputation losses and litigation risk to all other firms within the same group. Alternatively, a positive spillover is also possible. To minimize these costs to the entire group, affiliated firms can choose to be more transparent by forcing inside managers to release more firm-specific information in order to "clear the smoke," which ultimately leads to a more informative stock price. In addition, group affiliated firms are relatively larger than stand-alone ones and constitute a substantial portion of industrial outputs in many countries. This high visibility increases information acquisition and processing activities by the media, analysts, and other market participants, which accelerates the incorporation of firm-specific information into stock prices of affiliated firms (Dewenter, Novaes, and Pettway, 2001). In this circumstance, the information environment is likely to be more transparent for affiliated firms than for stand-alone firms.

On the other hand, the complex interdependencies among affiliated firms can provide inside managers with an easier way to manage the revelation of firm-specific information to their advantage. Jin and Myers (2006) show that in order to capture unexpected cash flows, self-interested insiders will adopt opaque disclosure policies, for example, by hiding part of the firm-specific information, which deteriorates stock price informativeness. Moreover, the very nature of the complexity of the business group structure itself can justify the fact that less firm-specific information gets revealed to outsiders by affiliated firms, compared to nonaffiliated stand-alone firms. Belonging to a business group can hamper the ability of member firms to fully disentangle the complex relations and implicit commitments that underlie the interdependent network relations and to produce and release the relevant firm-specific information to

[15] Bae, Cheon, and Kang (2008) find that an earnings announcement by an affiliate firm has a spillover effect on the market value of other non-announcing affiliates within the same business group.

outsiders (Healy and Palepu, 2001). Also, the interdependence across firms in a business group, along with its complex organizational structure, could dramatically increase the cost-benefit ratio for outside investors' information collection by increasing information gathering and processing costs to outside investors. The increased costs lead to less informative pricing (Grossman and Stiglitz, 1980). As a result, the information environment is likely to be more opaque for business group-affiliated firms than for stand-alone firms, and stock price is less informative for the affiliates than for the stand-alones. Stated another way, the amount of firm-specific information incorporated into the stock price is smaller for the affiliates than for the stand-alones.

Given the two opposing views on the effect of business group affiliation on a firm's information environment, it is ultimately an empirical question whether stock price is more informative for group-affiliated firms, compared to stand-alone firms. To provide empirical evidence on this unexplored issue, we propose and test our first hypothesis (H1) in alternative form:

> **H1**: All else being equal, stock price informativeness is lower for firms that belong to a business group than for stand-alone firms.

2.2. Business-group affiliation and asymmetric incentives of disclosing good news versus bad news

The disclosure literature identifies various incentives to motivate managers to release good news versus bad news. For example, in a standard principal-agency model where insiders' preferences are not aligned with those of outside investors, managers have an incentive to withhold bad news relative to good news. Specifically, Dye (1985) and Verrecchia (1983) suggest that managers choose to reveal (good) news that favorably affects stock price and withhold (bad) news that adversely affects price. Both models imply that insiders will choose to disclose relatively good news and withhold relatively bad news. Evidence shows that managers hide bad news for various reasons such as career concerns, compensation schedules and empire building (Nagar, Nanda, and Wysocki, 2003; Ball, 2009; Kothari, Shu, and Wysocki, 2008). On the other hand, litigation risk and reputation concerns may motivate managers to release bad news in a timelier manner (Skinner 1994, 1997). In addition, managers tend to withhold good news and accelerate the release

of bad news prior to stock option award periods, consistent with managers making disclosure decisions to increase stock-based compensation (Yermack, 1997; Aboody and Kasznik, 2000). When control rights deviate from ownership rights, corporate insiders may obfuscate financial reporting and hide good news in order to capture or extract unexpected cash flow. Chung, Lee, Lee, and Sohn (2015) show that firms with strong labor unions withhold good news, suggesting that firms facing strong labor unions tend to reduce disclosure frequency, with an objective to maintain the bargaining power against labor unions.

The interdependence of member firms in a business group creates differential incentives for managers of group affiliated firms to disclose bad news versus good news, compared with those of standalones. We posit that affiliated firms have asymmetric incentives of disclosing good news less frequently (or release it in a delayed manner) and releasing bad news more frequently (or release it in a timelier manner) for the following reasons. First, several analytical studies in corporate disclosure show that managers can strategically disclose firm-specific information to affect the behavior of its competitors in the product market. For any publicly traded company, the release of information is a trade-off between wanting to give good news to investors and bad news to the competitors (Dontoh, 1989). Firms have an asymmetric incentive to release bad news and hide good news to impose entry barriers on potential competitors in the product market and thereby to keep any monopoly rents (Darrough and Stoughton, 1990; Wagenhofer, 1990). Consistent with this disclosure incentive, Botosan and Stanford (2005) find that firms use segment reporting to hide good news in less competitive industries to protect profits from competitors, but do not find evidence that these firms use segment reporting to mask bad news. This asymmetric behavior will be more prominent for group affiliated firms because the loss of market share or profit decline in an affiliate due to rival firms' market entry and competitive actions would adversely affect other member firms' profitability through complex business ties among member firms. Thus, firms belonging to a business group have greater incentives, in comparison to stand-alone firms, to release unfavorable information and delay the release of favorable information to discourage new entrants and keep any monopoly rents within the business group.

Second, firms affiliated with business groups are relatively large and account for a large fraction of corporate assets and business activity in many developing and developed countries. The relative size and economic importance of group affiliated firms in a country put them under greater political scrutiny. In such an environment, releasing good news of an affiliate would invite adverse political actions against both disclosing and non-disclosing member firms by politicians and regulators. Watts and Zimmerman (1986) point out that reported earnings attract the regulators' and politicians' attention and scrutiny, which in turn brings potential adverse political actions to firms in the form of tax increases, new tariffs, or new regulations.[16] To avoid this possibility or minimize political costs associated therewith, we expect the affiliated firms would exhibit asymmetric disclosure behavior by disclosing more bad news than good news, or releasing bad (good) news in a timelier (delayed) manner.

Third, prior research on disclosure suggests that potential legal actions against managers for untimely disclosures and associated reputational costs may motivate managers to release bad news versus good news in an asymmetric way (Skinner, 1994, 1997). Since the reputation and litigation costs associated with hoarding firm-specific information are, in general, greater for group-affiliated firms than for stand-alone firms, managers of affiliated firms have stronger incentives for timely releases of bad news than good news.

Fourth, in countries with weak investor protection and poor transparency, concealing positive news and releasing bad news can serve the self-interest of the managers of group affiliated firms by keeping outsiders' expectation about firm performance low, which offers them more opportunities for capturing unexpected cash flows. Further, the opaque environment of a business group (associated with good news hoarding and complex organizational structure) helps insiders of affiliated firms extract private control benefits with a

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[16] Consistent with this political cost hypothesis, Han and Wang (1998) provide empirical evidence that consumer product firms facing unusual increases of prices use accounting accruals to decrease reported earnings to reduce the likelihood of adverse political actions. Refer to Wong (1988), Cahan (1992), and Key (1997) for the empirical support for the political cost hypothesis.

low risk of detection, in comparison to managers of (less opaque) stand-alone firms (Jin and Myers, 2006).

As argued above, group affiliated firms have asymmetric disclosure incentives to hoard good news and release *unexpected* bad news in a timelier manner. As bad news is released in a timelier manner for group affiliated firms, the likelihood of experiencing negative jumps in the stock return distribution is smaller for firms that belong to a business group than for stand-alone firms. On the other hand, even though inside managers of a group-affiliated firm can minimize political, litigation, and product market competition costs and extract private control benefits by hiding favorable news when the firm is performing well, they can do so only to a certain limit; once a tipping point is reached, inside managers of a group-affiliated firm have to disclose the favorable news all at once, resulting in a large positive jump in the distribution of firm-specific returns. Building upon the above discussions, we now propose and test our second (H2) and third hypotheses (H3) in alternative form:

H2: All else being equal, extreme negative jumps in the distribution of firm-specific returns or stock price crashes occur less frequently for firms that belong to a business group than for stand-alone firms.

H3: All else being equal, extreme positive jumps in the distribution of firm-specific returns occur more frequently for firms belonging to a business group than for stand-alone firms.

3. Data

In this section we describe our data sources, explain the construction of the main variables of interest and present summary statistics.

3.1. Data sources

We collect accounting data for from Worldscope and Compustat North America and stock price/return data from Datastream, to compute the variables used in our analyses. We then merge these three databases with the Bureau van Dijk (BvD) Osiris database that provides ownership structure data that are necessary to identify business group membership. As the Osiris database available to us covers the 2002-2011 period, our sample period is limited to the Osiris data period of 2002-2011. We exclude firm-

year observations if the number of weekly stock return observations from the Datastream database is less than 26 per year and if the key variables of interest and control variables have missing values.

3.2. Measuring business-group affiliation

We identify firms affiliated with business groups using the BvD Osiris ownership database, a global database of listed firms with detailed shareholder structure data. The BvD Osiris ownership database contains information on owners and subsidiary links worldwide with over 21 million active and archived links on more than 7 million companies around the world. The BvD Osiris gathers ownership information from companies, government agencies, or associated information providers, such as company registrars of national statistical offices, credit registries, stock exchanges, and regulatory filings. The BvD Osiris tracks firms' control structure by calculating voting rights and identifies a shareholder of a firm to be the ultimate owner at a given threshold. The BvD Osiris presets the threshold, either at 25% or 50%. For example, if a shareholder's direct stake in a firm exceeds the threshold of 25% (or 50%) or a shareholder controls the firm via a control chain whose links all exceed that threshold, the shareholder is defined as the ultimate controlling owner. A shareholder can be a corporation, an individual, a family, a foundation, or a government. A business group is defined as two or more publicly listed firms that are controlled by the same ultimate controlling owner. We report results using a threshold of 25% to define the ultimate controlling owner.[17] We complement the Osiris ownership information by manually collecting data on business group characteristics from a range of information providers in LexisNexis (e.g., the Major Companies Database) and Factiva (e.g., the Taiwan Economic Journal database of Asian companies), stock exchange and securities regulator websites (in Argentina, Belgium, Chile, Colombia, India, Indonesia, Italy, and Sri Lanka) and directly from company annual reports available in the Standard and Poor's Mergent Online database or other online sources (this constitutes a substantial portion of the ownership data collected

[17] Alternatively, we have used the 50% threshold to define the ultimate owner. Our results remain qualitatively unchanged.

for firms in Israel, Malaysia, Mexico, Pakistan, Sri Lanka, Singapore, and Thailand) as well as other online sources such as Dun and Bradstreet's Who Owns Whom and Thomson Reuters' OneSource.

Next, because the distribution of the number of firms affiliated with business groups is unbalanced across countries, we match group-affiliated firms to stand-alone companies by country, year, and the Campbell (1996) industry group. We then categorize the affiliates into quintiles based on size (market capitalization) and select stand-alone firms within the same size quintile. Among the multiple stand-alones meeting the matching criteria, we select the firm with a rank of book-to-market that is closest to the sample affiliate. After the matching procedure, our sample includes a total of 7,470 firm-years with business group affiliation and 6,974 firm-years with no business group affiliation that comprise the control group.

Table 1 provides descriptive statistics for firms categorized as stand-alones and business-group affiliates. Panel A of Table 1 reports the number of firm-year observations in each country. The country with the largest number of firm-year observations in the "Business-group affiliates" sample is Japan with 29.79%, followed by South Korea with 11.39%, and France with 5.29%. Panel B of Table 1 reports the sample distribution of firm-year observations by year. The number of business-group affiliate observations increases during our sample period. Because of the matching procedure where one of the matching criteria is year, the distribution across years is similar for the stand-alones and the affiliates. Panel C of Table 1 reports the industry distribution of the sample of firms. We use the industry classifications from Campbell (1996). Because one of our matching criteria is industry in the matching procedure, the distribution across industries is similar for the stand-alones and the affiliates. The firm-year observations are distributed across all Campbell (1996) industries, suggesting that the firms are well distributed across a range of industries. However, we note that Food & Tobacco and Leisure industries represent a large portion of our sample, 16.63% and 16.05%, respectively, for the affiliated firms and the stand-alone firms.

3.3. Measuring stock price informativeness

The dependent variable in our regression models for testing H1 is stock price informativeness (*SPI*). *SPI* is a proxy for the amount of firm-specific information incorporated into stock prices. We follow prior

studies and compute *SPI* based on R^2 from an expanded market model (Jin and Myers, 2006; Ferreira and Laux, 2007; Fernandes and Ferreira, 2009). Specifically, we first compute firm-specific risk by using the residual from the augmented market model with two-year lead and lag terms, which is estimated using weekly return data for each firm in a country in each sample year (Morck, Yeung, and Yu, 2000; Jin and Myers, 2006):

$$r_{it} = \alpha_i + \beta_{1,i} r_{m,j,t} + \beta_{2,i}[r_{us,t} + EX_{jt}] + \beta_{3,i} r_{m,j,t-1} + \beta_{4,i}[r_{us,t-1} + EX_{j,t-1}] + \beta_{5,i} r_{m,j,t-2} + \beta_{6,i}[r_{us,t-2} + EX_{j,t-2}] + \beta_{7,i} r_{m,j,t+1} + \beta_{8,i}[r_{us,t+1} + EX_{j,t+1}] + \beta_{9,i} r_{m,j,t+2} + \beta_{10j}[r_{us,t+2} + EX_{j,t+2}] + \varepsilon_{it} \quad (1)$$

where r_{it} is the return on a firm's share i in week t in country j; $r_{m,j,t}$ is the MSCI country-specific market index return or the country index return provided by Datastream in week t; $r_{us,t}$ is the MSCI USA INDEX as the U.S. market index return (additional proxy for the global market movement); $EX_{j,t}$ is the change in country j's exchange rate for one US dollar; and ε_{it} denotes firm-specific return after controlling for common (industry-and market-wide) risk. The U.S. market returns are translated into local currency units through the term, $r_{us,t} + EX_{j,t}$. To address the issue of nonsynchronous trading (Dimson, 1979), we include lead and lag terms for the market index returns. In estimating Eq. (1), we require at least 26 weekly return observations for each firm per year. We define the relative firm-specific return variation for each stock as firm-specific return variation (σ_{ie}^2) scaled by total return variation (σ_i^2), e.g., $\sigma_{ie}^2 / \sigma_i^2$, per year. Note here that $1 - R_i^2$ of Eq. (1) is identical to this ratio, while R_i^2 of Eq. (1) is equal to the relative common return variation for each stock, i.e., $(\sigma_i^2 - \sigma_{ie}^2) / \sigma_i^2$. Following other R^2-based studies (Hutton, Marcus, and Tehranian, 2009; Kim and Shi, 2012), we compute stock price informativeness (SPI_i) for firm i in the sample year as follows:

$$SPI_i = \ln[(1 - R_i^2) / R_i^2] = \ln[\sigma_{ie}^2 / (\sigma_i^2 - \sigma_{ie}^2)] \quad (2)$$

To circumvent the bounded nature of R_i^2 within (0, 1), we apply the logistic transformation of the stock price informativeness measure in Eq. (2). As the value of *SPI* increases, the level of firm-specific return

variation relative to common return variation (which is equal to total variation net of firm-specific variation) increases. As such, higher values of *SPI* indicate more firm-specific information reflected in stock prices.

3.4. Measuring firm-specific positive price jumps and negative price jumps (crash events)

In our analysis we compare the likelihood of firm-specific positive jump and that of firm-specific negative jump (or crash risk) for the affiliated firms versus the stand-alone firms. Firm-specific negative price jump risk represents the likelihood of observing extreme negative outliers in firm-specific return distributions, while firm-specific positive price jump refers to the likelihood of observing extreme positive outliers. Employing the augmented market model in Eq. (1), we obtain firm-specific weekly return for firm *i* in week *t*, which is the residual from Eq. (1), and then, define W_{it} as $W_{it} = ln\ (1 + \varepsilon_{it})$. We follow prior studies and construct proxies for positive jump risk versus negative jump risk in the distribution of firm-specific returns, W_{it}, (Hutton, Marcus, and Tehranian, 2009; Kim, Li, and Zhang, 2011a, 2011b; Hong, Kim, and Welker, 2017).

Our measures of positive jumps and negative jumps (crash risk) in firm-specific return distributions are the up-to-down and down-to-up volatility (e.g., Chen, Hong, and Stein, 2001), denoted by *UDVOL* and *DUVOL*, respectively. For each firm in each year, we categorize all weeks into "down" weeks and "up" weeks. The down weeks (up weeks) are defined as weeks with firm-specific weekly returns, e.g., W_{it}, is below (above) the annual mean. We calculate the standard deviation for each of these subsamples separately and estimate the *DUVOL* variable using the natural logarithm of the standard deviation on down weeks scaled by the standard deviation on up weeks. Similarly, we estimate the *UDVOL* variable using the natural logarithm of the standard deviation on up weeks scaled by the standard deviation on down weeks. Specifically, for firm *i* in year *t*, we estimate:

$$DUVOL_{it} = ln\left[(n_u - 1)\sum_{DOWN} W_{i\tau}^2 / (n_d - 1)\sum_{UP} W_{i\tau}^2\right] \qquad (4a)$$

$$UDVOL_{it} = ln\left[(n_d - 1)\sum_{UP} W_{i\tau}^2 / (n_u - 1)\sum_{DOWN} W_{i\tau}^2\right] \qquad (4b)$$

where n_d and n_u are the number of down and up weeks, respectively. We estimate the right and left tails, respectively, of the *W*-distribution for each affiliated firm and each stand-alone firm.[18]

3.5. Summary Statistics

Table 2 reports the summary statistics for the variables used in our primary analysis on the relation between business-group affiliation and firm's stock price informativeness. We provide detailed descriptions of all variables in Appendix A. Consistent with our primary hypothesis, we find that affiliated firms tend to have a lower level of stock price informativeness (*SPI*) than stand-alone firms, with a mean (median) of 71.59% (68.40%) for affiliated firms versus 82.52% (80.95%) for stand-alone firms. The amount of firm-specific information incorporated into stock price is significantly lower for the affiliates than for the stand-alones, and suggests that the information environment is less transparent for the former than for the latter.

Table 2 also reports summary statistics of our control variables. Following the literature, we include, in our baseline regressions, a range of firm-level and country-level control variables known to explain cross-sectional variation in *SPI* (e.g., Piotroski and Roulstone, 2004; Fernandes and Ferreira, 2009; Ferreira and Laux, 2007; Kim and Zhang 2016; Kim, Wang, and Zhang, 2016). These control variables include: firm-specific operating volatility (*VARROA*); profitability measured by the return on asset (*ROA*); growth opportunities (*MB*); leverage (*LEV*); firm size (*MKTCAP*); dividend payouts (*DIV*); product market concentration as measured by the Herfindahl index (*HERF*); the natural log of the number of firms in each industry (*NIND*); absolute total accruals divided by absolute operating cash flows (*ACC*); the natural

[18] Following Hutton, Marcus, and Tehranian (2009) and Kim, Li, and Zhang (2011a, 2011b), we also create proxies for the probability of negative or positive jumps, i.e., jump risk and crash risk, using the number of W exceeding 3.2 standard deviations below and above of its mean value for each firm in each year. To compute these measure, we specify crash (jump) weeks in a given year for a firm as those weeks during which the firm experiences firm-specific weekly returns that are lower than (greater than) 3.2 standard deviations below (above) mean firm-specific weekly returns over the entire fiscal year. We choose 3.2 standard deviations to generate a frequency of 0.1% in the normal distribution. The proxies are defines as dummy variables that take the value of one for a firm-year that experiences one or more crash weeks (one or more jump weeks) during the fiscal year period, and zero otherwise. We also choose n standard deviations to generate frequencies of 0.01% and 1% in the lognormal distribution. We find that our reported results are qualitatively the same when we use these alternative measures but untabulated for brevity and available upon request.

logarithm of the number of analysts issuing forecasts for a firm (*NAF*); and trading volume measured by the average of monthly trading turnover (*VOL*). As a country-level control, we include anti-self-dealing index (*ANTI-SD*), a newly developed country-level index of the strength with which minority shareholders are protected against corporate insiders' dysfunctional behavior (Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2008).

Table 2 shows that business group affiliates are characterized as having more volatile operating environments as represented by operating risk, and having lower levels of leverage, larger size, lower stock volume, and greater analyst following on a univariate basis, compared with stand-alones. We also find that the business group affiliates tend to distribute larger dividends relative to the stand-alones. These results are consistent with those reported by Gopalan, Nanda, and Seru (2014) whereby internal capital market characteristics of business groups, e.g., reallocation of capital across group firms, are associated with greater dividend payouts by the affiliates relative to the stand-alones. That is, business group insiders reallocate dividends from cash-rich firms and use their share of payout to invest in other affiliated firms.

4. Empirical Results Related to Stock Price Informativeness

4.1. Group affiliations and group size

To test whether the amount of firm-specific information incorporated into stock prices is lower for the affiliates than for the stand-alones (H1), we estimate the following regression:

$$SPI_{it} = \alpha + \beta_1 GROUP_{it-1} + \beta_2 VARROA_{it-1} + \beta_3 ROA_{it-1} + \beta_4 MB_{it-1} + \beta_5 LEV_{it-1} + \beta_6 MKTCAP_{it-1} + \beta_7 DIV_{it-1} + \beta_8 HERF_{it-1} + \beta_9 NIND_{it-1} + \beta_{10} ACC_{it-1} + \beta_{11} NAF_{it-1} + \beta_{12} VOL_{it-1} + \beta_{13} ANTI\text{-}SD + \varepsilon_t \quad (5)$$

where *SPI* is our measure of stock price informativeness for firm *i* in year *t* as defined in Eq. (2). Our variable of interest, *GROUP*, is an indicator variable that equals one for firms belonging to a business group and zero for stand-alone firms. Similar to prior related studies on determinants of *SPI* we use a one-year lagged specification (e.g., Piotroski and Roulstone, 2004; Fernandes and Ferreira, 2009; Kim and Shi 2012). Hypothesis H1 predicts that the affiliates would exhibit a lower level of stock price informativeness, and

thus, translates into $\beta_1 < 0$ in Eq. (5). Throughout the paper, we report *t*-statistics that are calculated using robust standard errors corrected for clustering at the firm level. Year, industry, and country dummies are included to control for year-, industry-, and country-specific fixed effects. Appendix A provides detailed definitions of all the variables included in Eq. (5).

Table 3 presents the results of our baseline regression in Eq. (5). In Column (1), we include only the group indicator variable and year, industry, and country dummies, and find that the coefficient on *GROUP* is significantly negative (-0.1093 with *t*-value = -6.17). The finding is consistent with H1, suggesting that the affiliates exhibit a lower degree of stock price informativeness relative to the stand-alones. In Column (2), where we include all firm-level control variables and year, industry, and country indicators, we find that the coefficient on *GROUP* remains significantly negative (-0.0301 with *t*-value = -2.18). Overall, these results indicate that business-group affiliation appears to hamper the flow of firm-specific information into the market, and thus decrease the amount of firm-specific information incorporated into stock prices. In Column (3) we replace country indicators with a country-level institutional variable, *ANTI-SD*, and find that the coefficient on *GROUP* remains significantly negative (-0.0605 with *t*-value = -3.80), yet the coefficient on *ANTI-SD* is not significant. Thus, our results are robust to controlling for country-level environment.[19,20] With respect to control variables, all the coefficients except *ACC* are significant and negative at less than 5% level. The sign and significance of the coefficients on the control variables are, overall, consistent with those reported by prior studies (e.g., Piotroski and Roulstone, 2004; Ferreira and Laux, 2007; Fernandes and Ferreira, 2008; Jiang, Kim, and Pang, 2013). The results reported inTable 3 strongly support our first hypothesis H1 that business-group affiliation is negatively associated with stock price informativeness.

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[19] It is possible that blockholders may affect stock price informativeness (Brockman and Yan, 2009) and thus we also include the ratio of the shares held by insiders to the total shares outstanding as a control variable. The coefficient associated with this ownership variable is insignificant and our results still hold.

[20] Japan and Korea account for approximately 40% of the sample. Our results are robust to the exclusion of these two countries.

Having established that business-group affiliation is, on average, negatively related to stock price informativeness (*SPI*), we next examine whether this relation is largely driven by particular types of group members with horizontal versus vertical integration structures, as well as at different layers within the pyramid group. To this end, we construct the following three dummy variables: *SMALL*, *MEDIUM* and *LARGE* which is an indicator for the business group if the number of affiliated firms is less than or equal to two, greater than two and less than or equal to five, and greater than five, respectively. We re-estimate our baseline regression in Eq. (5) after replacing *GROUP* with *SMALL*, *MEDIUM* and *LARGE*. The results are reported in Column (1) of Table 4. We find that the coefficients associated with the three dummy variables are all negative but only the coefficients associated with *MEDIUM* and *LARGE* are significant. More importantly, the coefficient on *LARGE* is greater than the coefficient on *MEDIUM* (the difference in the coefficients is statistically significant as well).

Next, we take a different approach and define *LOG_NFIRM* as the natural logarithm of one plus the number of firms affiliated with the business group. In Table 4, Column (2) presents the results when we use *LOG_NFIRM* instead of the three dummy variables. We find that the coefficient on *LOG_NFIRM* is negative and statistically significant. In both columns of Table 4 the coefficient on *ANTI-SD* is positive and significant, indicating that SPI is greater when the country-level environment is better.

The above findings are consistent with the notion that large business groups have lower stock price informativeness, compared to small business groups, and suggest that, as the number of the affiliates within a business group increases, inside managers of affiliated firms have more tools and opportunities to keep the information environment opaque and to manage outsiders' expectations on cash flows downward. In such a way, inside managers could withhold unexpected positive cash flows inside the firm with an aim to capture them for their consumption of private control benefits when good news arrives in the future.

Taken together, the regression results reported in Table 3 and 4 strongly support our first hypothesis H1 that business-group affiliation is negatively associated with stock price informativeness and more so when a firm belong to a large business group. The opacity and complexity associated with business groups

provide inside managers of affiliate firms with abilities, tools and opportunities to seize unexpected cash flows (i.e., cash flows beyond the level expected by outside investors) by adopting an opaque disclosure policy. Managers, for example, withhold value-relevant information that is idiosyncratic to the affiliates. As a result, stock prices for the affiliates incorporate less firm-specific information relative to common (market- or industry-level) information, which in turn leads us to observe lower stock price informativeness for the affiliates than for the stand-alones.

4.2. Business-group structure

We next examine how stock price informativeness differs across firms belonging to different group structures. The literature indicates that corporate operating and investment policies are different between for business groups that are vertically integrated versus those that are horizontally integrated. The vertical integrated structure (e.g., a strategy where a firm multiplies its business operations into diverse steps on the same production path, including when a manufacturer owns its supplier and/or distributor) may, for example, facilitate the transfer of corporate fund between different layers of pyramidal structure to finance the affiliates' investment opportunities (e.g., Masulis et al. 2013). On the other hand, the vertical structure may also provide more incentives, opportunities and mask to the ultimate owner to engage in tunneling behavior, for example, via their supply chains (e.g., Cen, Maydew, Zhang, and Zuo 2016). Thus, ex ante it is not clear whether the vertical structure is associated with an increase or a decrease in stock price informativeness.

For this analysis, all groups are categorized into vertical (pyramidal) and horizontal groups. Among pyramidal groups, we further divide the affiliates into three subgroups, e.g., apex (firms at the very top of a pyramid), bottom (firms at the bottom of a pyramidal chain), and middle (firms within a pyramidal chain that are neither apex nor bottom). Firms at the apex of pyramidal structures are typically characterized as the ultimate owners having the greatest cash flow rights. In contrast, for firms at the bottom of a pyramidal chain, the ultimate owners have, in general, the lowest cash flow right. This means that the ultimate owners may have stronger incentives to divert or transfer resources from the bottom-layer firms to the apex-layer

firms. Stated another way, the ultimate owners of the former firms are likely to prefer the opaque disclosure policy than those of the latter. We therefore predict that SPI is lower for the apex-layer firms than for the bottom-layer firms. Stated another way, we expect to observe that SPI decrease as an affiliate firm's location moves from the apex to the bottom of the vertically integrated group structure. To test this prediction, we investigate whether and how a group firm's location within the group pyramidal structure affects stock price informativeness or *SPI*.

Table 5 reports results of within-group analysis, which is based only on group-affiliated firms. Here our analysis focuses mainly on differences in *SPI* within group firms, contingent upon within-group structures—horizontal versus vertically integrated structure, as well as different layers of the pyramid. As reported in Table 5, the coefficient on *ULTIMATE OWNERS' CASH FLOW RIGHT*, the ultimate owners' direct ownership percentage, is negative and significant (-0.0009 with *t*-value = -2.03 in Column (1)). This result is in line with the view that the ultimate owners tend to have higher cash flow rights for the apex-layer firms than for the bottom-layer firms. One notable result in Columns (5) and (9) of Table 5 reveals that, within a group, *SPI* characteristically increases down a pyramid chain from -0.569 (*t*-value = -6.21) to 0.1003 (*t*-value = 3.12), and firms at bottom have the greatest *SPI* relative to other group firms. This result, combined with the significantly negative coefficient on *ULTIMATE OWNERS' CASH FLOW RIGHT*, suggests that affiliated firms at the apex layers are more likely to adopt an opaque disclosure policy than those at the bottom layers.

As shown in Columns (2) and (3), the coefficients on *RELATIVE LEVEL*, which represents the number of layers from the apex of pyramidal structures to the affiliate, and *BOTTOM*, which denotes firms at the bottom of pyramid, are both significant and positive (0.0089 with *t*-value = 3.40 in Column (2); and 0.0998 with *t*-value = 2.58 in Column (3)). However, the coefficient on *BOTTOM* becomes insignificant after controlling for corporate growth opportunities, as captured by *HIGH_GROWTH*, which is an indicator for firm-year observations with the value of market-to-book being above the sample median. The interaction between *BOTTOM* and *HIGH_GROWTH* is significant and positive (0.1330 with *t*-value = 1.95 in Column

(4) and 0.1374 with *t*-value = 2.03 in Column (8)), indicating that the higher *SPI* at bottom firms is largely driven by their higher growth opportunities. Masulis et al. (2011) document that these firms are typically young and risky firms with the greatest investment intensity relative to those at other layers of pyramid. For these bottom firms with high growth opportunities, the costs of being opaque (e.g., forgoing positive net present value projects due to informational frictions) are likely to exceed the associated benefit (e.g., private control benefits achieved though tunneling activities). They thus choose to be more transparent, reduce cost of being opaque, and maximize their growth and investment opportunities. Supporting our view, Masulis et al. (2011) show that firm value and investment intensity (as captured by capital investment expenditure) increase significantly as an affiliate firm's location within the group moves down along a pyramidal chain from the apex to the bottom.

In contrast, as shown in Column (5), we find that coefficients on *APEX*, which is an indicator for firms at the apex of pyramid are negative and highly significant (-0.1569 with t-value = -6.21). This result suggests that firms at the apex have the least *SPI* relative to group-affiliated firms at other layers of pyramidal structure. The coefficients on *APEX* are continuously negative and significant even after controlling for firms' high growth opportunities, *HIGH_GROWTH* (Columns (6)-(8)). These results are consistent with those reported by Masulis et al. (2011) that firms at the apex of pyramid generally have lower firm value and investment intensity, and tend to have an opaque disclosure policy as the costs of being opaque may not outweigh the associated private benefits. Overall, the two opposite results on *SPI* at the bottom and at the apex of business group structures are consistent with those reported by prior studies; the business group structure is largely formed around the ultimate owners' desire to perpetuate corporate control, as well as to ease financing constraints at the country and firm levels. It appears that firms at the bottom have greater growth opportunities and face frictions to finance their positive net present value projects. In contrast, firms at the apex are largely owned and controlled by ultimate owners to perpetuate control over group members; the ultimate owners or controlling insiders appear to operate these firms in secrecy by obfuscating informational environments.

In Columns (9) and (10), we examine how SPI is influenced by the indicator variable, *VERTICAL*, that equals one for firms belonging to vertically integrated groups and zero for firms belong to horizontally structured groups. As shown in Column (9), we find that the coefficient on *VERTICAL* is positive and highly significant (0.1003 with *t*-value = 3.12), indicating that firms at vertically structured business groups tend to have more transparent information environments relative to those at horizontally structured business groups. However, the positive coefficient on *VERTICAL* becomes insignificant (0.0320 with *t*-value = 0.95 in Column (10)), yet the interaction between *VERTICAL* and *HIGH_GROWTH* is significant and positive (0.1466 with *t*-value = 4.92 in Column (10)). This result supports the view that the (vertically integrated) pyramidal structure is largely designed to alleviate financial constraints for firms with value-increasing investment projects (e.g., firms at the bottom), and the *negative* correlation between *SPI* and group affiliations are largely mitigated by corporate investment opportunities as reflected in significantly *positive* coefficient on *VERTICAL*HIGH_GROWTH*.

We conjecture that the greater *SPI* at firms with vertically integrated group structures, as reflected in the significantly positive coefficient on *VERTICAL* in Column (9), could be driven by their attempt to reduce market discounts, which may hamper financing of their value-increasing projects. Similarly, Masulis et al. (2011) show that firms belonging to a purely horizontal structure have lower capital expenditure than the stand-alones. This suggests the unique financing advantages that the pyramidal structure has to support capital-intensive group firms facing financial frictions, and withholding information can be more costly for the affiliates with the vertical structure. Overall, the above within-group analysis assures that our results arise at least partially from intentional private-information hoarding by insiders, based on the net costs of hoarding proprietary information.

4.3. Country-level external environment

Previous studies have shown that when a firm has operational or geographical complexity, such as multi-segment or geographically diversified conglomerates, stock price informativeness is lower due to limited investor attentions and the higher costs of information collection (Cohen and Lou, 2012; Li,

Richardson, and Tuna, 2014; Huang, 2015). Country-level institutional characteristics are important determinants of varying incentives of business group managers to strategically disclose inside information to the public. Weak country-level institutional characteristics such as weak shareholder protections and disclosure requirements would provide more means, incentives and opportunities for the ultimate owner's tunneling behavior. Such an institutional environment can provide stronger incentives to business group managers to strategically manipulate their private information when they release it to the public; affiliates are more likely to help each other via cross-subsidization, related parties transaction and/or internal financial market, if necessary and when desired. We thus conjecture that stock price informativeness is lower for business groups in countries with weak legal enforcement than in countries with strong enforcement.

To alleviate the concern that our results could be driven by investor information processing constraints, we take advantage of the fact that we have cross-country business group data. To this end, we now re-estimate regression in Eq. (5) after adding an interaction between *GROUP* and a country-level institutional factor, denoted by *FACTOR*. Here, *FACTOR* refers to one of the following variables (i) *LEGAL* which is a measure of legal enforcement; and (ii) *ANTI-SD* which refers to the anti-self-dealing index from Djankov et al. (2008). If our results are driven only by the complexity of the business groups, we expect to find that coefficient associated with the interaction term, *GROUP * FACTOR*, to be insignificant. However, if the documented negative relation between group affiliation and stock price informativeness is also a result of collective, intentional information hoarding among group entities, we expect to find a positive and significant coefficient on the interaction term given that *FACTOR* proxies for better quality of the country-level external environment.

Table 6 report the results. Notably, all coefficients associated with *GROUP * FACTOR* are positive and significant in all columns. Therefore, the *SPI* for affiliates versus stand-alones is greater in countries with better country-level legal enforcement, and stronger protection of minority shareholders against a

controlling party's expropriation. These results indicate that intentional information hoarding is an important channel of our findings reported so far.

4.4. Controlling for organizational complexity

We perform additional tests to assure that our results are at least partially due to intentional private-information hoarding by insiders rather than organizational complexity of the business group.[21] Table 7 reports results when we control for organizational complexity. We now interact *GROUP* with *GEOGRAPHIC_SEG*, which is an indicator variable which equals one if a group-affiliated firm has more than one geographic segments, and otherwise zero. The coefficient on *GROUP*, *GEOGRAPHIC_SEG*, and the interaction term, *GROUP * GEOGRAPHIC_SEG* are all negative and significant in both columns of the Table 6. These results confirm our conjecture that even after controlling for organizational complexity, group affiliation has a negative effect on *SPI*. Further, the significantly negative coefficients on the interaction term suggests that the adverse effect of group affiliation on SPI is more pronounced when the affiliated firms are geographically complex and/or diversified.

4.5. The contagion effect of the group affiliation on stock return

We next investigate whether one or more members' negative or positive news influence other members' stock returns in the group. To examine the contagion (or spillover) effect of negative and positive news among group members, we focus on weeks when one or more members experience stock price jump or crash. We categorize all weeks into "jump" weeks and "crash" weeks. Jump (crash) weeks are weeks with firm-specific weekly returns above (below) 3.2 standard deviation. The dependent variable is a weekly

[21] We further interact *GROUP* with *DIRECT OWNERSHIP* which is an indicator variable of direct ownership of over 50% for a recorded shareholder. For most affiliated firms *DIRECT OWNERSHIP* is in fact the ultimate owner of the business group (not a separate blockholder), while for stand-alones *DIRECT OWNERSHIP* identifies a blockholder. On the one side, direct ownership by the ultimate owner reduces the agency conflicts, e.g. tunneling risk, in which case the coefficient on the interaction term should be positive. On the other side, full control over the company can in fact provide the ultimate owner with tools to expropriate outside shareholders and thus the coefficient on the interaction term in case should be negative. In any case, as long as the coefficient on the interaction term is significant our results are not solely due to the organizational complexity of the business groups. Untabulated results show that the coefficient on the interaction terms is negative and significant showing that when the ultimate owner has a direct stake of at least 50% the *SPI* is lower for affiliates vs. standalone.

stock return. The test variable, *VWRET_GROUP*, is a value-weighted weekly return for the affiliates per the business group. We expect *VWRET_GROUP* to be positively correlated with an affiliate's stock return, if there is a contagion effect.

Table 8 presents regression results on the contagion effect of the business group affiliations on stock return. The coefficients on *VWRET_GROUP* are positive and highly significant for both jump risk week (0.9592 with *t*-value = 45.60) and for crash risk week (0.9276 with *t*-value = 31.28), indicating that one or more members' extreme good news has a positive effect on other members' stock return, while one or two members' extreme bad news adversely affect other members' stock returns.

4.6. Ultimate Owner Type

We next examine whether the ownership type affects stock price informativeness (SPI). We define *STATE*, *INDUSTRY*, and *FAMILY* as indicator variables taking the value of one where the ultimate owner is the state, an industrial publicly-traded firm, and a family firm, respectively. We replace *GROUP* with *STATE*, *INDUSTRY*, and *FAMILY* in our main regression in Eq. (5). Table 9 reports the results. The coefficients on *STATE* are negative and significant for both standalones and affiliates (-0.3592 with *t*-value = -2.61 for standalones and -0.1999 with *t*-value = -2.89 for affiliates), indicating that firms owned by states are likely to have less informative environments, irrespective whether they are stand-alones or affiliates. These results are largely consistent with those reported by prior research that state ownership is, in most cases, symptomatic with inefficient corporate governance, and shareholders protection may be poor when the ultimate owner of a firm is the state (e.g., Shleifer and Vishny 1994; Shleifer 1998; Gul, Kim and Qiu 2010). Similarly, the coefficient on *INDUSTRY*, which is an indicator for firms with ultimate owner being publicly-traded firms, is positive and significant for stand-alones (0.0829 with t-value = 1.87), yet is negative and significant for affiliates for affiliates (-0.1102 with t-value = -1.96). In contrast, the coefficients on *FAMILY*, which is an indicator for family-owned firms, are positive for standalones, while it is insignificant for group-affiliate firms (0.2836 with t-value = 5.56 for standalones and 0.0530 with t-value = 0.78 for affiliates), indicating that family-owned stand-alone firms tend to be more transparent. Similarly,

Masulis et al. (2011) find that family-owned business group firms are highly visible to the market, suggesting that they have incentives to protect their reputations, rather than exploiting a lack of transparency.

5. Empirical Results Related to Asymmetric Corporate Disclosure

5.1. Group affiliation and group size

Having established that business-group affiliation exacerbates stock price informativeness, we now investigate whether and how the group affiliation influences: (i) the frequency of extreme negative return outliers (or stock price crashes) in the distribution of firm-specific returns (H2); and (ii) that of extreme positive return outliers (or stock price jumps) in the same distribution (H3). More specifically, we examine whether and how the disclosure opacity associated with the business-group affiliation is related to inside managers' asymmetric incentives in disclosing good versus bad news. To test whether the effect of business-group affiliation on positive return jump differs systematically from its effect on negative return jump, we estimate the following regression:

$$\begin{aligned} \textit{Jump Risk}\ (\textit{Crash Risk})_{it} = {} & \alpha + \beta_1 GROUP_{it-1} + \beta_2 PCSKEW_{t-1}(NCSKEW_{it-1}) \\ & + \beta_3 TRADE\_VOLUME_{it-1} + \beta_4 RETURN\_SD_{it-1} + \beta_5 RETURN_{it-1} \\ & + \beta_6 MARKET\_CAP_{it-1} + \beta_7 MB_{it-1} + \beta_8 LEVERAGE_{it-1} + \beta_9 ROA_{it-1} \\ & + \beta_{10} ACC_{it-1} + (\text{Year indicators}) + (\text{Industry indicators}) \\ & + (\text{Country indicators}) + \varepsilon. \end{aligned} \quad (6)$$

In Eq. (6), the dependent variable is jump risk proxied by *UDVOL* or crash risk (i.e., the likelihood of negative return jump) proxied by *DUVOL*. When jump risk (crash risk) is the dependent variable, we include the lagged positive (negative) firm-specific return skewness, i.e., $PCSKEW_{t-1}$ ($NCSKEW_{t-1}$), to control for firm-specific return skewness conditional on the direction of return skewness. The procedures for computing these variables are as explained in Section 3.4, and their definitions are summarized in Appendix A.

Table 10 presents the results for the tests of our second and third hypotheses. As shown in Column (1), we find that the coefficient on the key variable of interest, *GROUP* is positive and significant at the 5% level when the dependent variable is the jump risk proxied by *UDVOL*. These findings are, overall, consistent with the prediction in H3, suggesting that firms belonging to a business group have a higher likelihood of experiencing positive price jumps, relative to stand-alone firms. As shown in Column (2), we also find that the coefficient on *GROUP* is negative and significant at less than the 5% level when the dependent variable is the crash risk proxied by *DUVOL*. This finding is consistent with the prediction in H2, suggesting that affiliated firms have a lower likelihood of experiencing stock price crashes, relative to stand-alone firms.[22]

We next examine whether these results are driven by large firms. To do that we re-estimate our model in Eq.(6) where we replace *GROUP* with three dummies, i.e., *SMALL*, *MEDIUM*, and *LARGE*. As shown in Column (1) where the dependent variable is the jump risk (*UDVOL*), Table 11, we find that the coefficient on *LARGE* is positive and significant, while the coefficients on *SMALL* and *MEDIUM* are insignificant. As shown in Column (3) where the dependent variable is the crash risk (*DUVOL*), we also find that the coefficient on *LARGE* is negative and significant while the coefficients on *SMALL* and *MEDIUM* are both insignificant. In addition, we find that the coefficient on *LOG_NFIRM* is also positive in Column (2) and negative in Column (4). The above results suggest that our results in Table 10 are, in large part, driven by large business groups.

The significant negative relation observed between business group affiliation and crash risk corroborates the notion that the business group provides inside managers of an affiliated firm with incentives, means, and the ability to absorb more negative firm-specific news (via cross-subsidization among member firms in a group), compared to those of a stand-alone company. As a result, we observe

[22]We also find a higher probability of positive jumps and a lower probability of negative jumps for firms that belong to the large group, compared with those for firms that belong to the small group.

fewer crashes for business-group affiliated firms than for stand-alone firms. In the preceding section, we note that the absorption of negative information is important for other firms belonging to the same business group because they share common and mutual interest within the group; such negative information, unless absorbed, could make it challenging for other firms in the group to raise subsequent external capital, further hampering the group's investment prospects and the solvency of the other firms (Gopalan, Nanda, and Seru, 2007). The positive relation observed between business group affiliation and stock price jump risk supports the view that inside managers of affiliated firms have greater tools and opportunities to hide good news from competitors in the product market and from outside investors in the capital market in order to appropriate unexpected cash flows. Also, insiders of affiliated firms have greater incentives to withhold and accumulate good news inside the firm as a cushion for times of low cash flows so that they can smooth out their reported earnings to outside investors and regulators.[23]

5.2. Bad- versus good-news periods

We established so far that affiliated firms are more (less) likely to experience stock price jump risk (crash risk) relative to stand-alone firms. This is because the former have stronger incentives to hide good news, and accelerate the release of bad news, than the latter to downward-manage the market expectation on future cash flows. In this section, we further corroborate our finding by comparing market reactions to earnings announcements with bad versus good news between the affiliates and the stand-alones, and

[23] Almeida, Kim, and Kim (2015) show that Korean business called chaebol, in the aftermath of the 1997 Asian financial crisis, transferred cash from low-growth to high-growth member firms, using cross-firm equity investments that helped them mitigate the negative effects of the crisis. Ang, Masulis, Pham, and Zein (2015) find that during the global financial crisis of 2008, the family group-affiliated firms, on average, cut investments less than similar stand-alone firms. Affiliated firms also generally perform better than stand-alone firms during bear markets (Ramachandran, Manikandan, and Pant, 2013). In light of this evidence we investigate whether the global financial crisis of 2008 has an effect on the information environment of business-group-affiliated firms because our sample spans the years around the crisis. To do that we split the sample into the pre-crisis sample of firms prior to the global financial crisis and the post-crisis period of firms subsequent to the crisis. The results, untabulated for brevity, show that irrespective of the sub-periods, affiliated firms exhibit low stock price informativeness, more frequent positive jumps, and less frequent negative jumps, compared to stand-alone firms. The finding suggests that our results are robust to the global financial crisis of 2008.

comparing analyst forecast error and forecast dispersion in the bad versus good news periods between the affiliates and the stand-alones.

5.2.1. Market reactions to earnings announcements

Following Kothari, Shu, and Wysocki (2009), we measure market reactions to earnings announcements by calculating daily abnormal return (*AR*) around the earnings announcements date. *AR* is computed as the difference between actual return and the predicted return on day *t* during the earnings announcement window. We calculate the predicted return by using the estimated market model parameters from the single-factor market model for each country where daily raw returns are regressed onto a country's daily market index returns over the estimation windows (-120 days, -10 days) prior to the earnings announcement date. A country's daily market return is based on the Morgan-Stanley World Market Index. Finally, we calculate cumulative absolute abnormal returns (*CAAR*) over the 3-day window (-1 days, +1 days) relative to the annual earnings announcement date. We extract the annual earnings announcement date from the Institutional Brokers' Estimate System (I/B/E/S) Summary database. Higher values of *CAAR* indicate stronger market reactions to earnings announcements.

First, we compare market reaction to earnings announcements between the affiliates and the stand-alones. To do so, we estimate the following regression in Eq. (7), using the full (combined) sample of both good news and bad news announcements:

$$CAAR_t = \alpha + \beta_1 GROUP_{t-1} + \beta_2 NAF_{t-1} + \beta_3 MKTCAP_{t-1} + \beta_4 MB_{t-1} + \beta_5 LEV_{t-1} + \beta_6 LOSS_{t-1} + \beta_7 DISP_{t-1} + \beta_8 REPLAG_{t-1} + (Year\ dummies) + (Industry\ dummies) + (Country\ dummies) + \varepsilon \quad (7)$$

where $CAAR_t$ represents absolute abnormal returns cumulated over (-1 days, +1 days) around earning announcement date.[24] In Eq. (7), we include a set of firm-level control variables that are known to affect cross-sectional variations in market reaction (e.g., Kim, Wang, and Zhang, 2016). These controls include

[24] When we employ an alternative time window, e.g., 5-day window (-2, +2) around the earnings announcement, the results are qualitatively the same.

the natural logarithm of the number of analysts following a firm (*NAF*); firm market capitalization (*MKTCAP*); growth opportunities (*MB*); leverage (*LEV*); forecast dispersion (*DISP*); and earnings reporting lags (*REPLAG*). Year, industry, and country indicators are included to control for year-, industry- and country-specific fixed effects, respectively. Appendix A provides the detailed definitions of all the variables included in Eq. (7).

To test the impact of the group affiliations on the market reaction to positive versus negative earnings news, we estimate Eq. (7), separately, for the subsample of good news announcements (with a positive earnings surprise) and for the subsample of bad news announcements (with a negative earnings surprise). Specifically, to estimate Eq. (7), separately, for the full (combined) sample, the bad news subsample, and the good news subsample, we gather additional data on analyst earnings forecasts from I/B/E/S International. After merging the I/B/E/S International data file with our main sample data, we attain the full sample of 12,980 firm-quarter observations for the analysis of the market reaction to annual earnings announcements. We split this full sample into two subsamples, i.e., the bad news subsample and the good news subsample, based on the sign of unexpected earnings or earnings surprise for each firm. For each firm, we compute the unexpected earnings as the difference between actual earnings per share (EPS) and consensus EPS forecast divided by lagged price. We define the bad (good) news period if firms experience negative (positive) unexpected earnings.

Table 12 presents results for Eq. (7) separately for the full sample, the bad news subsample, and the good news subsample. As shown in Column (1), when Eq. (7) is estimated using the full sample, we find that the coefficient on *GROUP* is positive and significant at the 10% level (0.0079 with *t*-statistic = 1.84), based on a two-tailed test. If inside managers of affiliated firms are better able to manage outsiders' expectations downward than those of stand-alone firms by concealing value-relevant, firm-specific

information from outside investors, we expect to observe greater reactions to earnings announcements for affiliated firms than for stand-alone firms.[25]

Columns (2) and (3) report the estimated results for Eq. (7), using the bad news subsample and the good news subsample, respectively. As shown in Columns (2) and (3), the coefficient on *GROUP* is positive but insignificant for the bad news subsample, while the same coefficient is positive and significant at the 5% level for the good news subsample. This result suggests that inside managers of affiliated firms are more inclined to hide good news than those of stand-alone firms in an attempt to downward-manage outsiders' expectation on future cash flows. In this way, insider managers generate positive unexpected cash flows (i.e., cash flows beyond the level expected by outsiders) which can be captured in the future for their private control benefits. When good news, whether current or previously hidden, is disclosed via the earnings announcement channel, the market perceives the earnings news to possess greater information content, and thus, reacts more intensely to the release of good earnings news. In contrast, as mentioned earlier, affiliated firms have incentives to accelerate the release of bad news to downward-manage outsiders' expectations on future cash flows. Therefore, for group-affiliated firms, bad news releases via the earnings announcement channel are less credible in general, and have a lower level of information content in

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[25] Based on our search of news articles around the dates of the stock price jump, the stock price jump is largely caused by the affiliates' earnings announcement, litigation settlement, and/or merger and acquisition announcements. For example, "Hyundai Autonet has surged more than 50 percent since Aug. 8 on news that the company may be sold to Germany's Hamann Group.' There is a good chance that Hyundai Autonet may be sold to a third party, especially with its improved business performance in the second quarter and the optimistic outlook for even better results in the coming quarters,' Dongwon Securities said yesterday." (*Korea Times*, August 20, 2003, "LexisNexis® Academic")

Two days after Tasman Resources NL director Douglas Howard Solomon indirectly purchased 100,000 ordinary shares on-market, Tasman Resources shares jumped 273 percent after the company painted a positive view of a major new mineral discovery (*Australian Company News Bites*, November 24, 2004, "LexisNexis® Academic"). This anecdotal evidence indicates that inside managers consume private benefits of control (e.g., obtaining profits from insider trading) prior to releasing the cumulated positive news to outside investors.

Tasman Resources Ltd. experienced a stock price jump after announcing the financial support from Rio Tinto in its copper-gold project. "Mining giant Rio Tinto has backed junior explorer Tasman Resources' hopes of discovering the next Olympic Dam by agreeing to pay up to $92 million for a potential majority interest in its copper-gold project… Rio would initially inject $10m into its Vulcan prospect in South Australia to accelerate an exploration program at the site, which is 30km from BHP Billiton's Olympic Dam copper-gold-uranium mine. Shares in Tasman soared on the news yesterday, closing the day 72.13 percent higher at 10.5c." (*The Australian*, October 11, 2011 http://www.theaustralian.com.au/business/companies/rio-tinto-buys-into-olympic-dams-next-door-neighbour/story-fn91v9q3-1226163382684).

particular, compared to good news releases. However, this asymmetric disclosure incentive is not the case for stand-alone firms, which implies that the market reaction to a bad news release should not necessarily be higher for affiliated firms than for stand-alone firms, as reflected in the insignificant coefficient on *GROUP* in Column (2) of Table 12. In a nutshell, good earnings news is more credible and more informative at the time of its release for the affiliated firms than for the stand-alone firms, because the affiliates have stronger incentives to hide good news than the stand-alones, while bad earnings news is not necessarily so.

5.2.2. Analyst forecast error

We argue that group-affiliated firms have stronger incentives to obfuscate their performance than stand-alone firms by hiding good news and accelerating the release of bad news. In such a case, it is more (less) difficult for analysts to forecast earnings of affiliated firms with good (bad) news firms. However, this is not necessarily so for stand-alone firms with no asymmetric disclosure incentives. One can therefore expect that, for good news firms, analyst earnings errors and forecast dispersion are larger for the affiliates than for the standalones, while the opposite is likely for bad news firms. In this subsection, we test whether the above prediction is empirically supported.

In so doing, we calculate analyst forecast error (*AFE*) as the absolute difference between consensus earnings forecast over a 7-month horizon prior to the fiscal year-end and actual earnings per share before extraordinary items in that fiscal year, scaled by the stock price at the beginning of the fiscal year (e.g., Duru and Reeb, 2002; Hope, 2003; Chen, Ding, and Kim). We calculate analyst forecast dispersion (*DISP*) as the standard deviation of analyst forecasts over the 7-month horizon prior to fiscal year-end, scaled by the price at the preceding fiscal-year end. Following the literature, we adjust for the timing differences among forecasts during our time window by taking the residual from the regression of a forecast onto the length of time between a forecast and the fiscal-year end for all forecasts (e.g., Tong, 2007; Kim, Yeung, and Zhou, 2015).[26] Specifically, we calculate timing-adjusted forecast error and forecast dispersion. We

[26] We also find that our results are qualitatively the same by using a raw value of analyst forecast error and dispersion.

compare these timing-adjusted forecasts during good news periods versus bad news periods between the affiliates and the stand-alones to test whether analysts forecast quality is lower during good news periods for the affiliates than for the stand-alones. Specifically, in the good news period, we compare analysts forecast quality, captured by analyst forecast error and forecast dispersion, between the affiliates and the stand-alones. That is, we investigate the effect of business group affiliation on firm-level information opacity induced by a firm's asymmetric disclosure as captured by analyst forecast quality. To this end, we estimate the following regression:

$$AFE_t \text{ (or } DISP_t) = \alpha + \beta_1 GROUP_{t-1} + \beta_2 ANALYST_{t-1} + \beta_3 MKTCAP_{t-1} + \beta_4 MB_{t-1} + \beta_5 LEV_{t-1} + \beta_6 BIG4_{t-1} + \beta_7 OPERCYCLE_{t-1} + \beta_8 CFO\_STD_{t-1} + (Year\ dummies) + (Industry\ dummies) + (Country\ dummies) + \varepsilon. \quad (8)$$

In the regression model above, the dependent variable is either analyst forecast error (*AFE*) or forecast dispersion (*DISP*). Appendix A provides the definitions of all other variables included in Eq. (8).

To estimate Eq. (8), we gather additional data on analyst forecasts from I/B/E/S International. After merging the I/B/E/S data file with our main sample data, we attain 5,339 and 4,464 firm-year observations for the analysis of the analyst forecast error and dispersion, respectively. We compute unexpected earnings as the difference between actual earnings and consensus earnings forecast divided by lagged price. We define the good (bad) news period if firms experience positive (negative) unexpected earnings. We partition the sample into two subsamples, based on the sign of the unexpected earnings surprise for each analyst. We construct two subsamples, that is, (i) the bad-news subsample with a negative earnings surprise; and (ii) the good-news subsample with a positive earnings surprise. We estimate Eq. (8) separately for the full sample, the bad news subsample, and the good news subsample, and report the results in Table 13.

As shown in Table 13, for the sample of firms with good news, the coefficients on *GROUP* are positive and significant; they are 0.0041 with *t*-statistic = 1.89 (0.0050 with *t*-statistic =2.14) when the dependent variable is *AFE* (*DISP*). In contrast, the coefficients on *GROUP* are insignificant during the bad news period, irrespective of whether *AFE* or *DISP* is used as the dependent variable. As indicated in the *Diff* row,

the difference in the *AFE* or *DISP* coefficient between the good and bad news samples is significant. The above results, taken together, support the view that inside managers of affiliated firms have a propensity to hide good earnings news with an aim to capture or extract unexpected cash flows associated therewith for their private benefits to the detriment of outside investors. As a result, analyst forecast quality deteriorates for affiliated firms in the good news period, as reflected in significantly higher analyst forecast errors and dispersion for the affiliates versus the stand-alones. In short, the results reported in Table 13 further corroborate the view that due to the asymmetric disclosure incentives of group-affiliated firms with respect to good versus bad news disclosures, the information environment is more opaque or less transparent for affiliated firms than for stand-alone firms, particularly, in the good news announcement period.

6. Two-stage simultaneous equation analysis

The preceding results support our hypotheses on the impact of the business-group affiliation upon the stock price informativeness (H1), negative jump risk or crash risk (H2) and positive jump risk (H3). However, our business group indicator may be subject to potential endogeneity because the factors that are related to business group formation can simultaneously influence stock price informativeness (SPI), crash risk and/or jump risk. For example, inside managers who intend to hide their rent extraction by obfuscating firm performance may possibly choose to form the business group. In that case, the findings on the impact of business group affiliation on the information environment (e.g., *SPI* and a range of jump and crash risk variables) could be ascribed to the underlying attributes of firms, rather than to the affiliation with a business group *per se*.

To address this potential self-selection bias, we employ a two-stage, simultaneous equation procedure (e.g., Masulis, Pham, and Zein, 2011). Using the maximum likelihood estimation approach, we simultaneously estimate two models: (i) the group-selection regression (the treatment model); and (ii) the stock price informativeness regression (the outcome model). In the first stage, we estimate the treatment model using the Compustast Global universe; while in the second stage, we estimate the outcome model

using firm-year observations in our sample. In the first-stage treatment model, group membership is the dependent variable and the covariates include a vector of independent variables from the SPI regression and instruments. The instruments are predicted to be related to group affiliation, but not to the unexplained components of SPI (Belenzon and Berkovitz, 2010; Masulis, Pham, and Zein, 2011). We employ three industry-level instruments: (i) *RD_Intensity*, capturing R&D intensity; (ii) *ExternalFinance* representing the level of dependence upon external capital; and (iii) *LernerIndex* representing firms' market power (Belenzon and Berkovitz, 2010). We additionally employ one market-level instrument, *Index_Ret*, representing the market conditions when managers form the business group organization (Masulis, Pham, and Zein, 2011). Following prior studies, we measure *RD_Intensity*, *ExternalFinance* and *LernerIndex* at the three-digit industry level based on the U.S. firms from Compustat America. We choose these instrumental variables since business groups are likely to be more pervasive in R&D-intensive industries—business groups facilitate R&D projects through cross-subsidization within the organization (e.g., Gopalan, Nanda, and Seru, 2014). Business groups are also predicted to be more prevalent in industries with greater reliance upon external finance.

We follow Rajan and Zingales (1998) and rank industries according to their reliance on external financing using U.S. firms from Compustat America. We compute *ExternalFinance* as capital expenditures minus cash flow from operations, scaled by capital expenditures. Rajan and Zingales (1998) argue that using U.S. firms are beneficial in three ways. First, the U.S. market is one of the most advanced capital markets in the world such that U.S. firms experience the least informational friction in raising external capital. This suggests that the amount of external capital raised by these companies is likely to be a good proxy for their demand for external finance. Second, strict disclosure requirements in the U.S. market ensure good coverage of data on external financing. Finally, while using U.S. industry data is rather peripheral to our sample firms in the world, an industry's dependence on external funds in the U.S. is a good measure of external dependence in non-U.S. countries in our sample. Using the U.S. firms in our setting is particularly advantageous because the number of business groups is small due to steep tax and regulatory costs of

starting and maintaining a business group in the U.S. market (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1999; Masulis, Pham, and Zein, 2011). As such, we can reduce the confounding effects of factors influencing both managers' choice of business group affiliations and our sets of industry-level instrumental variables.

We also measure the firms' market power by employing the Lerner Index which captures the ability of a firm to increase the market price of a good or service over marginal cost. A business group is likely to woo firms with greater market power, leading us to observe a positive correlation between the group affiliation and the Lerner Index. Consistent with the preceding instrumental variables, we estimate the Lerner Index by using the U.S. firms.

Finally, we employ one country-level instrument, *Index_Ret*. Business group membership can be related to historical market conditions around a firm's listing date. The stand-alones are more likely to go public in the strong external capital market (to increase cash proceeds from capital markets) than the affiliates within a group, which can cross-subsidize their investment projects (Masulis, Pham, and Zein, 2011). *Index_Ret* is calculated as the cumulative return on the domestic stock market index in the listing year of each firm.

Table 14 presents the results of regressions for both the first-stage treatment model and the second-stage outcome model. As shown in Table 14, Panel A, the coefficient on *GROUP* is significantly negative (-0.0420 with *t*-statistics=-4.25) in the second-stage regression using *SPI* as the dependent variable. The significantly negative coefficient on *GROUP* is consistent with the prediction in H1, suggesting that group-affiliated firms are more opaque or less transparent than stand-alone firms. These results in Table 14 suggest that our main findings are unlikely to be confounded by the underlying firm-specific characteristics, or by the firm's voluntary decision to join a business group.

In addition to the two-stage, simultaneous equation, we conduct two additional tests. First, we remove firms experiencing a change in their affiliation status to reduce the possibility that any unobserved factors during the sample period drive our results. Second, we include the pre-sample average of *SPI* of each firm

to our main regression model to control for the effect of unobserved heterogeneity in firm-level stock price informativeness at the beginning of our sample (e.g., Blundell, Griffith, and Reenen, 1999; Masulis, Pham, and Zein, 2011). Though not tabulated for brevity, the results for both tests are in support of our primary hypothesis that stock price is less informative for affiliated firms than for stand-alone firms.

7. Conclusion

In this paper we juxtapose business-group affiliated firms and nonaffiliated stand-alone firms in terms of their information environments. We examine whether and why stock prices are less informative or more opaque for affiliated firms than for stand-alone firms. We also investigate whether and how business group affiliation is associated with asymmetric disclosure with respect to good versus bad news.

We find that stock price is less informative for group-affiliated firms than for stand-alone firms. This finding suggests that firms belonging to a business group tend to release less firm-specific information to the market than stand-alone firms. This disclosure pattern could be intentional because of strategic management of information or it could be unintentional because of the complex networking nature of a business group. We also provide evidence that group affiliation is positively related to the likelihood of positive return jumps and negatively related to the likelihood of negative return jumps or stock price crash risk, suggesting that group-affiliated firms tend to withhold good news, while accelerating the release of bad news.

Low frequency of negative jumps could be due, in large part, to three non-mutually exclusive actions by the insiders of affiliated firms for the benefit of the group as a whole. Insiders of affiliated firms are better able to absorb unexpected or temporarily bad news, for example, via cross-subsidization within the group, compared to insiders of stand-alone firms. Managers of affiliated firms can strategically release bad news to deter competitors in the product market from gaining entry into the product market for the benefit of the whole group. Finally, the reputation and litigation costs can be greater for affiliated firms, and thus managers of affiliated firms have an incentive for timely revelation of bad news.

High frequency of positive jumps are also consistent with the hypothesis that a group-affiliated firm maximize its own value and also the value of group as a whole, i.e., the total value of affiliated firms within the group. Withholding good news could be a strategy to deter competitors' entry into the same product market. Withholding good news about positive cash flows can be used to avoid a big bath that can spillover to other group members. Of course, hiding unexpected cash flows could serve self-interested insiders. There is a limit beyond which hiding of good news becomes impossible and it gets revealed to the market, causing a positive jump in firm-specific returns.

Our findings suggest that information flow for group-affiliated firms is different from that for nonaffiliated ones, reflecting the fact that firms in a group are together in bad times and in good times for their common mutual interest. In bad times, a troubled firm within a group can receive a bailout from other affiliated firms within the group, while in good times they all enjoy the laurels together.

To the best of our knowledge, our study is the first to examine the impact of business group affiliation on inside managers' disclosure incentives and the information environment, using a large sample of group-affiliated firms from 38 countries around the world. Given the scarcity of international evidence on the effect of business group as an organizational structure on inside managers' disclosure incentives and outside investors' perception about disclosure quality, further research in this direction is called for.

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Appendix A. Variable Definitions

Firm-level variables:

GROUP	An indicator variable which equals one if a firm belongs to a business group. A business group is defined as a set of firms owned by the same ultimate owner. We define a shareholder of a firm to be the ultimate owner at a given threshold if that shareholder's stake in the firm exceeds that threshold directly or he controls it via a control chain whose links all exceed that threshold. 25 percent threshold is chosen in this study.
ULTIMATE OWNERS' CASH FLOW RIGHT	The direct ownership of the ultimate owner in percentage.
RELATIVE LEVEL	An integer variable that denotes the layer at which an affiliated firm is relative to its ultimate controlling shareholders. That is, it denotes the number of layers of firms that exist between a group firm and its ultimate controlling shareholder.
VERTICAL	An indicator for a business group where the controlling shareholder holds both direct and indirect stakes in affiliated firms.
APEX	An indicator variable which equals one if an affiliate is at the very top of the pyramid. That is, APEX is an affiliated firms which has the lowest RELATIVE LEVEL.
BOTTOM	An indicator variable which equals one if an affiliate is at the very bottom of the pyramid. That is, BOTTOM is an affiliated firm which has the highest RELATIVE LEVEL.
HIGH_GROWTH	An indicator for firm-year observations with market-to-book ratio greater than the sample median.
Firm-Specific- Weekly Return	$ln(1+residual)$, where the residual is from the augmented market model regression: $r_{it} = \alpha_i + \beta_{1,i} r_{m,j,t} + \beta_{2,i}[r_{us,t} + EX_{jt}] + \beta_{3,i} r_{m,j,t-1} + \beta_{4,i}[r_{US,t-1} + EX_{j,t-1}] + \beta_{5,i} r_{m,j,t-2} + \beta_{6,i}[r_{US,t-2} + EX_{j,t-2}] + \beta_{7,i} r_{m,j,t+1} + \beta_{8,i}[r_{US,t+1} + EX_{j,t+1}] + \beta_{9,i} r_{m,j,t+2} + \beta_{10j}[r_{US,t+2} + EX_{j,t+2}] + \varepsilon_{it}$ where r_{it} is the return on a firm's inferior voting shares i in week t in country j, $r_{m,j,t}$ is the return on the MSCI country-specific market index or the country index compiled by DATASTREAM in week t, $r_{us,t}$ is the US market index return (a proxy for the global market), and $EX_{j,t}$ is the change in country j's exchange rate versus the US dollar.
SPI	A measure of firm-specific information arriving to the security market based on R^2 from the augmented market model regression. Specifically, $SPI = \ln((1 - R^2)/ R^2)$.
PCSKEW	The positive skewness of *Firm-Specific-Weekly Return* over the fiscal year.
UDVOL	The log of the ratio of the standard deviations of up-week to down-week *Firm-Specific-Weekly Return*.
NCSKEW	The negative skewness of *Firm-Specific-Weekly Return* over the fiscal year.
DUVOL	The log of the ratio of the standard deviations of down-week to up-week *Firm-Specific-Weekly Return*.
AFE	$AFE_t = 100 \times (|Forecast_t^{t-1} - EPS_t|)/Price_{t-1}$ (1) Where AFE is the absolute magnitude of analyst consensus forecast error in period *t*, EPS^t is the actual earnings per share before extraordinary items for period *t*, $Price_{t-1}$ is the stock price at the end of the fiscal year *(t-1)*, and $Forecast_t^{t-1}$ is the average consensus forecast of earnings per share. The timing differences among forecasts over this horizon is adjusted by: (1) regressing a forecast against the length of time between the forecast and the fiscal year-end for all forecasts and (2) then taking residual of each predicted forecast as the timing-adjusted forecast. The time horizon is the 7-month period before the fiscal year end.
DISP	Standard deviation of analyst's forecast over the 7-month horizon before the fiscal year-end deflated by the price at previous fiscal year-end then multiplied by 100. The timing differences among forecasts over this horizon is adjusted by (1) regressing a forecast against the length of time between a forecast and the fiscal year-end for all forecasts, and (2) then taking residual of each predicted forecast as the timing-adjusted forecast.
VARROA	The logarithmic transformation of the R^2 from a regression of a firm's yearly return on assets on a value-weighted market index of ROA, and estimated using nine yearly observations in each firm-specific regression.
ROA	Income before extraordinary items divided by the beginning-of-year total assets.

MB	The ratio of market value of equity (where market value of equity is the sum of the market value of the superior voting and inferior voting share classes) to the book value of equity at the end of the year.
LEV	The book value of long-term debt scaled by the sum of market value of equity and book value of long-term debt at the end of the year.
MKTCAP	The natural log of a firm's total market capitalization (where total market capitalization is the sum of the market capitalization of the superior voting and inferior voting share classes in millions of US$.
DIV	The dividend payment scaled by sales.
HERF	The revenue-based Herfindahl index of industry-level concentration.
NIND	The natural log of the number of firms in each industry used to calculate *HERF*.
ACC	Defined as the previous three years' moving sum of the *absolute* value of discretionary accruals. Specifically, ACC= $\|DiscAcc\|_{t-1}$ + $\|DiscAcc\|_{t-2}$ + $\|DiscAcc\|_{t-3}$, where *DiscAcc* is measured using the Modified Jones Model (Dechow, Sloan, and Sweeney, 1995).
NAF	The number of analysts issuing forecasts for the firm during the fiscal year.
VOL	The average monthly share turnover over the current year, where share turnover is calculated as the monthly trading volume divided by total number of shares outstanding during the month.
TRADE_VOLUME	The average monthly share turnover over the current year, minus the average monthly share turnover over the previous year, where monthly share turnover is calculated as the monthly trading volume divided by total number of shares outstanding during the month.
RETURN_SD	The standard deviation of the *Firm-Specific-Weekly Return* over the current year.
RETURN	The mean of the *Firm-Specific-Weekly Return* over the current year.
DISP	The standard deviation of the analysts' earnings forecasts, scaled by the year-end price.
REPLAG	Earnings reporting lags, calculated as the number of days from the fiscal year-end to the earnings announcement date reported by I/B/E/S.
RD_INTENSITY	The three-digit industry mean of R&D expenditure divided by sale per country during the listing year of a firm.
EXTERNALFINANCE	The three-digit industry mean of capital expenditure minus operating cash flow, divided by capital expenditure per country during the listing year of a firm.
LERNERINDEX	The three-digit industry average of 1 minus profits over sales per country during the listing year of a firm.
INDEX_RET	The index return during the listing year of a firm per country.
ANALYSTS	Natural logarithm of the number of analysts who followed the firm over the 7-month horizon before the fiscal year-end.
BIG4	Equal to 1 if the firm's audit service is supplied by PWC, Deloitte & Touche, Ernst & Young, and KPMG, otherwise, 0.
OPERCYCLE	Natural logarithm of the sum of the firm's days of accounts receivable and days of inventory.
CFO_STD	Standard deviation of the firm's cash flow from operations deflated by the average of the beginning and end balances of total assets over the 5-year period from *t-4* to *t*.
LOG_NFIRM	The natural logarithm of the number of firms affiliated with the business group
SMALL	An indicator for the business group if the number of affiliated firms is less than or equal to two.
MEDIUM	An indicator for the business group if the number of affiliated firms is greater than two and less than or equal to five.
LARGE	An indicator for the business group if the number of affiliated firms is greater than five.

GEOGRAPHIC_SEG	An indicator variable which equals one if a firm has more than one geographic segments, and otherwise zero.
STATE	An indicator if an ultimate owner is the State.
INDUSTRY	An indicator if an ultimate owner is an industrial firm.
FAMILY	An indicator if an ultimate owner is the family.

Country-level variables:

LEGAL	Equals one if the origin of the commercial law of a country is English Common Law, and zero otherwise. Source: Djankov, et al. (2008) by way of La Porta et al. (1999).
ANTI-SD	The anti-self-dealing index measures the laws in place to regulate a potential related party transaction proposed by Mr. James, who is the controlling shareholder in both the Buyer and Seller in the proposed transaction, but with different ownership stakes in the two companies. The index captures both ex-ante rules and disclosures that apply before the transaction can take place as well as the ex-post remedies and disclosures that apply after the transaction has occurred. The ten variables underlying the index are (1) the transaction must be approved by disinterested shareholders; (2) a positive review required before the transaction may be approved (e.g., by a financial expert or independent auditor); (3) a 10% shareholder may sue derivatively Mr. James or the approving bodies or both for damages that the firm suffered as a result of the transaction; (4) the degree of the ease in rescinding the transaction; (5) the degree of the ease of holding Mr. James liable for civil damages; (6) the degree of the ease in holding members of the approving body liable for civil damages; (7) access to evidence; (8) ease in proving wrongdoing; (9) disclosures that Buyer must make before the transaction can be approved; and (10) disclosures that Mr. James must make before the transaction can be approved. Scale from one to zero, with higher index values indicating stronger protection of minority shareholders against a controlling party's expropriation. Source: Djankov et al., 2008.

Table 1. Sample distribution.

The table provides an overview of our sample in terms of the number of firm-year observations of stand-alones and affiliates by country (Panel A), by year (Panel B), and by industry (Panel C).

Panel A: Sample distribution by country

Country	***Stand-alones***		***Business-group affiliates***	
	# of firm-year obs.	%	# of firm-year obs.	%
Argentina	21	0.3	24	0.32
Australia	239	3.43	241	3.23
Austria	16	0.23	23	0.31
Belgium	35	0.5	32	0.43
Brazil	106	1.52	121	1.62
Canada	15	0.22	31	0.41
Chile	57	0.82	63	0.84
Denmark	32	0.46	29	0.39
Finland	52	0.75	50	0.67
France	371	5.32	395	5.29
Germany	287	4.12	300	4.02
Greece	131	1.88	144	1.93
Hong Kong	86	1.23	76	1.02
India	345	4.95	380	5.09
Indonesia	58	0.83	53	0.71
Israel	39	0.56	46	0.62
Italy	142	2.04	155	2.07
Japan	2,035	29.18	2,225	29.79
Korea, Re	772	11.07	851	11.39
Malaysia	268	3.84	311	4.16
Netherlands	23	0.33	24	0.32
Norway	77	1.1	74	0.99
Pakistan	33	0.47	38	0.51
Peru	19	0.27	16	0.21
Philippines	21	0.3	22	0.29
Poland	45	0.65	50	0.67
Portugal	19	0.27	20	0.27
Singapore	210	3.01	226	3.03
South Africa	88	1.26	92	1.23
Spain	55	0.79	53	0.71
Sri Lanka	64	0.92	82	1.1
Sweden	132	1.89	142	1.9
Switzerland	79	1.13	81	1.08
Taiwan	243	3.48	242	3.24
Thailand	49	0.7	49	0.66
Turkey	103	1.48	114	1.53
United Kingdom	185	2.65	183	2.45
United States	422	6.05	412	5.52
Total	6,974	100	7,470	100

Table 1. Sample distribution (continued).

Panel B: Sample distribution by year

	Stand-alones		***Business-group affiliates***	
Country	# of firm-year obs.	%	# of firm-year obs.	%
2002	326	4.67	344	4.61
2003	495	7.1	526	7.04
2004	716	10.27	759	10.16
2005	486	6.97	490	6.56
2006	521	7.47	540	7.23
2007	708	10.15	774	10.36
2008	807	11.57	841	11.26
2009	915	13.12	956	12.8
2010	1,060	15.2	1,134	15.18
2011	940	13.48	1,106	14.81
Total	6,974	100	7,470	100

Panel C: Sample distribution by industry

Industry as in Campbell (1996)	***Stand-alones***		***Business-group affiliates***	
	# of firm-year obs.	%	# of firm-year obs.	%
Basic industry	762	10.93	818	10.95
Capital goods	324	4.65	356	4.77
Construction	166	2.38	187	2.5
Consumer durables	501	7.18	523	7
Finance & real estate	354	5.08	369	4.94
Food & tobacco	1,176	16.86	1,242	16.63
Leisure	1,097	15.73	1,199	16.05
Other	6	0.09	6	0.08
Petroleum	632	9.06	661	8.85
Services	527	7.56	557	7.46
Textiles & trade	608	8.72	654	8.76
Transportation	237	3.4	245	3.28
Utilities	584	8.37	653	8.74
Total	6,974	100	7,470	100

Table 2. Descriptive statistics.

The table presents descriptive statistics for variables used in the main regression analysis for stand-alones and affiliates separately. Data are annual for the period 2002–2011. *SPI* is a measure of firm-specific information arriving to the security market based on R^2 from the augmented market model regression, i.e., *SPI* = $\ln((1 - R^2)/ R^2$. The table also reports summary statistics for our control variables: firm-specific operating volatility (*VARROA*); profitability measured by the return on asset (*ROA*); growth opportunities (*MB*); leverage (*LEV*); firm size (*MKTCAP*); dividend payouts (*DIV*); product market concentration as measured by the Herfindahl index (*HERF*); the natural log of the number of firms in each industry (*NIND*); absolute total accruals divided by absolute operating cash flows (*ACC*); the natural logarithm of the number of analysts issuing forecasts for a firm (*NAF*); and trading volume measured by the average of monthly trading turnover (*VOL*). *ANTI-SD* is the country-level index of the strength of protection for minority shareholders against corporate insiders' dysfunctional behavior (Djankov, La Porta, Lopez-de-Silanes, and Shliefer, 2008). Detailed variable definitions are provided in Appendix A. ***, ** and * indicates that the difference in means between affiliates and stand-alones is significant at the 1%, 5% and 10% level, respectively.

	Stand-alones					***Business-group affiliates***				**t-test**	**Wilcoxon**
	N	Mean	Median	Std		N	Mean	Median	Std	**p-value**	**p-value**
Dependent variables:											
SPI	6,974	0.8252	0.8095	0.8503		7,470	0.7159	0.6840	0.8535	***	***
Control variables:											
VARROA	6,974	1.3927	1.3129	2.5858		7,470	1.4702	1.3271	2.4210	*	
ROA	6,974	0.0317	0.0332	0.1008		7,470	0.0304	0.0323	0.1011		
MB	6,974	1.7483	1.1794	2.0529		7,470	1.8651	1.1745	2.3881	***	
LEV	6,974	0.2057	0.1529	0.2056		7,470	0.1997	0.1436	0.2055	*	**
MKTCAP	6,974	4.9904	5.0033	2.2377		7,470	5.4844	5.4720	2.4460	***	***
DIV	6,974	0.0810	0.0718	1.1480		7,470	0.6180	0.1000	1.6882	***	**
HERF	6,974	0.0919	0.0630	0.0622		7,470	0.0953	0.0642	0.0653	***	**
NIND	6,974	9.2579	9.3211	0.7622		7,470	9.2545	9.3211	0.7657		
ACC	6,974	1.2913	0.6171	2.8073		7,470	1.3221	0.6506	2.7951		***
NAF	6,974	2.3902	2.0794	2.4757		7,470	2.6176	2.5649	2.6012	***	***
VOL	6,974	1.1847	0.0374	4.9662		7,470	0.8544	0.0363	4.0345	***	***
ANTI-SD	6,974	0.5396	0.4986	0.1909		7,470	0.5374	0.4986	0.1903		

Table 3. The effect of the group affiliation on stock price informativeness.

This table presents OLS regression results as per Eq.5 on the effect of the business group affiliations on stock price informativeness (*SPI*). The dependent variable is *SPI*. Data are annual for the period 2002–2011. The main variable of interest is *GROUP*, an indicator variable set equal to one if the firm is affiliated with a business group, and zero otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Model	**Pred. Sign**	**(1)**	**(2)**	**(3)**
GROUP $_{t-1}$	-	**-0.1093*** **	**-0.0301** **	**-0.0605*** **
		(-6.17)	**(-2.18)**	**(-3.80)**
$VARROA_{t-1}$	-		-0.0058**	-0.0078
			(-2.16)	(-1.20)
ROA_{t-1}	?		-0.0316	-0.3052***
			(-0.46)	(-2.74)
MB_{t-1}	?		0.0294***	0.0309***
			(7.86)	(3.32)
LEV_{t-1}	?		-0.1049***	-0.0721
			(-2.76)	(-1.07)
MKTCAP $_{t-1}$	-		-0.1752***	-0.1259***
			(-29.39)	(-5.40)
DIV $_{t-1}$	+		0.0013***	0.0008
			(4.39)	(1.68)
HERF $_{t-1}$	+		0.0341**	0.0522***
			(2.26)	(3.49)
NIND $_{t-1}$	-		-0.0410***	-0.0428**
			(-2.90)	(-2.71)
ACC $_{t-1}$	-		-0.0007	-0.0012
			(-0.32)	(-0.56)
NAF $_{t-1}$	-		-0.0223***	-0.0312**
			(-5.74)	(-2.57)
VOL $_{t-1}$	-		-0.0169***	-0.0413***
			(-5.90)	(-4.92)
ANTI-SD	+			0.1167
				(0.69)
Year dummies		Yes	Yes	Yes
Industry dummies		Yes	Yes	Yes
Country dummies		Yes	Yes	No
Obs.		14,444	14,444	14,444
Adj. R^2		0.17	0.26	0.21

Table 4. The effect of number of firms in a business group and stock price informativeness.

This table presents OLS regression results on the effect of the number of firms in a business group and stock price informativeness (*SPI*). The dependent variable is *SPI*. The indicator variables *SMALL*, *MEDIUM*, and *LARGE* take the value of one if the affiliate belongs to a business group with less than or equal to two firms, greater than two and less than or equal to five firms, and greater than five, respectively. We report results of re-estimating the model on Eq.(5) where we replace *GROUP* with *SMALL*, *MEDIUM*, and *LARGE*. Data are annual for the period 2002–2011. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Model	**Pred. Sign**	**(1)**	**(2)**
LOG_NFIRM $_{t-1}$			**-0.0675*** **
			(-7.28)
SMALL $_{t-1}$	**-**	**-0.0122**	
		(-0.50)	
MEDIUM $_{t-1}$		**-0.1345*** **	
		(-5.20)	
LARGE $_{t-1}$		**-0.1978*** **	
		(-5.94)	
$VARROA_{t-1}$	-	-0.0124***	-0.0125***
		(-3.11)	(-3.22)
ROA_{t-1}	?	-0.7108***	-0.7191***
		(-6.26)	(-8.58)
MB_{t-1}	?	0.0091	0.0092**
		(1.43)	(2.07)
LEV_{t-1}	?	-0.2360***	-0.2320***
		(-3.63)	(-4.72)
MKTCAP $_{t-1}$	-	-0.0001***	-0.0001***
		(-7.66)	(-5.19)
DIV $_{t-1}$	+	0.0001	0.0001
		(1.14)	(0.52)
HERF $_{t-1}$	+	-0.0172	-0.0185
		(-0.12)	(-0.26)
NIND $_{t-1}$	-	-0.0481**	-0.0483***
		(-2.22)	(-4.50)
ACC $_{t-1}$	-	0.0017	0.0017
		(0.62)	(0.58)
NAF $_{t-1}$	-	-0.0863***	-0.0863***
		(-10.94)	(-21.65)
VOL $_{t-1}$	-	0.0029*	0.0032**
		(1.89)	(2.07)
ANTI-SD	-	0.3322*	0.3397***
		(1.80)	(6.94)
Year dummies		Yes	Yes
Industry dummies		Yes	Yes
Country dummies		No	No
Obs.		14,444	14,444
Adj. R^2		0.21	0.20

Table 5. The effect of the group affiliation on stock price informativeness—Within-group analysis.

This table presents regression results on the effect of the business group affiliations on stock price informativeness. The dependent variable is *SPI*. Data are annual for the period 2002–2011. *ULTIMATE OWNERS'DIRECT OWNERSHIP* denotes the ultimate owner's direct ownership percentage. *RELATIVE LEVEL* denotes the number of layers of firms that exist between a group firm and its ultimate controlling shareholder. *VERTICAL* is an indicator for a business group where the controlling shareholder holds both direct and indirect stakes in affiliated firms. *APEX* (*BOTTOM*) is an indicator variable which equals one if an affiliate is at the very top (bottom) of the pyramid. *HIGH_GROWTH* is an indicator for firm-year observations with market-to-book ratio greater than the sample median. Data are annual for the period 2002–2011. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
ULTIMATE OWNERS' CASH FLOW RIGHT	**-0.0009** **(-2.03)**									
RELATIVE LEVEL		**0.0089*** **(3.40)**								
APEX					**-0.1569*** **(-6.21)**	**-0.1731*** **(-6.09)**	**-0.1504*** **(-5.74)**	**-0.1686*** **(-5.77)**		
APEX *HIGH_GROWTH						**0.0353** **(0.90)**		**0.0395** **(1.01)**		
BOTTOM			**0.0998**** **(2.58)**	**0.0404** **(0.80)**			**0.0416** **(1.04)**	**-0.0204** **(-0.40)**		
BOTTOM *HIGH_GROWTH				**0.1330*** **(1.95)**				**0.1374**** **(2.03)**		
VERTICAL									**0.1003*** **(3.12)**	**0.0320** **(0.95)**
VERTICAL *HIGH_GROWTH										**0.1466*** **(4.92)**
$VARROA_{t-1}$	-0.0062 (-1.52)	-0.0069* (-1.71)	-0.0069* (-1.71)	-0.0070* (-1.73)	-0.0070* (-1.76)	-0.0071* (-1.76)	-0.0070* (-1.74)	-0.0071* (-1.77)	-0.0045 (-1.01)	-0.0051 (-1.14)
ROA_{t-1}	-0.0773 (-0.72)	-0.0632 (-0.61)	-0.0678 (-0.66)	-0.0658 (-0.64)	-0.0741 (-0.72)	-0.0774 (-0.75)	-0.0748 (-0.73)	-0.0765 (-0.74)	-0.0657 (-0.52)	-0.0938 (-0.73)
MB_{t-1}	0.0291*** (5.39)	0.0264*** (5.05)	0.0263*** (5.00)	0.0252*** (4.76)	0.0257*** (4.99)	0.0249*** (4.76)	0.0256*** (4.97)	0.0236*** (4.47)	0.0322*** (5.31)	0.0220*** (3.44)
LEV_{t-1}	-0.1057* (-1.75)	-0.0721 (-1.23)	-0.0707 (-1.20)	-0.0691 (-1.18)	-0.0622 (-1.06)	-0.0605 (-1.03)	-0.0620 (-1.06)	-0.0585 (-1.00)	-0.1293* (-1.85)	-0.1100 (-1.58)
$MKTCAP_{t-1}$	-0.1636*** (-18.82)	-0.1714*** (-20.43)	-0.1671*** (-19.85)	-0.1675*** (-19.94)	-0.1647*** (-19.82)	-0.1654*** (-19.85)	-0.1640*** (-19.70)	-0.1653*** (-19.85)	-0.1672*** (-17.01)	-0.1756*** (-17.85)
DIV_{t-1}	0.0014*** (3.83)	0.0014*** (3.95)	0.0014*** (3.87)	0.0014*** (3.88)	0.0014*** (4.02)	0.0014*** (3.98)	0.0014*** (4.02)	0.0014*** (3.99)	0.0013*** (3.32)	0.0013*** (3.39)
$HERF_{t-1}$	0.0422** (1.97)	0.0315 (1.47)	0.0348 (1.62)	0.0345 (1.61)	0.0285 (1.34)	0.0284 (1.33)	0.0291 (1.37)	0.0287 (1.35)	0.0505** (2.11)	0.0555** (2.35)
$NIND_{t-1}$	0.0705*** (3.05)	0.0612*** (2.71)	0.0638*** (2.80)	0.0630*** (2.78)	0.0568** (2.55)	0.0568** (2.54)	0.0575*** (2.58)	0.0566** (2.54)	0.0581** (2.20)	0.0601** (2.33)

ACC_{t-1}	0.0044	0.0040	0.0037	0.0038	0.0035	0.0036	0.0035	0.0036	0.0082**	0.0082**
	(1.27)	(1.16)	(1.09)	(1.11)	(1.04)	(1.04)	(1.02)	(1.05)	(2.04)	(2.01)
NAF_{t-1}	-0.0234***	-0.0237***	-0.0238***	-0.0242***	-0.0247***	-0.0246***	-0.0246***	-0.0250***	-0.0260***	-0.0255***
	(-3.95)	(-4.08)	(-4.11)	(-4.18)	(-4.29)	(-4.27)	(-4.28)	(-4.34)	(-3.75)	(-3.70)
VOL_{t-1}	-0.0260***	-0.0180***	-0.0175***	-0.0174***	-0.0170***	-0.0171***	-0.0170***	-0.0169***	-0.0188***	-0.0193***
	(-4.29)	(-4.35)	(-4.23)	(-4.21)	(-4.17)	(-4.17)	(-4.14)	(-4.12)	(-3.61)	(-3.74)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,436	6,592	6,592	6,592	6,592	6,592	6,592	6,592	5,004	5,004
Adj. R^2	0.33	0.32	0.31	0.32	0.31	0.32	0.30	0.33	0.34	0.34

Table 6. The effect of the group affiliation on stock price informativeness, conditional on country-level legal enforcement.

This table presents OLS regression results on the effect of the business group affiliations on stock price informativeness (*SPI*). The dependent variable is *SPI*. Data are annual for the period 2002–2011. The test variable, *GROUP*, is an indicator variable set equal to one if the firm is affiliated with a business group, and zero otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively. The reported *t*-statistics associated with *GROUP*FACTOR* are based on one-tailed test.

		Legal enforcement	
FACTOR =	**Pred. Sign**	**(1) LEGAL**	**(2) ANTI-SD**
$GROUP_{t-1}$	-	-0.1064***	-0.1516***
		(-7.05)	(-4.17)
FACTOR	-	0.3319*	0.2520
		(1.73)	(1.34)
$GROUP_{t-1}$* FACTOR	+	**0.0605****	**0.1200****
		(1.98)	**(1.96)**
$VARROA_{t-1}$	-	-0.0147***	-0.0136***
		(-3.22)	(-3.02)
ROA_{t-1}	?	-0.7182***	-0.6999***
		(-6.53)	(-6.08)
MB_{t-1}	?	0.0020	0.0084
		(0.29)	(1.27)
LEV_{t-1}	?	-0.2459***	-0.2142***
		(-4.12)	(-3.24)
$MKTCAP_{t-1}$	-	-0.0001***	-0.0001***
		(-8.15)	(-10.14)
DIV_{t-1}	+	0.0007*	0.0003
		(1.69)	(0.65)
$HERF_{t-1}$	+	0.0169	0.0005
		(0.14)	(0.00)
$NIND_{t-1}$	-	-0.0286	-0.0496**
		(-1.46)	(-2.22)
ACC_{t-1}	-	0.0015	0.0019
		(0.58)	(0.69)
NAF_{t-1}	-	-0.0882***	-0.0867***
		(-11.92)	(-11.63)
VOL_{t-1}	-	-0.0006	0.0067**
		(-0.12)	(2.09)
Year dummies		Yes	Yes
Industry dummies		Yes	Yes
Country dummies		No	No
Obs.		14,444	14,444
Adj. R^2		0.17	0.17

Table 7. The effect of the group affiliation on stock price informativeness, conditional on organizational complexity.

This table presents OLS regression results on the effect of the business group affiliations on stock price informativeness (*SPI*). The dependent variable is *SPI*. Data are annual for the period 2002–2011. The test variable, *GROUP*, is an indicator variable set equal to one if the firm is affiliated with a business group, and zero otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively. The reported t-statistics associated with GROUP*FACTOR are based on one-tailed test.

Model	**Pred. Sign**	**(1)**	**(2)**
GROUP $_{t-1}$	**-**	**-0.0936*****	**-0.0701*****
		(-5.25)	**(-3.08)**
GEOGRAPHIC_SEG	-	-0.1580***	-0.1287***
		(-7.56)	(-4.79)
GROUP $_{t-1}$* GEOGRAPHIC_SEG	+		**-0.0548****
			(-1.84)
VARROA$_{t-1}$	-	-0.0130***	-0.0131***
		(-3.10)	(-3.12)
ROA$_{t-1}$	?	-0.7037***	-0.7003***
		(-8.07)	(-8.03)
MB$_{t-1}$	?	0.0125***	0.0125***
		(2.78)	(2.78)
LEV$_{t-1}$	?	-0.2352***	-0.2344***
		(-4.75)	(-4.73)
MKTCAP $_{t-1}$	-	-0.0002***	-0.0002***
		(-5.88)	(-5.96)
DIV $_{t-1}$	+	0.0000	0.0000
		(0.11)	(0.10)
HERF $_{t-1}$	+	-0.0133	-0.0139
		(-0.18)	(-0.19)
NIND $_{t-1}$	-	-0.0545***	-0.0545***
		(-4.99)	(-4.99)
ACC $_{t-1}$	-	0.0015	0.0016
		(0.51)	(0.53)
NAF $_{t-1}$	-	-0.0773***	-0.0772***
		(-18.42)	(-18.42)
VOL $_{t-1}$	-	0.0030	0.0032
		(1.01)	(1.10)
		0.2916***	0.2904***
		(5.89)	(5.87)
Year dummies		Yes	Yes
Industry dummies		Yes	Yes
Country dummies		No	No
Obs.		14,444	14,444
Adj. R^2		0.22	0.22

Table 8. The contagion effect of the group affiliation on stock return.

This table presents OLS regression results on the contagion effect of the business group affiliations on stock return. The dependent variable is a weekly stock return. The test variable, *VWRET_GROUP*, is a value-weighted weekly return for the affiliates per the business group. We categorize all weeks into "jump" weeks and "crash" weeks. Jump (crash) weeks are weeks with firm-specific weekly returns above (below) 3.2 standard deviation. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Dep Variable =	**Pred. Sign**	**Jump Risk Week**	**Crash Risk Week**
$VWRET\_GROUP_t$	**+**	**0.9592*** **	**0.9276*** **
		(45.60)	**(31.28)**
$VARROA_{t-1}$	+/-	-0.0002	0.0000
		(-0.67)	(0.06)
ROA_{t-1}	?	0.0087	0.0060
		(1.26)	(0.58)
MB_{t-1}	-	-0.0002	-0.0002
		(-0.69)	(-0.49)
LEV_{t-1}	?	-0.0019	0.0048
		(-0.67)	(1.23)
$MKTCAP_{t-1}$	-	0.0007*	-0.0005
		(1.66)	(-0.92)
DIV_{t-1}	+	0.0000	-0.0000
		(0.62)	(-0.32)
$HERF_{t-1}$	+	-0.0019	0.0098*
		(-0.46)	(1.74)
$NIND_{t-1}$	-	-0.0001	0.0014
		(-0.14)	(1.60)
ACC_{t-1}	-	-0.0000	0.0003
		(-0.10)	(1.13)
NAF_{t-1}	-	0.0001	-0.0002
		(0.53)	(-0.40)
VOL_{t-1}	+	-0.0037	0.0031
		(-0.54)	(0.35)
ANTI-SD	+	-0.0015	0.0002
		(-0.57)	(0.04)
Year dummies		Yes	Yes
Industry dummies		Yes	Yes
Country dummies		No	No
Obs.		6,333	3,464
Adj. R^2		0.36	0.34

Table 9. The effect of the group affiliation on stock price informativeness conditional on the ownership type.

This table presents OLS regression results on the effect of the business group affiliations on stock price informativeness (*SPI*). The dependent variable is *SPI*. Data are annual for the period 2002–2011. STATE, INDUSTRY, and FAMILY are an indicator variable where the ultimate owner of groups is the State, an industrial firm, and a family firm, respectively. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Pred. Sign	***Stand-alones***	***Business-group affiliates***
STATE $_{t-1}$		**-0.3592*** **	**-0.1999*** **
		(-2.61)	**(-2.89)**
INDUSTRY $_{t-1}$		**0.0829***	**-0.1102***
		(1.87)	**(-1.96)**
FAMILY $_{t-1}$		**0.2836*** **	**0.0530**
		(5.56)	**(0.78)**
$VARROA_{t-1}$	-	-0.0085	-0.0159***
		(-1.64)	(-2.77)
ROA_{t-1}	?	-0.6544***	-0.7561***
		(-5.61)	(-6.41)
MB_{t-1}	?	-0.0016	0.0166***
		(-0.24)	(2.97)
LEV_{t-1}	?	-0.2635***	-0.1949***
		(-4.13)	(-2.73)
MKTCAP $_{t-1}$	-	-0.0002***	-0.0001***
		(-4.38)	(-3.66)
DIV $_{t-1}$	+	-0.0001	0.0001
		(-0.57)	(0.39)
HERF $_{t-1}$	+	0.0710	-0.0615
		(0.79)	(-0.60)
NIND $_{t-1}$	-	-0.0373***	-0.0531***
		(-2.70)	(-3.32)
ACC $_{t-1}$	-	-0.0053	0.0079*
		(-1.25)	(1.91)
NAF $_{t-1}$	-	-0.0775***	-0.0932***
		(-14.76)	(-16.45)
VOL $_{t-1}$	-	0.0056**	0.0029
		(2.22)	(1.42)
ANTI-SD	-	0.2902***	0.4263***
		(4.44)	(6.03)
Year dummies		Yes	Yes
Industry dummies		Yes	Yes
Country dummies		Yes	Yes
Obs.		6,974	7,470
Adj. R^2		0.19	0.22

Table 10. Crash and Jump Risk

This table presents OLS regression results on the effect of the business group affiliations on stock positive price jump and negative price (crash) risk. The dependent variables in Columns (1) and (2) are *UDVOL* and *DUVOL*, respectively. Data are annual for the period 2002–2011. The test variable, *GROUP*, is an indicator variable set equal to one if the firm is affiliated with a business group, and 0 otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Model	**(1)**	**(2)**
Dep. Variable =	*UDVOL*	*DUVOL*
GROUP $_{t-1}$	**0.0139****	**-0.0163****
	(1.96)	**(-2.47)**
$NCSKEW_{t-1}$		0.0123***
		(3.14)
$PCSKEW_{t-1}$	-0.0107**	
	(-2.46)	
$TRADE\_VOLUME_{t-1}$	0.0014	-0.0019
	(0.53)	(-0.75)
$RETURN\_SD_{t-1}$	0.5272***	-0.5220***
	(22.33)	(-22.83)
$RETURN_{t-1}$	-0.0337***	0.0317***
	(-3.90)	(3.93)
$MKTCAP_{t-1}$	-0.0240***	0.0228***
	(-10.58)	(10.64)
MB_{t-1}	-0.0089***	0.0036*
	(-3.47)	(1.96)
LEV_{t-1}	-0.0043	0.0056
	(-0.22)	(0.31)
ROA_{t-1}	0.0096	0.0080
	(0.25)	(0.22)
$OPACITY_{t-1}$	-0.0008	0.0006
	(-0.60)	(0.53)
Year dummies	Yes	Yes
Industry dummies	Yes	Yes
Country dummies	Yes	Yes
Obs.	14,444	14,444
Adj. R^2	0.09	0.08

Table 11. Crash and Jump Risk and of number of firms in a business group

This table presents OLS regression results on the effect of the business group affiliations on stock positive price jump and negative price (crash) risk. The dependent variable in Columns (1) and (2) is *UDVOL*, while the dependent variable in Columns (3) through (4) is *DUVOL*. Data are annual for the period 2002–2011. The indicator variables *SMALL*, *MEDIUM*, and *LARGE* take the value of one if the affiliate belongs to a business group with less than or equal to two firms, greater than two and less than or equal to five firms, and greater than five, respectively. We report results of re-estimating the model on Eq.(6) where we replace *GROUP* with *SMALL*, *MEDIUM*, and *LARGE*. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Model	**Pred. Sign**	**(1)**	**(2)**	**(3)**	**(4)**
Dep. Variable =		*UDVOL*		*DUVOL*	
LOG_NFIRM $_{t-1}$			0.0083**		-0.0087**
			(2.14)		(-2.38)
SMALL $_{t-1}$	-	0.0131		-0.0143	
		(1.27)		(-1.48)	
MEDIUM $_{t-1}$		0.0097		-0.0125	
		(0.89)		(-1.24)	
LARGE $_{t-1}$		0.0195*		-0.0223**	
		(1.84)		(-2.27)	
$NCSKEW_{t-1}$	-			0.0108***	0.0109***
				(2.69)	(2.70)
$PCSKEW_{t-1}$		-0.0089**	-0.0089**		
	?	(-2.00)	(-2.01)		
$TRADE\_VOLUME_{t-1}$		-0.0011	-0.0011	0.0011	0.0011
	?	(-1.50)	(-1.51)	(1.52)	(1.54)
$RETURN\_SD_{t-1}$		0.2812***	0.2812***	-0.2835***	-0.2835***
	?	(17.97)	(17.97)	(-18.14)	(-18.15)
$RETURN_{t-1}$		-0.0288***	-0.0290***	0.0248***	0.0250***
	-	(-3.42)	(-3.44)	(3.08)	(3.10)
$MKTCAP_{t-1}$		-0.0274***	-0.0276***	0.0242***	0.0243***
	+	(-11.86)	(-11.86)	(12.04)	(12.06)
MB_{t-1}		-0.0001*	-0.0001*	0.0000***	0.0000***
	+	(-1.67)	(-1.67)	(2.78)	(2.80)
LEV_{t-1}		0.0005	0.0009	0.0059	0.0057
	-	(0.03)	(0.05)	(0.34)	(0.33)
ROA_{t-1}		0.0017	0.0017	-0.0014	-0.0015
	-	(0.60)	(0.63)	(-0.51)	(-0.54)
OPACITY $_{t-1}$		-0.0001*	-0.0001*	0.0001*	0.0001*
	-	(-1.91)	(-1.90)	(1.81)	(1.80)
Year dummies	-	Yes	Yes	Yes	Yes
Industry dummies		Yes	Yes	Yes	Yes
Country dummies	-	Yes	Yes	Yes	Yes
Obs.		14,444	14,444	14,444	14,444
Adj. R^2		0.09	0.09	0.09	0.08

Table 12. The effect of group affiliation on market reaction to earnings announcement.

This table presents OLS regression results comparing the effect of the business group affiliations on stock market reaction to firms' earnings announcement in the good news period versus in the bad news period. The table presents results for Eq. (7). Data are quarterly for the period 2002–2011. The test variable, *GROUP*, is an indicator variable set equal to one if the firm is affiliated with a business group, and zero otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

		(1)	(2)	(3)
Model	**Pred. Sign**	**Full sample**	**Bad news subsample**	**Good news subsample**
GROUP	+	**0.0079***	**0.0064**	**0.0112****
		(1.84)	**(1.20)**	**(2.56)**
Diff.			***-0.0048****	
			(-2.01)	
NAF	+	-0.0027	-0.0074	0.0049
		(-0.80)	(-1.35)	(1.25)
MKTCAP	-	-0.0149***	-0.0160**	-0.0156***
		(-3.90)	(-2.51)	(-7.91)
MB	+	0.0056***	0.0091***	-0.0009
		(3.25)	(3.60)	(-0.53)
LEV	+	0.0860**	0.1012**	0.0610***
		(2.63)	(2.21)	(2.98)
DISP	+	0.0147*	0.1038	0.0098***
		(1.72)	(1.67)	(4.37)
REPLAG	+	0.0053	0.0110**	-0.0000
		(1.24)	(2.18)	(-0.02)
Year dummies		Yes	Yes	Yes
Industry dummies		Yes	Yes	Yes
Country dummies		Yes	Yes	Yes
Obs.		12,980	7,163	5,817
Adj. R^2		0.11	0.10	0.21

Table 13. The effect of group affiliation on analysts' forecasts.

The dependent variable for the regressions is analyst forecast error (*AFE*) in the first three columns of Table 6, and forecast dispersion (*DISP*) in the last three columns of Table 6. Data are annual for the period 2002–2011. The test variable, *GROUP*, is an indicator variable set equal to one if the firm is affiliated with a business group, and zero otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Dep. Variable =		**Analysts forecast error (*AFE*)**			**Analysts forecast dispersion (*DISP*)**		
Model	Pred. Sign	Full sample	Bad news subsample	Good news subsample	Full sample	Bad news subsample	Good news subsample
GROUP $_{t-1}$	-/+	**0.0008**	**-0.0010**	**0.0041***	**0.0023***	**0.0006**	**0.0050****
		(0.38)	**(-0.40)**	**(1.89)**	**(1.94)**	**(0.27)**	**(2.14)**
Diff.			***0.0051****			***0.0044****	
			[1.79]			***[1.98]***	
ANALYSTS $_{t-1}$	-	-0.0011*	-0.0002	-0.0027***	-0.0007	-0.0008	-0.0011
		(-1.71)	(-0.19)	(-2.84)	(-1.31)	(-0.97)	(-1.41)
MKTCAP$_{t-1}$	-	-0.0067***	-0.0071***	-0.0061***	-0.0032***	-0.0030***	-0.0032***
		(-7.41)	(-6.27)	(-4.78)	(-4.38)	(-3.15)	(-3.24)
MB$_{t-1}$	-	-0.0100***	-0.0096***	-0.0100***	-0.0077***	-0.0073***	-0.0079***
		(-11.30)	(-8.41)	(-8.17)	(-11.28)	(-7.72)	(-8.55)
LEV$_{t-1}$	+	0.0057	0.0060	0.0065	-0.0002	0.0031	-0.0022
		(0.94)	(0.81)	(0.76)	(-0.04)	(0.49)	(-0.33)
BIG4$_{t-1}$	-	-0.0060*	-0.0033	-0.0096*	-0.0019	-0.0002	-0.0045
		(-1.66)	(-0.80)	(-1.76)	(-0.68)	(-0.06)	(-1.14)
OPERCYCLE $_{t-1}$	+	-0.0043**	-0.0058**	-0.0028	-0.0057***	-0.0070***	-0.0043*
		(-2.10)	(-2.20)	(-0.97)	(-3.37)	(-3.11)	(-1.88)
CFO_STD $_{t-1}$	+	0.0272	0.0525**	0.0009	-0.0019	0.0091	-0.0128
		(1.54)	(2.27)	(0.04)	(-0.13)	(0.46)	(-0.66)
Year dummies		Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies		Yes	Yes	Yes	Yes	Yes	Yes
Country dummies		Yes	Yes	Yes	Yes	Yes	Yes

Obs.	5,339	2,931	2,408	4,464	2,462	2,002
Adj. R^2	0.23	0.24	0.25	0.14	0.15	0.16

Table 14. The effect of the group affiliation on stock price informativeness and jump and crash risks after controlling potential endogeneity.

This table presents simultaneous regression results on the effect of the business group affiliations on stock price informativeness. Data are annual for the period 2002–2011. The test variable, *GROUP*, is an indicator variable set equal to one if the firm is affiliated with a business group, and zero otherwise. Variable definitions are provided in Appendix A. Errors are robust and clustered at the firm level. *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Dep. Variable	**1st Stage Model Pr(Group Indicator=1)**	**2nd Stage Model SPI**
Group		**-0.0420*** (-4.25)**
Firm-level controls:		
$VARROA_{t-1}$	0.0020***	-0.0095***
	(3.45)	(-6.48)
ROA_{t-1}	-0.0593***	-0.1736***
	(-5.94)	(-6.87)
MB_{t-1}	-0.0032***	0.0189***
	(-6.78)	(15.65)
LEV_{t-1}	-0.0258***	-0.1186***
	(-4.28)	(-7.64)
$MKTCAP_{t-1}$	0.0207***	-0.1150***
	(29.02)	(-62.22)
DIV_{t-1}	0.0005***	0.0013***
	(6.05)	(6.24)
$HERF_{t-1}$	0.0122***	0.0156***
	(6.17)	(2.80)
$NIND_{t-1}$	0.0099***	0.0201***
	(5.75)	(3.68)
ACC_{t-1}	0.0000	-0.0006
	(0.08)	(-0.60)
NAF_{t-1}	-0.0014**	-0.0450***
	(-2.31)	(-28.90)
VOL_{t-1}	-0.0500***	-0.0666***
	(-7.92)	(-4.17)
Instrumental variables:		
RD_INTENSITY	0.1046	
	(0.86)	
EXTERNALFINANCE	0.1428***	
	(4.08)	
LERNERINDEX	0.1831***	
	(4.47)	
INDEX_RET	0.0003	
	(0.34)	
Year dummies	Yes	Yes
Industry dummies	No	Yes
Country dummies	Yes	Yes

Obs.	75,300	12,071
Pseudo R^2	0.05	0.29