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INFORMATION ENVIRONMENT, THE ORGANIZATION OF FIRMS, AND

INVESTMENT DECISIONS

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Abstract

In this dissertation, I examine whether a richer information environment facilitates the delegation of decision making within firms, and whether delegation increases the responsiveness of investment to growth opportunities. I argue that a richer information environment increases the delegation of decisions from the CEO to division managers since richer information (i) helps the CEO mitigate agency conflicts with division managers, and (ii) helps division managers make more informed decisions. Furthermore, I predict that delegation increases the responsiveness of investment to growth opportunities because delegation can reduce the CEO's time and information processing capacity constraints. Using a novel international survey dataset, I find that a richer information environment increases delegation. I further find that this relation is stronger when agency frictions of delegation are more severe, and when the benefits of using relevant information are greater for division managers. Next, my results show that firms that delegate more decision making exhibit greater investment sensitivity to growth opportunities, and that the effect of delegation is stronger when the information environment is richer. I exploit the adoption of IFRS, shocks to agency conflicts, and shocks to growth opportunities to mitigate potential endogeneity concerns.

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Dedication

Dedicated to my wonderful wife Marzieh, my love and best friend

1 Introduction

Corporate investments in growth opportunities are critical not only for stakeholders of the firm but also for macroeconomic growth.[1] However, making efficient investment decisions involves costly activities (e.g., identifying investment opportunities; collecting and processing relevant information) that demand a significant amount of time and information processing capacity. Therefore, to the extent that managers with decision making authority (e.g., CEOs) have limited time and capacity, they might pass up some of their investment opportunities (Simon, 1973; Bloom et al., 2012). The *delegation of decision making* for division-level decisions from CEOs (or headquarters)[2] to division managers reduces CEOs' time and capacity constraints (Garicano, 2000), allowing them to allocate more time to the remaining investment decisions (division managers can also make more informed decisions on the delegated division-level decisions (see section 2.2)). Thus, I argue that delegation can improve the responsiveness of investment to growth opportunities. Furthermore, I argue that delegation, in turn, depends on the information that the CEO can use to mitigate agency frictions with division managers and on the information that these managers can obtain to make informed decisions. To investigate these arguments, I use the information disclosed by peer firms in the industry and their information intermediaries (i.e., peer information environment),[3] and explore (i) whether and how a richer peer information environment induces greater delegation of decision making from the CEO to division managers and (ii) whether delegation results in greater investment sensitivity to growth opportunities.

My first prediction is that a richer peer information environment increases delegation through two channels. First, it helps division managers obtain decision-relevant information and make more informed decisions, motivating the CEO to increase delegation (*managerial learning channel*). The decisions by firms in the same industry (e.g., capital investments, production) are influenced by common economic factors, such as future product demand, expected profitability, and growth opportunities (Admati and Pfleiderer, 2000; Durnev and Mangen, 2009). Thus, same-industry

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[1] See Stein (2003) and Roychowdhury et al. (2019) for reviews of the literature on corporate investment.

[2] Throughout the paper, I use the terms CEO and headquarters interchangeably.

[3] I exploit the peer information environment, rather than the firm's own information environment, for two main reasons. First, peer information conveys valuable information that is unlikely to be available from the firm's own information (particularly about industry-level factors), and thus has significant influence on firms' investment decisions (Badertscher et al., 2013; Chen et al., 2013). Second, using peer information minimizes the endogeneity challenges because a firm's own information is largely shaped by the agents who choose the degree of delegation (i.e., CEOs). However, this point is not to suggest that using peer information eliminates endogeneity concerns (see section 5.1).

peer firms' disclosures convey valuable information (e.g., customer contracts, performance, capital investments, planned projects) that is relevant to understanding the common economic factors (Badertscher et al., 2013; Shroff et al., 2017). To the extent that division managers' information set about these economic factors is incomplete, peer information reduces their uncertainty. To optimize the CEO's limited time, when division managers can make informed decisions, decision rights are allocated to them (Garicano and Van Zandt, 2013; Graham et al., 2015). Thus, richer peer information can increase delegation by helping division managers obtain relevant information and make informed decisions.

Second, peer information can help the CEO evaluate and monitor division managers, mitigating agency costs that may arise from delegation (*agency cost mitigation channel*). To the extent that the division manager's and CEO's preferences are not perfectly aligned, the manager may make decisions that differ from the CEO's preferences, leading to a costly loss of control for the CEO (e.g., Aghion and Tirole, 1997; Nagar, 2002). For example, division managers may have incentives to extract private benefits, build their own mini-empires, or shirk to enjoy a "quiet life" (Jensen, 1986; Bertrand and Mullainathan, 2003; Graham et al., 2015). However, peer information can provide insights into division managers' decisions. For example, CEOs can use peer information to obtain relevant information about the extent of competition, growth opportunities, and the profitability and investment expenditures of peer firms, all of which provide useful benchmarks for evaluating and monitoring the decisions and performance of division managers (Holmstrom, 1982; Shroff et al., 2014). Thus, richer peer information can reduce agency costs of delegation. Based on these two arguments, I predict that a richer peer information environment increases delegation.

Nevertheless, whether peer information increases delegation is ultimately an empirical question. Agency frictions between the CEO and division manager can be mitigated by alternative mechanisms, such as trust between the CEO and division manager (Bloom et al., 2012). If other mechanisms completely remove agency frictions, then peer information will not play an agency mitigation role. Furthermore, the use of peer information imposes processing costs on division managers (Hirshleifer and Teoh, 2003; Blankespoor, 2019). If the information processing costs are greater than the expected benefits of learning from peer information and resolving uncertainty, division managers might not seek to use such information. Finally, similar to the division manager, the CEO can use peer information to reduce his or her uncertainty and make informed decisions,

i.e., CEO learning. Thus, the effect of learning from peer information could depend on the relative learning of the division manager and CEO. To the extent that peer information reduces the CEO's uncertainty more than the division manager's uncertainty, the CEO could have a weaker incentive to delegate decisions to the division manager.

The second prediction is that a greater degree of delegation increases investment sensitivity to growth opportunities. CEOs have limited time and information processing capacity (Simon, 1973; Sims, 2003; Garicano and Van Zandt, 2013).[4] Thus, to the extent that CEOs do not delegate decision making, they might forgo investment opportunities because they face time and capacity constraints. Therefore, when delegation is more costly (e.g., when the information environment is poor), it is more difficult for firms to take advantage of their growth opportunities. However, a greater degree of delegation reduces the time and capacity constraints on CEOs (Garicano, 2000; Gibbons et al., 2013), helping firms more efficiently exploit their growth opportunities. Thus, I argue that greater delegation improves investment sensitivity to growth opportunities.

Moreover, delegation reduces information transfers within firms, enhancing investment sensitivity. When the CEO retains the decision rights, to the extent that the division manager has relevant information (Chen et al., 2018), that information must be communicated to the CEO. After making decisions, the CEO must instruct the division manager on what actions to take. Such communication can be noisy and time-consuming, leading to information loss and decision making delays (Jensen and Meckling, 1992; Dewatripont and Tirole, 2005). However, when decision making is delegated, information is processed at the level at which it is used, and therefore the need for communication is reduced. Thus, delegation can help division managers make more informed investment decisions and respond promptly to changes in growth opportunities, thereby increasing investment sensitivity to growth opportunities. However, to the extent that agency problems remain unresolved, delegation may not have this positive effect. For instance, division managers may prefer to avoid costly efforts and make fewer investments in growth opportunities.

To obtain detailed information on the internal organization of firms, I rely on a novel international dataset from the World Management Survey (WMS), as detailed in Bloom et al. (2012). The survey data include public and private firms and are obtained through in-depth interviews with

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[4]Prior research documents that even the most sophisticated investors (human or computer) face these constraints and have limits on the amount of information they can process (Blankespoor et al., 2019).

division managers, with interview questions designed to be directly applicable to extant theories of firm organization. To measure the degree of delegation, I use WMS data on division managers' responses about their authority over four decisions: capital investment, hiring employees, introducing new products, and sales and marketing decisions.[5]

I rely on theoretical models exploring peer information (Holmstrom, 1982; Admati and Pfleiderer, 2000; Foucault and Fresard, 2014) and construct a proxy for the richness of peer information to measure: (i) the aggregate amount (i.e., number of signals), (ii) the quality (i.e., signal precision), and (iii) the relevance (i.e., extent to which signals contain information about common economic factors) of peer information. Specifically, I use the amount of press coverage received by firms (Bushee et al., 2010; Guest, 2017), accruals quality of firms (Dechow and Dichev, 2002), and the degree of earnings synchronicity (Shroff et al., 2017) in the division's industry-country to measure the richness of peer information.

In line with prior research (e.g., Hubbard, 1998; Badertscher et al., 2013), I interpret investment sensitivity to growth opportunities as a proxy for investment efficiency. Furthermore, I measure investment as the change in fixed assets (Desai et al., 2009; Asker et al., 2014) and rely on sales growth to proxy for growth opportunities (Bloom et al., 2007; Biddle et al., 2009).

The analyses test for both predictions. Consistent with my first prediction, I find that firms with richer peer information exhibit a greater degree of delegation, even after controlling for time-varying division-, firm-, and industry-level variables that might affect delegation (e.g., firm size, incentive contracts, CEO's span of control) and including several fixed effects (survey interviewer, year, industry, country). The finding is also robust to alternative functional forms of peer information and delegation measures, standard errors clustered on different dimensions, the use of alternative industry classifications, and exclusions of individual countries from the sample.

Next, I explore the two channels through which peer information increases delegation (i.e., agency cost mitigation and managerial learning channels) using four cross-sectional tests. I explore the agency cost mitigation channel using two tests. If peer information plays an agency cost mitigation role, the effect of peer information on delegation should be weaker when agency problems of delegation are minor. I explore two mechanisms that mitigate agency problems: social trust and product market competition. As Bloom et al. (2012) show, the CEO's trust in the divi-

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[5]See the Appendix B for a detailed discussion of the WMS and the details of interview questions.

sion manager, measured by trust in the headquarters' region, can reflect their congruent objectives. Similarly, division managers operating in competitive industries have stronger incentives to work hard and improve their performance, because they have little slack (Bloom et al., 2010). Thus, high trust and intense competition should mitigate the need to monitor the division manager and reduce the importance of peer information for resolving agency frictions. Accordingly, my results show that the relation between peer information and delegation is weaker when firms are headquartered in high-trust regions and when industry competition is more intense.

Second, I explore the managerial learning channel using two tests. If learning from peer information leads to increased delegation (managerial learning), the positive relation between peer information and delegation should be stronger when the benefits of learning are greater. To capture variation in these benefits, I use two industry characteristics: the degree of investment irreversibility and uncertainty. Investment decisions are characterized by some degree of irreversibility, i.e., investments are, at least partially, sunk and cannot be costlessly recovered after ex post learning that the investment is suboptimal (Pindyck, 1991). Thus, the value of obtaining decision-relevant information to avoid suboptimal investments increases with the degree of investment irreversibility. Similarly, when industry uncertainty is low, division managers are less likely to learn and benefit from peer information, whereas greater uncertainty increases the benefits of richer peer information. Consistent with these arguments, I predict and find that the positive relation between peer information and delegation emerges as stronger in industries with a greater degree of investment irreversibility and a higher level of uncertainty.

Next, I move on to study whether delegation increases investment sensitivity to growth opportunities. Consistent with my prediction, firms that delegate more decision making exhibit greater investment sensitivity. This result is robust to the inclusion of several control variables (e.g., financing constraints) and fixed effects (year, industry, country). Since the outcome of interest is *investment sensitivity to growth opportunities*, i.e., a slope coefficient, rather than the *investment level*, I provide evidence that my result is robust to controlling for the interaction of growth opportunities with control variables and with fixed effects. My finding is also robust to controlling for peer information and its interaction with growth opportunities, using an alternative proxy for delegation, clustering standard errors on different dimensions, and dropping individual countries from the sample.

Moreover, I examine cross-sectional variation in the relation between delegation and investment sensitivity. When agency frictions between the CEO and division manager are more severe, delegation can lead to inefficient investment decisions. For example, division managers might prefer to avoid risky investment and costly efforts associated with investment decisions (Bertrand and Mullainathan, 2003), and thus undertake fewer investments. Accordingly, I argue that the positive relation between delegation and investment sensitivity to growth opportunities is stronger when division managers have higher incentives to work hard. Supporting this argument, my result shows that the relation is stronger when competition is more intense.

Next, I study whether the agency cost mitigation and the managerial learning role of peer information influence the relation between delegation and investment sensitivity. To the extent that the CEO can use peer information to motivate division managers to make more efficient investment decisions, and peer information helps division managers obtain relevant information to make informed investment decisions, the positive relation between delegation and investment sensitivity should grow stronger with the richness of peer information. I find that the relation between delegation and investment sensitivity is stronger when peer information is richer.

Examining peer, rather than the firm's own, information environment can mitigate potential concerns that delegation and the information environment are endogenously determined by the firm. However, a potential concern is that a common industry-, country-, or time-specific factor might drive peer information and delegation, in which case the results might reflect an omitted variable bias (Manski, 1993). The empirical tests of the effect of delegation on investment sensitivity might also be subject to this concern. Finally, a common concern in investment literature is that growth opportunities are measured with error (Erickson and Whited, 2000, 2012).

I take several steps to mitigate these endogeneity concerns. First, I find that the results are robust to the inclusion of year×industry, year×country, and industry×country fixed effects. Moreover, the positive relationship between delegation and investment sensitivity is robust to controlling for growth opportunities interacted with each of these fixed effects. Second, I employ the adoption of IFRS (capturing the joint effects of new accounting standards and concurrent institutional changes (Christensen et al., 2013)) as a proxy for an improved peer information environment (Hail et al., 2014). A difference-in-differences estimator reveals that firms located in countries that switch to IFRS delegate more than firms located in countries that do not adopt IFRS. The effect of delegation

on investment sensitivity is also stronger for firms located in IFRS-adopting countries. Third, I exploit shocks to industry-level import tariff rates to isolate the effects of peer information on delegation due to the agency cost mitigation channel. Specifically, I use reductions in tariff rates that intensify product market competition (Fresard, 2010), which pressures division managers to work harder (Bloom et al., 2010). Thus, treated firms that experience tariff rate cuts, relative to control firms that do not, should experience lower agency frictions with division managers. Accordingly, I predict that treated firms are less likely to use peer information to mitigate the agency costs of delegation, resulting in a weaker sensitivity of delegation to peer information. The results of difference-in-differences regressions are consistent with this prediction. Finally, following a similar approach used in Asker et al. (2014), I use variations in corporate income tax rates at the country-level as shocks to investment opportunities, eliminating the need to measure investment opportunities (e.g., a tax rate cut increases after-tax returns on investment, improving investment opportunities). I find that the positive effect of delegation on investment sensitivity is unchanged.

This study contributes mainly to two strands of literature. First, prior research documents the real effects of the information environment, particularly on investment decisions (e.g., Biddle et al., 2009; Badertscher et al., 2013; Goodman et al., 2014; Shroff et al., 2014; Shroff, 2017b; Chen, 2019). Investment decisions are made by managers within firms, not just by firms as generic entities. Thus, it is important to explore where, within the corporate hierarchy, decisions are made. As Alonso and Matouschek (2007, p. 1070) point out, "an understanding of what determines the internal allocation of decision rights is . . . a prerequisite for understanding ... the decisions that firms make, such as how much to invest." My paper extends this literature by exploring the real effects of peer information on the *delegation of decision making within firms*. In addition, I show that a richer information environment improves investment decisions *by facilitating delegation*.

Second, my study contributes to the empirical literature on the internal allocation of decision rights. This literature links delegation to incentive contracts (e.g., Nagar, 2002; Indjejikian and Matějka, 2012); the level of trust and firm size (Bloom et al., 2012); and the firm's operating environment and technology characteristics (Acemoglu et al., 2007; Campbell et al., 2009; Robinson and Stocken, 2013; Bloom et al., 2014; Labro et al., 2019). I contribute to this literature by showing that peer information increases delegation through two distinct channels, and that delega-

tion increases investment efficiency. Furthermore, I exploit settings that can mitigate endogeneity concerns that may arise from studying the firm's own choices (e.g., incentive contracts).

2   Prior research and hypotheses

2.1   The peer information environment and investment decisions

This section discusses the role of peer information in reducing managers' uncertainty regarding investment decisions. Corporate disclosures contain significant amounts of information (e.g., key products and services, major customer identities, investment outlays, planned projects, sales, production costs, material contracts, operating risks, and strategic plans) relevant for understanding firms prospects (Beyer et al., 2010). For instance, prior research shows that disclosures on store growth rates provide information about a firm's future sales (Curtis et al., 2013), and forward-looking statements (e.g., such as those in the Management Discussion and Analysis) contain information about future performance and capital expenditures (Li, 2010; Cole and Jones, 2015; Bozanic et al., 2018). These studies suggest that firms' disclosures can be informative about the disclosing firms and the economic environment of the industry (e.g., demand conditions and investment opportunities). In addition, information intermediaries (e.g., financial analysts and the business press) generate, summarize, and disseminate information relevant to reducing uncertainty about firms and industry (Bushee et al., 2010; Kadan et al., 2012; Bonsall et al., 2019).

To the extent that firms in the same industry are affected by common economic factors such as demand, supply, growth opportunities, and labor markets, disclosures about one firm can also provide information relevant to other firms in the industry (Admati and Pfleiderer, 2000; Durnev and Mangen, 2009). Prior research demonstrates that the peer information environment conveys valuable information about these common economic conditions, affecting the investment decisions of firms in an industry. For instance, the literature documents that misreporting by one firm leads to suboptimal capital investments, marketing and sales decisions at peer firms (Durnev and Mangen, 2009; Beatty et al., 2013; Li, 2015), suggesting that managers rely on their peers' disclosure when making decisions. Moreover, richer peer information helps managers reduce their uncertainty and make more efficient investment decisions (Badertscher et al., 2013; Chen et al., 2013; Foucault and Fresard, 2014).[6] In sum, peer information provides valuable information that reduces uncertainty

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[6]This literature also documents that earnings announcements and forecasts are informative to investors of other firms in the industry (Foster, 1981; Baginski, 1987; Arif and De George, 2018), management voluntary disclosures contain macroeconomic information (Anilowski et al., 2007; Bonsal et al., 2013), peer information affects the cost of capital

and improves corporate investments.

2.2 Delegation of decision rights within firms

A large and particularly theoretical literature studies a principal (the CEO or headquarters in my analyses) who has limited time and information capacity to make all decisions related to a firm's operations and who can delegate some decision rights to agents (division managers in my analysis). I do not aim to survey this literature, but instead, provide a brief discussion of the relevant works to provide a framework for my analyses.[7]

There are at least two reasons for delegating operational decisions related to a division, even when the CEO can make more informed decisions than the division manager. First, to the extent that the CEO's time is more limited and more valuable than the division manager's time, delegation is beneficial as it relaxes the CEO's time constraints (Geanakoplos and Milgrom, 1991; Garicano and Rossi-Hansberg, 2006). As Simon (1997, p. 319) puts it, "the superior is presumably a higher paid individual than the subordinate. His time must be conserved for the more important aspects of the work of the organization." Second, even if the CEO's time is not more valuable than that of the division managers, delegation is beneficial as it decreases information transfer and communication costs. Under centralization (i.e., when the CEO retains the authority to make decisions related to a division), the CEO processes relevant information to make decisions. To the degree that the division manager has relevant information on the division's operations (Dessein, 2002), that divisional information must be communicated to the CEO, and after integrating that information with other (e.g., external and industry-level) information and making decisions, the CEO must send detailed instructions to the manager on what actions to take. These communications are costly because (i) communication can be imperfect and noisy leading to the loss of information and less informed decisions,[8] and (ii) the sender must spend time and attention to formulate and

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of newly public firms in the same industry (Shroff et al., 2017), and disclosures by peers affect other firms' voluntary disclosure incentives (Baginski and Hinson, 2016; Breuer et al., 2018).

[7] See Gibbons et al. (2013) for a review of this literature.

[8] The literature studies two sources of imperfect communication. First, when the sender (e.g., a division manager) and the receiver (e.g., a CEO) have different objectives and information is soft (i.e., the receiver cannot verify it), the sender may strategically communicate information (e.g., through misreporting or withholding information) to bias the principal toward his or her preferred action (Holmstrom, 1984; Dessein, 2002). Second, even if objectives are perfectly aligned, communication can be imperfect and costly because the sender is ex-ante uncertain about what specific piece(s) of idiosyncratic information is relevant and will be used by the receiver, as described in Jensen and Meckling (1992), or because communication is typically channeled through reports with a "coarse" aggregation level and information summary (e.g., product cost reports), as modeled in Melumad et al. (1992).

communicate the information effectively, and the receiver must spend time by paying attention, decoding, and understanding the acquired information (Dewatripont and Tirole, 2005).[9]

However, delegation can also lead to a costly "loss of control" borne by the CEO. The source of these control costs can be agency costs resulting from the opportunistic behavior of the division manager (Aghion and Tirole, 1997; Nagar, 2002).[10] To the degree that the division manager's and CEO's preferences are not perfectly aligned, delegation allows the manager to make decisions that can be suboptimal for the CEO. For instance, the manager may select a suboptimal project because it lessens their career concerns, decreases the required effort resulting in a quiet life, yields a higher private benefit, or imposes less risk compared to the optimal project (Lambert, 1986; Aghion and Tirole, 1997; Bertrand and Mullainathan, 2003). Thus, delegation reduces CEOs' time constraints and communication costs, but it can lead to agency costs.

2.3 The role of the peer information environment in facilitating delegation

This section discusses how peer information can increase the degree of delegation through two channels: (i) the managerial learning channel and (ii) the agency cost mitigation channel.

First, peer information helps division managers obtain relevant information to make more informed decisions, motivating the CEO to increase delegation (managerial learning channel). As discussed in section 2.1, firms in an industry are affected by common economic factors such as demand, supply, and growth opportunities (Admati and Pfleiderer, 2000; Durnev and Mangen, 2009). Thus, the peer information environment conveys valuable information about these common factors and helps firms in the industry make more informed decisions (e.g., Chen et al., 2013; Foucault and Fresard, 2014). To the extent that peer information helps division managers to reduce their uncertainty about common economic factors, these managers become more informed.[11]

Moreover, when the division manager obtains more information, delegation increases. To the extent that the CEO's time is more valuable than that of the division manager and delegation reduces communication costs, when a division manager can make a decision (i.e., when that manager

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[9]Delegation can also motivate the division manager to acquire more information (Aghion and Tirole, 1997).

[10]Control costs may also arise due to failures in coordinating the activities of different divisions. For instance, different divisions producing substitutable products tend to price those products too low (Alonso et al., 2008). Although the coordination costs may be less applicable to my sample since the firms are medium-sized, I include several control variables (e.g., firm size, number of divisions, whether the firm is a multinational company) to control for these costs.

[11]Note that the assumption necessary for peer information to inform the division manager is not that the manager has less information than that available from peer disclosures, but only that he or she does not have perfect information about all decision-relevant factors and that peer information contains some incremental information.

can obtain relevant information), the decision right is allocated to the manager; while more exceptional and more difficult decisions (e.g., those involving greater uncertainty) will be made by the CEO, i.e., management by exception (Garicano, 2000; Garicano and Rossi-Hansberg, 2006). That is, when both the CEO and division manager can make an informed decision (e.g., because both use peer information), delegating the decision rights to the division manager is less costly. Garicano and Van Zandt (2013) discuss several case studies consistent with the idea that when a lower-level manager cannot make a decision, the decision right is allocated to a higher-level manager. Moreover, Caroli and Van Reenen (2001) find that the supply of skilled employees is a key factor driving greater delegation. Thus, richer peer information helps the division manager make more decisions, thereby motivating the CEO to delegate more.

Second, CEOs can use peer information to facilitate the evaluation and monitoring of division managers, thereby mitigating the agency costs of delegation (agency cost mitigation channel). Specifically, the CEO can use peer information to evaluate managerial efficiency and potential agency conflicts (Holmstrom, 1982; Nalebuff and Stiglitz, 1983). Peer disclosure can provide information about the costs of production, profitability, and growth opportunities in the industry, all of which can serve as benchmarks to monitor the manager's decisions and performance, reducing agency costs of delegation. For instance, Cichello et al. (2009) document that the probability of division managers' dismissal is positively associated with industry-level performance, suggesting that the CEO uses the performance of peer firms as benchmarks when evaluating division managers. Shroff et al. (2014) show that the capital investment efficiency of foreign subsidiaries increases in the transparency of the external information environment, suggesting that parent companies use external information to reduce agency frictions with their subsidiaries. Overall, richer peer information can lower the agency costs of delegation.

Based on the two above arguments, I predict that a richer peer information environment leads to greater delegation from the CEO to division managers. Nevertheless, whether peer information will increase delegation is ex-ante unclear. First, if alternative mechanisms such as trust and product market competition completely resolve agency frictions related to delegation, peer information would not play its agency mitigation role. Second, to the extent that the expected processing costs of peer information (e.g., Blankespoor, 2019) are greater than the expected benefits of reducing uncertainty, the division manager will not use peer information.

2.4 The role of delegation in facilitating investment in growth opportunities

This section argues that a greater degree of delegation increases investment sensitivity to growth opportunities for two reasons. First, delegation reduces the CEO's time and information processing capacity constraints, thereby improving investment in growth opportunities. Making good corporate investment decisions consumes managers' time and capacity because it involves several activities. For example, managers might need to identify investment opportunities, collect relevant information (e.g., the marginal cash flows of alternative investments, industry competition, product demand), process and synthesize that information, and use capital budgeting techniques to evaluate and select investment projects (Graham and Harvey, 2001; Goodman et al., 2014). However, CEOs have finite time and capacity and thus are constrained regarding the number of decisions they can make (Bloom et al., 2012). As Simon (1973, p. 270) puts it, "the scarce resource is not information; it is processing capacity to attend to information. Attention is the chief bottleneck in organizational activity, and the bottleneck becomes narrower and narrower as we move to the tops of organizations..." Thus, to the extent that CEOs do not delegate decision making, they might pass up investment opportunities. Consistent with these arguments, prior theoretical research (e.g., Penrose, 1959; Lucas, 1978; Garicano and Van Zandt, 2013) suggests that managerial capacity constraints can limit firm growth. For instance, in Penrose's (1959) resource-based view, the firm is a collection of internal and external resources (e.g., managerial capacity and the ability to raise capital), and managerial capacity is the key resource that determines firm growth. The delegation of decision making reduces the CEO's time and capacity constraints. Thus delegation can help the CEO collect and process decision-relevant information (Geanakoplos and Milgrom, 1991; Garicano, 2000; Bloom et al., 2012). In addition, delegation can lead to more informed investment decisions made by division managers because they can specialize in and acquire expertise for making decisions regarding their divisions (Bolton and Dewatripont, 1994; Gibbons et al., 2013).[12] Thus, I argue that greater delegation improves investment sensitivity to growth opportunities.

Second, delegation reduces information transfer and communication between the CEO and division manager, thereby improving investment in growth opportunities. As discussed in section 2.2,

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[12]Anecdotal evidence supports these arguments. Alfred Sloan (1964, xxii-xxiii), a former CEO of General Motors, emphasizes the role of decentralization (i.e., delegation) when discussing barriers to growth: "To me it is only a problem of management. My thoughts on that have always revolved around one concept which contains considerable complexity in theory and in reality—the concept that goes by the oversimplified name of decentralization."

information transfer and communication can lead to the loss of information and delays in decision making (Jensen and Meckling, 1992; Garicano and Rossi-Hansberg, 2006). Since delegation reduces the need for communication, it can help division managers make more informed decisions and respond more quickly to changes in growth opportunities, thereby improving investment sensitivity to growth opportunities. Based on these arguments, I predict that a higher degree of delegation improves investment sensitivity to growth opportunities. However, delegation may not increase investment sensitivity due to agency costs. Williamson (1967) shows that the agency costs of delegation are a key limiting factor for firm growth. When agency problems between the CEO and division managers remain unresolved, delegation may not lead to greater investment sensitivity. For instance, division managers may prefer to avoid costly efforts associated with investment decisions (Bertrand and Mullainathan, 2003) and make fewer investments in growth opportunities.

3 Empirical proxies, research design, and data

3.1 Overview of the internal organization survey

I obtain detailed data on the internal organization of firms from the World Management Survey (WMS), detailed and used in Bloom et al. (2012), for firms in North and South America, Europe, Asia, and Australia. A detailed discussion of the WMS is provided in the Appendix B, but I summarize the relevant details here.

Firms were randomly drawn from each country to be representative of medium-sized public and private firms in the manufacturing industry (SIC codes between 2000 and 3999).[13] The data were obtained through an in-depth phone interview with a representative division (plant) manager. Thus, data contain one division for each firm. To improve the accuracy of responses, the survey used the double-blind technique developed in Bloom and Van Reenen (2007). One part of this technique is that managers were not told that they were being scored on organizational structure. The other part of this technique is that the interviewers were not told anything in advance about the firm's performance. They were only provided with the name of the company and a telephone number. This technique helps to obtain scores that are based on a firm's actual organizational practices, rather than the manager's perceptions or the interviewer's impressions. The interviewers were trained to score organizational practices based on their discussion with the manager. The first question on each practice was broad (e.g., "To hire a full-time permanent shop floor worker, what

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[13]See footnote 21 for a comparison between the size of my sample firms and manufacturing firms in Compustat.

agreement would your plant need from corporate headquarters?"), and follow-up questions were asked to fine-tune the scoring. Each interviewer, on average, conducted 37 interviews, allowing me to remove the interviewer fixed effects to address potential concerns about the inconsistent interpretation of responses. All interviews were conducted in the division manager's native language, and the interviews, on average, took approximately 55 minutes.

The survey had a response rate of 45%, which is relatively high for firm surveys. The survey also collected a set of additional data on the division and firm to measure control variables. Section 3.5 discusses the control variables used in my study. Furthermore, the survey collected a series of "noise controls" on the interview process itself (duration of the interview), the manager (seniority and location), and the interviewer (fixed effects and the interviewer's judgment regarding the reliability of the information collected). I include these noise controls in my regressions.

3.2 Proxies for the degree of delegation

To capture the degree of delegation from the headquarters to division managers, I use the WMS data that measure the autonomy of division managers along four dimensions. The first dimension is how much capital investment a division manager could make without authorization from the headquarters; this continuous variable is converted into U.S. dollars. Division managers were also asked about where the decisions were effectively made regarding three other decisions: (a) hiring new employees, (b) introducing new products, and (c) sales and marketing. These three measures were scored by the interviewers on a 5-point scale: from a score of one, when all decisions made by the headquarters, to a score of five, when all decisions made by the division manager (i.e., when the manager has "real authority").[14] The individual questions and scoring grids are presented in the Appendix B.

Since the scaling varies across these measures, I calculate their z-scores (mean zero and unit standard deviation) and use the average of the four z-scores as my main proxy for *Delegation*.[15]

3.3 Proxies for the peer information environment

Drawing on theoretical models studying when peer information conveys relevant information to other firms (Holmstrom, 1982; Nalebuff and Stiglitz, 1983; Admati and Pfleiderer, 2000; Foucault

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[14] Aghion and Tirole (1997) stress that the allocation of formal authority, i.e., who has the right to make the decision, differs from real authority, i.e., who actually makes the decision. For instance, if the CEO has formal authority but rubber-stamps the division manager's selected project, because the manager is more informed, then the division manager has real authority (Li et al., 2009).

[15] I also present results using the individual measures as dependent variables in Panel B of Table C1.

and Fresard, 2014), I construct my proxy for the richness of the peer information environment to measure the aggregate amount, quality, and relevance of peer information. More specifically, I use three proxies: press coverage, accruals quality, and earnings synchronicity.

First, I measure the aggregate amount of peer information using the average number of press articles written about a firm in each country-industry-year (*Press Coverage*). Press coverage improves the information environment. First, the press plays a monitoring role and can discipline managers through offering original analyses or drawing further attention to corporate governance issues identified by others (Miller, 2006; Core et al., 2008; Dyck et al., 2008). Second, the business press serves as an information intermediary by disseminating firm-initiated disclosures and producing new information through journalism (e.g., Bushee et al., 2010; Soltes, 2010; Drake et al., 2014; Guest, 2017).

Prior research provides evidence suggesting that higher quality financial reporting by peer firms can be used to develop more precise estimates of economic conditions (e.g., Durnev and Mangen, 2009; Bonsal et al., 2013; Hann et al., 2018) and help facilitate monitoring (Shroff et al., 2014). My second proxy is based on an accruals quality measure developed by Dechow and Dichev (2002), as modified by McNichols (2002). The measure captures the extent to which accruals map into cash flows, with a poor match capturing lower accruals quality. Accruals are fundamental to financial reporting (Dechow, 1994; Dechow et al., 2010) and are likely to affect a large set of signals that can be informative regarding a firm (Hann et al., 2018). Accordingly, this proxy has been extensively used to capture the quality of financial reporting (Biddle et al., 2009; Rajgopal and Venkatachalam, 2011; Hann et al., 2018). To construct my proxy, I obtain residuals from the modified Dechow and Dichev's (2002) model using all firms within each country-industry-year and define *Accruals Quality* as negative one times the cross-sectional standard deviation of these residuals.

My third proxy captures the relevance of peer information using the degree of earnings synchronicity in the industry (Shroff et al., 2017). Greater earnings synchronicity implies that a firm's earnings are more likely to be influenced by industry-wide economic factors (Morck et al., 2000; Gong et al., 2013), and thus the firm's disclosures convey more information about other peer firms in the industry. To construct this proxy, I first calculate earnings synchronicity for each firm-year, defined as the adjusted R-squared obtained from a time-series regression of the firm's earnings on the aggregated earnings in its industry using ten annual earnings data. *Earning Sync* is the average

of these firm-level R-squared values within each industry-country-year.

Finally, I convert these three proxies into quartile ranks (re-scaled to range from zero to one) and take the average of these ranks to construct an aggregate proxy for *Peer Info Environment*.[16]

3.4 Proxies for investment and investment sensitivity

Most research on corporate investment measures investment using capital expenditures and/or mergers and acquisitions. However, these data are not available for most of my sample firms, which are mainly private firms. Therefore, I follow prior research (e.g., Asker et al., 2014; Shroff et al., 2014) and measure investment in a way that captures both capital expenditures and mergers and acquisitions. Specifically, I measure *investment* as the firm-level annual change in net fixed assets scaled by beginning-of-year total assets.

Prior corporate investment studies measure growth opportunities using either Tobin's Q or sales growth. Tobin's Q is usually constructed as the ratio of the market value to the book value of total assets but the market value of the private firms in my sample is not observed because they are not traded on a stock exchange. I thus use sales growth as my proxy for growth opportunities. This proxy is widely used to measure growth opportunities (e.g., Bloom et al., 2007; Biddle et al., 2009; Asker et al., 2014). Section 5.2.2 also uses country-level changes in corporate tax rates as a proxy for exogenous shocks to growth opportunities (e.g., Badertscher et al., 2013; Asker et al., 2014). Using these shocks eliminates the need to directly measure growth opportunities.

3.5 Control variables and fixed effects

3.5.1 Peer information and the degree of delegation tests

This section discusses the control variables and fixed effects used in my tests studying the effects of peer information on delegation. To mitigate concerns about an omitted variable bias, I include several control variables in my regressions. Importantly, all regressions control for year, industry, and country fixed effects. I include year fixed effects to absorb the effects of potential time-trends on my inferences, industry fixed effects to reduce the potential effects of unobserved heterogeneity across industries, and country fixed effects to decrease heterogeneity across countries. As discussed in section 3.1, I also include survey interviewer fixed effects.

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[16]I use ranks and aggregate the three individual peer information proxies to address concerns about measurement error in these proxies, and to ease interpretation (Dechow et al., 2010; Leuz and Wysocki, 2016; Shroff et al., 2017). Panel A of Table C1 shows that my main inference is robust to using any of the three individual measures or a continuous version of peer information (*z_Peer Info Environment*).

In addition to the fixed effects, I include several time-varying division-, firm-, and industry-level control variables in my regressions. Prior research finds that the degree of delegation is positively associated with firm size and the CEO's span of control (Bloom et al., 2012; Graham et al., 2015). Thus, I control for *Firm Size*, measured using the number of employees, and *Span of Control*, measured using the number of divisions in the firm.

My regressions also control for whether the division belongs to a multinational company (*MNC*). Similar to the effect of size, as firms expand in geographic scope, obtaining relevant local information becomes more costly for the headquarters, favoring delegation (Aghion et al., 2013).

More skilled employees have a greater ability to gather information for decision making and to learn to respond to technological and organizational changes (Caroli and Van Reenen, 2001). Thus, I control for *Employee Skill*, defined as the portion of the division's employees with college degrees.

As the number of vertical layers in a firm increases, the vertical loss of control cascades down the various layers (Williamson, 1967). Thus, the vertical layers between the CEO and division managers increase agency costs, reducing the CEO's motivation to delegate to division managers. I hence control for the number of levels between the CEO and division manager *Levels To CEO*.

As a division becomes larger, it is more costly for the CEO to obtain all relevant information to make decisions for the division. Thus, the CEO obtains greater benefits from delegation as a division grows in size. Accordingly, I include *Division Size* in my regressions.

Growth opportunities can be positively associated with the degree of delegation. As discussed above, delegation helps the CEO take advantage of firms' growth opportunities (e.g., Penrose, 1959; Bloom et al., 2012). Thus, the benefits of delegation are greater for firms with greater growth opportunities. Accordingly, my specifications include growth opportunities using *Industry Q*. I also control for industry performance using *Industry ROA*. I include lagged quartile ranks of *Industry Q* and *Industry ROA* in my regressions.

Prior research demonstrates that delegation and incentive contracts can be associated (Nagar, 2002; Abernethy et al., 2004; Indjejikian and Matějka, 2012). To the extent that incentive contracts better align the manager's and CEO's incentives, delegation becomes less costly (Milgrom and Roberts, 1992). Accordingly, I control for *Incentive Contracts*, measured as the percentage of the division manager's compensation that is bonus-based. Finally, I add several "noise control"

variables, discussed in section 3.1.

3.5.2 Delegation and investment sensitivity tests

This section discusses the control variables and fixed effects included in my models exploring the effects of delegation on investment sensitivity to growth opportunities. Following the discussion in the previous section, I include year, industry, and country fixed effects to mitigate potential concerns that correlated omitted variables could affect my analyses. I also add survey interviewer fixed effects. However, I am interested not in the *investment level*, but in the *investment sensitivity* to growth opportunities, i.e., a slope coefficient. The standalone fixed effects only capture between-country and across-year differences in the level of investment, not investment sensitivity. Accordingly, I follow Edmans et al. (2017) and control for growth opportunities' interactions with both country fixed effects and year fixed effects to capture between-country and across-year differences in investment sensitivity.[17]

In addition, I include several firm-level control variables in my regressions following prior research (e.g., Badertscher et al., 2013; Asker et al., 2014). Specifically, I control for the firm-level return on assets (*ROA*), and total assets (*Ln_Assets*) because profitable and large firms are less likely to be financially constrained and can better take advantage of their growth opportunities (Baker et al., 2003). I also include cash holdings (*Cash*) and book leverage (*Leverage*) because firms with greater cash holdings and lower leverage can more easily take advantage of their growth opportunities. In addition, I include the interactions between growth opportunities and these control variables. To capture the direct effect of delegation on investment sensitivity, I control for peer information and its interaction with growth opportunities. Finally, I also add several "noise control" variables.

3.6 Research design

To test whether peer information increases delegation, I estimate OLS regressions of the following form:

$$Delegation_{i,j,c,t,a} = \alpha_j + \alpha_c + \alpha_t + \alpha_a + \beta_1 Peer\ Info\ Environment_{j,c,t-1} + \Gamma X + \epsilon_{i,j,c,t,a} \quad (1)$$

where i, j, c, t, and a index firms, industries, countries, years, and survey interviewers, respectively; α_j, α_c, α_t, and α_a denote industry, country, year, and survey interviewer fixed effects,

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[17]Section 5.2.1 further explores the robustness of my results to the inclusion of several alternative fixed effect specifications and the interaction terms between fixed effects and growth opportunities.

respectively. *Delegation* is measured at the firm-year level, and *Peer Info Environment* is my proxy for peer information at the industry-country-year level. Industries are defined using two-digit SIC codes. X is a vector of control variables discussed in section 3.5.1. All variables are defined in the Appendix A. Standard errors are clustered at the industry-country level.[18]

To explore whether delegation increases the investment sensitivity to growth opportunities, I estimate OLS regressions of the following form:

$$
\begin{aligned}
Investment_{i,j,c,t,a} = {} & \beta_1 Sales\ Growth_{i,j,c,t,a} \times Delegation_{i,j,c,t,a} \\
& + \beta_2 Sales\ Growth_{i,j,c,t,a} + \beta_3 Delegation_{i,j,c,t,a} + \Gamma Controls\_FEs + \epsilon_{i,j,c,t,a}
\end{aligned}
\tag{2}
$$

where *Investment* is the change in fixed assets scaled by beginning-of-year total assets. *Sales Growth* is the annual percentage change in sales. $Controls\_FEs$ includes the control variables and fixed effects discussed in section 3.5.2. β_2, captures investment sensitivity to growth opportunities (when $Delegation$ equals zero, which is the average). The coefficient of interest, β_1, captures the incremental investment sensitivity to growth opportunities as delegation increases. I interpret the investment sensitivity to growth opportunities as a proxy for investment efficiency (Hubbard, 1998; Bloom et al., 2007; Asker et al., 2014). That is, a positive β_1 suggests that a greater degree of delegation increases investment efficiency.

3.7 Data

My main sample for tests exploring the effect of peer information on delegation includes 4,300 unique public and private firms with 5,738 firm-years from several waves of the WMS (2005, 2006, 2008, 2010, 2013, and 2014). The sample used to explore investment decisions includes 1,065 observations.[19] The firms are from Australia, Brazil, Canada, China, France, Germany, Greece, India, Italy, Poland, Singapore, Sweden, the United Kingdom, and the United States. I obtain all division- and firm-level variables, including my proxies for the degree of delegation and control variables from the WMS data. The exceptions are the firm-level financial data used in my investment tests; these data are from Compustat for public U.S. firms and from Orbis for other

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[18]My main results are robust to clustering standard errors at the industry levels; country levels; and industry and country levels. In addition, I have too few (i.e., six) clusters at the year-level to reliably estimate standard error clustered at the year-level (Petersen, 2009; Gow et al., 2010).

[19]Variables used in models exploring peer information and delegation are mainly obtained from the WMS and financial data on peer firms in the industry. However, models studying investment decisions require firm-level financial data that are not available from the WMS. The WMS selected firms from a sampling population of firms with information on the company name, address, and size. Except for size, the survey did not require any other financial data. Requiring financial data for my models exploring investment reduces the sample size due to missing data.

firms. I obtain peer firms' financial data using WorldScope for non-U.S. firms and Compustat for U.S. firms. To construct my peer information proxy, I require each industry-year to have more than 15 observations. For stock returns data, I use DataStream for non-U.S. firms and CRSP for U.S. firms. I obtain press coverage data from RavenPack. I use data on trust from the World Values Survey (WVS) and the European Values Study Survey (EVS). I acquire the statuary corporate income tax rate from Ernst & Young Worldwide Tax Guides and the OECD tax dataset. Finally, I obtain U.S. import data from Peter Schott's website,[20] an update of Schott (2008).

4 Results

4.1 Descriptive statistics

Table 1 provides summary statistics for the variables in my analyses. Panel A shows that the mean and median number of firm employees (*Firm Size*) are 1,156 and 350, respectively.[21] Firms in my sample have, on average, about six divisions (*Span of Control*). Approximately 45% of divisions belong to a multinational company (*MNC*) and, on average, 17% of a division's employees have a college degree (*Employee Skill*). The peer information proxies show that the average for industry-level press coverage is about 22 articles per firm (*Press Coverage*), and the average earnings synchronicity is 14%. Panel B indicates that the average change in net fixed assets is 0.9 percent of beginning-of-year total assets. The average firm has 9% annual sales growth and 5% ROA.

Figure 1 shows the cross-country averages of my delegation measure (for selected countries) and the within-country dispersion. Firms located in China, Brazil, and India tend to delegate much less than firms located in the United Kingdom and the United States. The rest of European firms (located in Germany, France, Italy) tend to be in the middle in terms of delegation ranking. This Figure also shows that there is much firm-year level heterogeneity, even within countries. For a subset of sample firms with more than two observations, about 49% of the overall variance in my delegation measure is across firms, suggesting that about 51% of the variation in the delegation measure is within firms over time variation. The relatively large over time variation is consistent with anecdotal evidence. Alfred Sloan (1964, p. 430), a former CEO of General Motors, discusses

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[20]http://faculty.som.yale.edu/peterschott/.

[21]To put the distribution of firm size into context, I compare a few percentiles of my sample with those of a comparable Compustat sample (i.e., manufacturing firms over the period 2005-2014). The 10th, 50th, and 90th percentiles of firm size in my sample are 100, 350, 2500, and would have approximately the 27th, 43rd, and 69th percentile value of the comparable Compustat sample, respectively.

this issue in his book: "... [t]he problem of finding the right combination of freedom for the divisions and control over them. The combination *could not be set once and for all*, of course. It varies with changing circumstances, and the responsibility for determining administrative organization is a continuing one."

4.2 The peer information environment and the degree of delegation

To test whether peer information increases the degree of delegation, I estimate Equation 1. Table 2 reports the results for this baseline regression. Column 1 presents the results of regressing delegation on peer information, with only noise controls and survey interviewer fixed effects. The relationship between the degree of delegation and peer information is positive and statistically significant. To mitigate potential concerns about an omitted variable bias, Column 2 adds time, industry, and country fixed effects, and Column 3 further includes the control variables. The coefficient for peer information remains positive and significant in both columns. In terms of economic magnitude, the results in Column 3 imply that an increase from the first to fourth quartile of peer information is associated with about 24.9% standard deviation increase in delegation. The coefficients for the control variables are largely consistent with the predictions. For instance, delegation is positively associated with firm size, the CEO's span of control, and employee skills.

4.3 Peer information and delegation: The agency cost mitigation channel

Peer information can be used to evaluate and monitor the division manager's actions, decreasing the costs of delegation (agency cost mitigation channel). This section explores this channel using cross-sectional variations in two alternative mechanisms that mitigate agency frictions between the CEO and division managers: social trust and product market competition.

First, when a CEO can trust the division manager to take the optimal action from the CEO's point of view, rather than to take opportunistic actions, the agency frictions of delegation are lower. Supporting this argument, Bloom et al. (2012) find that firms headquartered in high-trust regions are more likely to delegate decisions to division managers. Similarly, competition can improve the alignment of preferences for two reasons. First, when the product cost is high, a higher level of competition can reduce profit and render operations unprofitable, increasing the probability of liquidation or division manager turnover. Thus, to avoid liquidation and job loss, the manager works harder to reduce costs and/or improve product quality (Schmidt, 1997). Second, when product substitutability is higher under more intense competition, increasing market share by cutting price is

easier, i.e., the business-stealing effect of competition (Raith, 2003). Thus, competition increases the marginal return to cost-cutting or productivity improvements, thereby motivating the division manager to work harder.[22] Consistent with these arguments, Bloom et al. (2010) find that competition increases delegation. To the extent that trust or competition mitigates agency frictions, the need for monitoring decreases, the CEO is less likely to use peer information, and thus the agency cost mitigation role of peer information decreases. Accordingly, I predict that when trust is higher or competition is more intense, the relation between peer information and delegation is weaker.

To measure trust, I use data on trust in people from the WVS and EVS, which consist of surveys conducted with representative samples of individuals in almost 100 countries. The measure is based on the following question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" I follow prior research (e.g., Aghion et al., 2010; Bloom et al., 2012) and measure *Trust* as the percentage of respondents who agreed with the statement "most people can be trusted" in the specific region where the headquarters are located for most divisions.[23] I measure *Competition* using the industry-country-level Lerner index, or price-cost margin, defined as one minus the average of income divided by sales across all firms in each industry-country, following (Aghion et al., 2005; Bloom et al., 2010). A value of one indicates perfect competition, and values below one indicate some degree of market power. One advantage of the price-cost margin is that it is affected by all competitors, including public, private, and foreign firms.

Then, I construct an indicator variable, *High Trust* (*High Competition*), that equals one when *Trust* (*Competition*) is above the median and zero otherwise. I modify Equation 1 by including *High Trust* (*High Competition*) and its interaction with peer information and estimate the modified equation.[24] Columns 1 and 2 of Table 3 present my results. The coefficients of *High Trust×Peer Info Environment* and *High Competition×Peer Info Environment* are negative and statistically significant. These results suggest that when trust (competition) is high, the effect of peer information

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[22]Raith (2003) also provides a theoretical argument that competition can *decrease* the incentive for managerial effort because it decreases demand, which in turn reduces the gains from cost-cutting activities. However, Bloom et al. (2010) show that the net effect of competition on delegation is positive.

[23]For divisions belonging to domestic firms and domestic MNCs in Australia, Brazil, Canada, China, France, Germany, India, the United Kingdom, and the United States (3,564 observations), I use data for narrowly defined regions within these countries (e.g., individual states in Germany and India). For the remaining firms (2,166 observations), I use data for the country where the headquarters is located.

[24]I use two year lagged *High Competition* to remove any potential contemporaneous effect (Bloom et al., 2010).

on delegation is weaker. These findings imply that when agency frictions are low, the headquarters' delegation decision becomes less sensitive to peer information, consistent with the idea that peer information plays a role in mitigating agency frictions.

4.4 Peer information and delegation: The managerial learning channel

Peer information can help division managers make more informed decisions, motivating the CEO to delegate more (managerial learning channel). This section explores this channel by studying whether the relation between peer information and delegation varies with two industry characteristics that affect the benefits of learning from peers: investment irreversibility and uncertainty.

First, investment decisions are characterized by some degree of irreversibility; that is, investments are (partially) sunk and cannot be undone without high costs upon ex-post learning that the investment is suboptimal (Bernanke, 1983; Pindyck, 1991).[25] Greater investment irreversibility increases the costs of making suboptimal decisions, and thus increases the value of acquiring decision-relevant information to reduce the probability of making suboptimal decisions. Consequently, the benefits of using peer information to obtain decision-relevant information increase with the investment irreversibility. Similarly, industry uncertainty increases the benefits of learning from peer information (Badertscher et al., 2013; Foucault and Fresard, 2014). When industry uncertainty is low, division managers are less likely to learn and benefit from peer information (i.e., limited managerial learning). As the level of industry uncertainty increases, the marginal benefits of richer peer information in reducing uncertainty increase (i.e., greater managerial learning).[26] Based on these arguments, I predict that when investment irreversibility or uncertainty is higher–and thus the managerial learning is greater–the effect of peer information on delegation becomes stronger.

I use two proxies for the degree of investment irreversibility. First, I follow prior research (e.g., Guiso and Parigi, 1999; Panousi and Papanikolaou, 2012) and use industry comovement. This proxy relies on the intuition put forward by Shleifer and Vishny (1992) that firms with a high industry comovement face more difficulty in disinvesting after a negative shock because other

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[25]Capital investment can be at least partially sunk and thus irreversible for a variety of factors such as the used-good discount on resale and because capital is firm- or industry-specific (Pindyck, 1991). Investments in new employees can be partly irreversible due to the costs of recruiting, training, and severance pay (Bloom, 2009).

[26]When industry uncertainty is high, peer disclosures are a source of information because peer firms can possess incremental information due to differences in prior investments, the experience of the management team, and information gathering activities (Durnev and Mangen, 2012).

same-industry firms, which are likely the potential buyers of assets on sale, are also likely experiencing problems. Thus, greater comovement captures higher investment irreversibility. For each industry-country-year, *Comovement* is the average value of firm-year industry betas, obtained from regressing the monthly return on value-weighted industry and market return indices. The second proxy, *PPE Sale*, is the industry-level average of sales of property, plant, and equipment (PPE), following Panousi and Papanikolaou (2012) and Gulen and Ion (2015). The rationale behind this proxy is that when the used capital market is more active in an industry, the share of sunk costs is lower, and disinvesting and selling assets are easier. Thus, lower PPE sales can measure a greater share of sunk costs and greater investment irreversibility. I construct an indicator variable, *High Comovement* (respectively, *Low PPE Sale*), that equals one for industry-country-years with *Comovement* (respectively, *PPE Sale*) above (respectively, below) the median value and zero otherwise. I then augment Equation 1 by including two year lagged *High Comovement* (or *Low PPE Sale*) and its interaction with peer information.

To measure uncertainty, I follow prior research (e.g., Bloom et al., 2007, 2018) and use the industry-level standard deviation of stock returns. Uncertainty can stem from a wide range of factors, including demand shocks, input costs, and technological change. To capture all relevant factors in one scalar measure, the prior research cited above uses the standard deviation of stock returns. The logic is that this proxy provides a forward-looking measure that is implicitly weighted in accordance with the importance of different sources of uncertainty for the firm's value. I define *Uncertainty* as the cross-sectional standard deviation of firm-level market-adjusted returns within each industry-country-year. *High Uncertainty* equals one for industry-country-years with *Uncertainty* above the median value. Finally, I augment Equation 1 by adding two year lagged *High Uncertainty* as well as its interaction with the peer information proxy.

Columns 3-5 of Table 3 present the results on managerial learning. Columns 3 and 4 report the results when my proxy for investment irreversibility is *High Comovement* and *Low PPE Sale*, respectively. Both columns show that the coefficient for the interaction term between investment irreversibility and *Peer Info Environment* is positive and statistically significant. Column 5 shows that the coefficient for *High Uncertainty*×*Peer Info Environment* is positive and statistically significant. These positive coefficients imply that the effect of peer information on delegation is stronger for firms operating in industries with high investment irreversibility or uncertainty, in other words,

when the value of acquiring relevant information to make more efficient investments is greater for division managers, consistent with the managerial learning channel.[27]

4.5 Delegation and investment sensitivity

To test whether delegation increases the investment sensitivity to growth opportunities, I estimate Equation 2. Table 4 reports the results for this baseline regression. Column 1 presents the baseline specification, where investment is regressed on sales growth, control variables, and fixed effects. The coefficient for sales growth is positive and significant at the 1% level. Column 2 introduces the effect of delegation. The positive and significant coefficient of 2.258 for *Delegation×Sales Growth* indicates that delegation increases the investment sensitivity to growth opportunities. A one-standard deviation increase in delegation improves investment sensitivity by 34% (2.258/6.659). Finally, as discussed in section 3.5.2, I control for *Sales Growth* interacted with control variables (*ROA*, *Leverage*, *Ln_Assets*, and *Cash*), with year fixed effects, and with country fixed effects. Column 3 shows that the coefficient for *Delegation×Sales Growth* remains positive and significant. These findings suggest that firms with greater delegation are more responsive to changes in growth opportunities. Consistent with prior research (e.g., Badertscher et al., 2013), the coefficient for *Peer Info Environment×Sales Growth* is positive and significant in Columns 2 and 3, suggesting that the direct effect of peer information on investment sensitivity is positive. The signs of control variables' coefficients are consistent with prior research (Badertscher et al., 2013). Specifically, *Cash* and *ROA* are positively associated with investment, and the coefficients for *Leverage* and *Ln_Assets* are negative. The coefficients for *ROA* and *Leverage* are statistically significant.

4.6 Delegation and investment sensitivity: Cross-sectional tests

4.6.1 Agency frictions between the CEO and division manager

The results reported in the previous section suggest that firms that delegate more have greater investment sensitivity to growth opportunities, i.e., higher investment efficiency. This section studies whether the improved investment efficiency varies with the extent of agency frictions between the CEO and division manager. When agency problems are more severe, delegation can lead to

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[27]Prior research (e.g., Panousi and Papanikolaou, 2012) mainly uses comovement and PPE sales as proxies for investment irreversibility in the context of *capital* investment. Accordingly, I use managers' autonomy over capital investment, *Delegation of Capital Investment*, rather than *Delegation* as the dependent variable. The untabulated results are consistent with those reported in Columns 3 and 4.

inefficient investment decisions made by division managers. For instance, division managers may prefer to extract private benefits and/or avoid risky investments and the costly efforts associated with investment decisions. Thus, division managers may make fewer investments and pursue fewer growth opportunities. When agency frictions with division managers are mitigated (e.g., managers have an incentive to work harder), they make more efficient investments. Thus, I predict that the positive relation between delegation and investment sensitivity is stronger when agency frictions are less severe than when they are more severe.

As discussed in section 4.3, agency frictions are weaker and division managers have an incentive to work harder when trust is higher (Bloom et al., 2012) and when competition is more intense (Bloom et al., 2010). To test my prediction, I estimate the following model:

$$
\begin{aligned}
Inv_{i,j,c,t,a} = &\beta_1 Delegation_{i,j,c,t,a} \times Low\ Agency\ Frictions \times Sales\ Growth_{i,j,c,t,a} \\
&+ \beta_2 Delegation_{i,j,c,t,a} \times Sales\ Growth_{i,j,c,t,a} + \beta_3 Low\ Agency\ Frictions \times Sales\ Growth_{i,j,c,t,a} \\
&+ \beta_4 Delegation_{i,j,c,t,a} \times Low\ Agency\ Frictions + \beta_5 Delegation_{i,j,c,t,a} \\
&+ \beta_6 Low\ Agency\ Frictions + \beta_7 Sales\ Growth_{i,j,c,t,a} + \Gamma Controls\_FEs + \epsilon_{i,j,c,t,a}
\end{aligned}
\tag{3}
$$

where i, j, c, t, and a index firms, industries, countries, years, and survey interviewers, respectively. Moreover, *Inv* is my proxy for investment, *Low Agency Frictions* is either *High Trust* or *High Competition*, and other variables are defined as in Equation 2. The coefficient of interest, β_1, captures the variation in the incremental effect of delegation on investment sensitivity as the agency frictions change.

Columns 1 and 2 of Table 5 present the results. The coefficient for *Delegation×High Trust × Sales Growth* is positive. The coefficient for *Delegation×High Competition × Sales Growth* is positive and statistically significant. Overall, these results suggest that the positive relation between delegation and investment sensitivity is stronger when the agency frictions of delegation are less severe.

4.6.2 The peer information environment

This section explores whether the effect of delegation on investment sensitivity to growth opportunities, i.e., investment efficiency, increases with the richness of peer information. First, to the extent that the CEO can use peer information to evaluate and monitor division managers, managers are motivated to make more efficient investment decisions. Second, to the extent that peer information helps division managers obtain relevant information, they make more efficient investment

decisions. Based on these arguments, I predict that the relation between delegation and investment sensitivity strengthens as the richness of peer information increases.

To test this prediction, I modify Equation 2 by replacing *Low Agency Frictions* with the lagged *Peer Info Environment*, and estimate the modified model. Column 3 of Table 5 reports the results. The coefficient for *Delegation×Peer Info Environment×Sales Growth* is positive and significant, consistent with the prediction that peer information increases the effect of delegation on investment sensitivity. Column 4 shows that after controlling for sales growth's interactions with the control variables, with year fixed effects, and with country fixed effects, the result remains positive and significant.

5 Endogeneity

5.1 The peer information environment and the degree of delegation

Tables 2 and 3 present results suggesting that peer information increases delegation through agency cost mitigation and managerial learning channels. Studying the peer information environment, rather than the firm's own information environment, mitigates potential concerns that the information environment and delegation are endogenously determined by the firm. The reason is that firms and their information intermediaries are likely to make their disclosure decisions based on the private costs and benefits of these decisions rather than the potential effects of disclosures on a peer firm, including a peer firm's delegation decisions (Leuz and Wysocki, 2016). However, a potential concern is that an omitted common industry-, country-, or time-specific factor may affect both firms' delegation and peer information, i.e., the results could reflect an omitted variable bias.[28] The next three sections discuss several steps that I take to mitigate this concern.

5.1.1 Alternative fixed effect specifications

My main analysis includes several time-varying control variables along with industry, country, and time fixed effects to mitigate potential concerns about an omitted variable bias. To further mitigate this concern, I explore the robustness of my inferences to alternative fixed effect specifications. One potential concern is that industry characteristics such as growth opportunities can affect both the richness of peer information and delegation. I control for growth opportunities using Tobin's Q. However, this proxy could be measured with error and other unobservable industry characteristics could affect my inferences. Accordingly, I study the robustness of my inferences

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[28]This concern is essentially a form of the reflection problem as described by Manski (1993).

to the inclusion of year×industry fixed effects to absorb industry time-varying characteristics. In addition, countries can experience country-specific time-varying economic shocks that influence delegation. To explore this possibility, I include year×country fixed effects in my main regression and study the effect of peer information on delegation within each year-country. Finally, industry characteristics can vary across countries, affecting my results. Accordingly, I investigate the robustness of my inferences to the inclusion of industry×country fixed effects.[29]

Table 6 presents the results from estimating Equation 1 with different fixed effect specifications. Columns 1; 2; 3; and 4 show that the coefficient for peer information is positive and significant after including year×industry and country; year×country and industry; year and industry×country; and year×industry, year×country, and industry×country fixed effects, respectively. These results mitigate concerns about an omitted variable bias. For endogeneity to generate my results, the hypothetical unobservable variable would have to vary within year and country, within year and industry, and within industry and country. Although this outcome is a theoretical possibility, what would generate this bias is not obvious. Nevertheless, I consider two alternative approaches to identifying the effects of peer information in the next two sections.

5.1.2 IFRS adoption

In this section, I study the mandatory adoption of IFRS as an exogenous country-level proxy for the improvement of the peer information environment (Shroff et al., 2014).[30] Prior research shows that the mandatory adoption of IFRS is associated with improvements in the quality of information disclosed by firms and information intermediaries (e.g., Byard et al., 2011; Landsman et al., 2012; Horton et al., 2013); reduced information asymmetry (e.g., Daske et al., 2008, 2013); increased disclosure quantity (Lang and Stice-Lawrence, 2015); and greater voluntary disclosure (Li and Yang, 2016). In addition, the voluntary adoption of internationally recognized accounting standards improves the role that accounting earnings play in performance evaluations and the mitigation of agency conflicts (Wu and Zhang, 2009). Moreover, the adoption of IFRS helps managers identify investment opportunities and improve investment efficiency (Chen et al., 2013; Louis and Urcan, 2014; Loureiro and Taboada, 2015). Several countries made major institutional changes,

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[29]These fixed effects eliminate a substantial amount of variation. For example, year×country fixed effects absorb unrelated shocks to firms in a given year and country, but with year×country fixed effects, the coefficient of peer information is estimated within a given year and country, i.e., using only cross-industry variation.

[30]Some firms voluntarily adopted IFRS before it became mandatory. However, to the extent that a positive portion of peer firms adopted IFRS mandatorily at the mandatory adoption date, there is a shift in peer information.

including revisions to their enforcement; auditing; and governance regimes, around the time of IFRS adoption (Daske et al., 2008; Christensen et al., 2013). However, my tests do not require the improvement of the peer information environment to be the result of adopting new accounting standards per se. Rather, similar to Hail et al. (2014), I rely on the joint effect of adopting new standards and other concurrent institutional changes as a proxy for improvement in the peer information environment.[31]

I employ a difference-in-differences design to study whether firms located in IFRS-adopting countries increased delegation after the IFRS adoption date as compared to control firms. Due to the staggered adoption of IFRS, my control group effectively includes not only firms in countries that never adopted IFRS (e.g., the U.S. and China) but also firms in countries that will adopt IFRS later. I construct an indicator variable, *Post_IFRS*, that equals one for firms in IFRS-mandating countries in fiscal years after the mandatory adoption date in the firm's country and modify Equation 1 by replacing *Peer Info Environment*$_{j,c,t-1}$ with *Post_IFRS*$_{c,t-1}$. As mandatory IFRS adoption occurs at the country level, my statistical inferences in this section are based on standard errors clustered by country (e.g., Byard et al., 2011; Hail et al., 2014; Li and Yang, 2016).

To effectively compare the same sample pre- and post-IFRS adoption, I use a constant sample of firms for which I have observations both before and after IFRS adoption.[32] I first estimate the modified Equation 1, with no control variables. Column 1 of Panel A in Table 7 shows that the coefficient for *Post_IFRS* is positive and statistically significant. Column 2 shows that after the addition of the control variables, the coefficient for *Post_IFRS* remains positive and significant. Overall, these results support my inference that peer information increases delegation.

The key identifying assumption of a DiD design is parallel trend assumption. This assumption requires that in the absence of treatment, conditional on fixed effects and control variables, the degree of delegation of treated and control firms must exhibit the same trend. In a review of the literature on the effects of IFRS adoption, De George et al. (2016) note that differences in characteristics across treated and control groups present a concern regarding inferences based on

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[31]The mandatory adoption of IFRS not only can improve the peer information environment but also can improve the firm's own information environment (Shroff, 2017a). Results reported in the Appendix C show that main my test in this section is robust to removing public firms from my sample, suggesting that the potential improvement in the firm's own information environment is not driving my results.

[32]For non-IFRS adopting countries, I use 2005 because most of my treated firms are in countries that adopted IFRS in 2005 (Australia and European countries).

a DiD design. I take two steps to mitigate this potential issue. First, I control for country fixed effects to absorb time-invariant cross-country differences. Moreover, to account for observable differences between the two groups, I include several time-varying control variables.[33] Second, I use my full sample as an alternative sample of treated and control firms. The untabulated results show that the coefficient for *Post_IFRS* is positive and statistically significant, suggesting that the choice of treated and control groups is not likely to affect my inferences.[34]

5.1.3   Industry-level import tariff rate reductions

In this section, I exploit a setting with exogenous variation in the agency costs of delegation using shocks to industry-level import tariff rates (Fresard, 2010; Valta, 2012; Huang et al., 2017). A reduction in industry-level import tariff rates decreases barriers to trade for foreign rivals, increasing import penetration and the intensity of competition (e.g., Tybout, 2003; Valta, 2012). To the extent that more intense competition pressures division managers to work harder and reduces the misalignment of preferences (Bloom et al., 2010), the CEO is less likely to use peer information to mitigate agency frictions with division managers. Thus, tariff cuts reduce the agency cost mitigation role of peer information. I predict that delegation is less sensitive to peer information following a shift in tariff rates.

I follow prior research (e.g., Fresard, 2010; Huang et al., 2017) to identify large reductions in tariff rates in the U.S.[35] To measure industry-level import tariff reductions, I obtain U.S. import data for the period 2005-2013. For each industry-year, I compute the tariff rate as the duties collected by the U.S. custom divided by the custom value of imports. Next, I identify industry-years for which the magnitude of the tariff rate reduction is three times larger than the magnitude of the median tariff rate reduction for the same industry during my sample period. To ensure that these large tariff cuts reflect non-transitory changes in competition, I exclude tariff reductions that are preceded or followed by a tariff increase equal to or greater than the reduction.

To identify the effect of peer information on the degree of delegation due to the agency cost

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[33]I find that the difference between the coefficient for *Post_IFRS* in Column 1 and 2 of Table 7 is statistically insignificant (p-value=0.152 (untabulated)), supporting the assumption that IFRS adoption is likely exogenous and does not systematically coincide with observable characteristics in my model. This finding suggests that differences in observable characteristics do not influence the effect of IFRS adoption on delegation.

[34]Firms in my sample have only one observation before IFRS adoption, and thus, I cannot test the pre-treatment trend in the degree of delegation.

[35]Huang et al. (2017) discuss that tariff rate reductions in the U.S. were influenced by global economic and political forces and were mainly the result of trade agreements with one or a few countries, affecting thousands of products traded.

mitigation channel, I estimate the following DiD regression:

$$
\begin{aligned}
Delegation_{i,j,c,t,a} =\;& \alpha_j + \alpha_c + \alpha_t + \alpha_a + \beta_1 Peer\ Info\ Environment_{j,c,t-1} \times Post\_Cut_{j,c,t} \\
& + \beta_2 Peer\ Info\ Environment_{j,c,t-1} + \beta_3 Post\_Cut_{j,c,t} + \Gamma X + \epsilon_{i,j,c,t,a}
\end{aligned}
\tag{4}
$$

where i, j, c, t, and a index firms, industries, countries, years, and survey interviewers, respectively. *Post_Cut* is an indicator variable that equals one if the division's industry experienced a large tariff cut in any of the last three years ($t-1$, $t-2$, and $t-3$). Other variables are defined as in Equation 1.

The coefficient β_1 measures the difference in the effect of peer information on delegation between U.S. firms operating in industries that experience a tariff reduction (treated firms) and firms in industries that do not (control firms). The tariff reductions occur in different industries in different periods, and thus, the control group is not restricted to industries that never experience a large tariff reduction. Rather, the control group effectively includes all non-U.S. firms as well as U.S. firms that do not experience a large tariff reduction in the last three years.

Column 1 of Panel B of Table 7 presents the results of estimating Equation 4, with no control variables. The coefficient for *Peer Info Environment* $\times$ *Post_Cut* is negative and statistically significant. After the inclusion of the control variables in Column 2, the coefficient remains negative and statistically significant at the 1% level. These coefficient estimates imply that the sensitivity of delegation to peer information is significantly lower for treated firms than for control firms. These results suggest that when an exogenous increase in competition mitigates agency frictions, the agency cost mitigation role of peer information declines. Since my treated firms are obtained using reductions in tariff rates for U.S. industries, I test the robustness of my results using only US firms. Although the sample size is significantly smaller, Columns 3 and 4 show that the coefficient for *Peer Info Environment* $\times$ *Post_Cut* remains negative and significant. Overall, these findings support a causal interpretation of my baseline result documenting that peer information increases delegation, and suggest that peer information plays an agency cost mitigation role.

5.2 Delegation and investment sensitivity

In this section, I explore the validity of my inferences suggesting that delegation increases investment sensitivity. The results of my main specification (section 4.5) and cross-sectional tests (section 4.6) are consistent with the idea that delegation improves investment sensitivity. How-

ever, my empirical tests could be subject to endogeneity concerns. First, my proxy for growth opportunities could suffer from measurement errors (Erickson and Whited, 2000, 2012). Second, unobservable factors might affect both delegation and investment sensitivity. The next three sections discuss several steps that I take to mitigate these concerns.

5.2.1 Alternative fixed effect specifications

My main analysis of the effects of delegation on investment sensitivity includes several firm-level control variables and fixed effects to mitigate concerns about an omitted variable bias. To further lessen this concern, I examine the robustness of my results to alternative fixed effect specifications. Using arguments similar to those discussed in section 5.1.1, I study the robustness of my results to the inclusion of year×country fixed effects that absorb time-varying industry characteristics, year×country fixed effects that capture country-specific time-varying characteristics, and industry×country fixed effects that absorb industry characteristics that vary across countries. Since my empirical predictions relate to the investment sensitivity rather than the investment level, in addition to standalone fixed effects, I include the interactions between these fixed effects and growth opportunities.

Table 8 presents the results from estimating Equation 2 with these alternative fixed effect specifications. The coefficient for *Delegation×Sales Growth* is positive and significant across all columns, alleviating concerns about an omitted variable bias.

5.2.2 Country-level corporate tax rate changes

To mitigate concerns that measurement error in my proxy for growth opportunities could affect my inferences, I exploit exogenous variation in corporate tax rates to sidestep the need to measure growth opportunities. A corporate tax rate change can be viewed as a shock to the after-tax return on investment (e.g., a tax rate cut increases the return on investment), thereby providing a measure of changes in investment opportunities (Badertscher et al., 2013; Asker et al., 2014).

I use data on the statuary corporate income tax rate in the headquarters' country of location and define *Tax Rate Change* as the negative value of the percentage point change in country-level corporate income tax rates during the fiscal year. I study the effect of delegation on the sensitivity of investment to tax rate change. Specifically, I modify Equation 2 by replacing *Sales Growth* with *Tax Rate Change* and estimate the modified model. Panel A of Table 9 reports the results. Column 1 shows that the coefficient for *Delegation×Tax Rate Change* is positive and statistically

significant, suggesting that investment in firm-years with more delegation is more responsive to tax rate changes than investment in firm-years with less delegation. Column 2 controls for *Tax Rate Change*'s interactions with control variables, with year fixed effects, and with country fixed effects. The coefficient for *Delegation×Tax Rate Change* remains positive and significant.

5.2.3   IFRS adoption

In this section, I use the mandatory adoption of IFRS as an exogenous proxy for the improvement of the peer information environment. As discussed in section 5.1.2, prior research shows that IFRS adoption improves the peer information environment (e.g., Landsman et al., 2012; Daske et al., 2013) and can be used as a general proxy for improvement in the peer information environment (Hail et al., 2014). I predict that the effect of delegation on investment sensitivity is stronger for treated firms located in IFRS-adopting countries than for control firms. I regress investment on *Delegation × Post_IFRS × Sales Growth*, and the control variables and fixed effects included in Equation 2. The model also includes standalone variables, and possible two-way and three-way interaction terms created using *Post*, *IFRS*, *Sales Growth*, and *Delegation*, unless these variables are absorbed by fixed effects. To effectively compare the same sample pre- and post-IFRS adoption, I use a constant sample of firms for which I have observations both before and after IFRS adoption. Column 1 of Table 9 presents the results with no control variables. Columns 2 adds the control variables and their interactions with *Sales Growth*. The results show that the coefficient for *Delegation × Post_IFRS × Sales Growth* is positive and statistically significant in both columns.[36] These results imply that the effect of delegation on investment sensitivity is stronger for treated firms in countries that switch to IFRS relative to control firms.

6   Additional analyses and robustness tests

I conduct several additional analyses and robustness tests to explore the validity of my main inferences. I discuss these tests and report the results in the Appendix C, but I summarize the main findings here. I find the positive relation between peer information and delegation remains unchanged when I use alternative functional forms of the peer information and delegation measures. My tests also indicate that agency frictions between shareholders and the CEO do not affect the relation between peer information and delegation, firms with stronger division manager's incentive

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[36]I find that the difference between the coefficient for *Delegation × Post_IFRS × Sales Growth* in Columns 1 and 2 is statistically insignificant (p-value=0.835 (untabulated)), supporting the assumption that IFRS adoption is likely exogenous and does not systematically coincide with observable characteristics in my model.

contracts have a weaker relation between peer information and delegation, and firm's own information environment does not appear to affect the relation between peer information and delegation. Finally, my main result is robust to dropping individual countries from the sample, requiring alternative minimum number of observations for each country-industry-year, using alternative industry classifications, using an alternative treatment of missing control variables, employing alternative methods to obtain rankings of my three proxies for peer information, using peer firms that have a comparable size to that of sample divisions, and clustering standard errors on different dimensions. Additionally, I find that the positive relation between delegation and investment sensitivity is robust to using an alternative proxy for the delegation measure, dropping individual countries from the sample, and clustering standard errors on different dimensions. My tests also suggest that agency frictions between shareholders and the CEO do not impact the positive relation between delegation and investment sensitivity.

7 Conclusion

This paper examines whether and how the peer information environment increases the delegation of decision making from a CEO to division managers, and whether delegation improves investment in growth opportunities.

Peer information can increase delegation through two channels. First, peer information helps division managers obtain relevant information and make more informed decisions, motivating the CEO to increase delegation. Second, peer information can help the CEO to evaluate and monitor managers, reducing agency frictions of delegation. Based on these two arguments, I predict and find that a richer peer information environment increases delegation. Further, I find that the relation between peer information and delegation is weaker when alternative mechanisms mitigate agency frictions between the CEO and managers, and stronger when learning from peers is more beneficial for division managers.

Next, I explore the effect of delegation on investment sensitivity to growth opportunities. When delegation is more costly for the CEO (e.g., the information environment is poor), it is more difficult for firms to exploit their growth opportunities as CEOs are time-constrained over the number of decisions they can make. A greater degree of delegation facilitates investment in growth opportunities. I predict and find that delegation increases the investment sensitivity to growth opportunities. I also find that the effect is stronger when agency frictions are less severe, and when peer

information is richer.

I conduct several tests to further verify the validity of my inferences, including using the adoption of IFRS as a proxy for exogenous improvement in the peer information environment, exogenous variation in agency conflicts, and exogenous variation in the corporate income tax rate to eliminate the need to measure growth opportunities. These analyses support my inferences.

My study contributes to the literature exploring the real effects of the information environment. Much of this literature examines investment decisions and provides limited evidence on the internal organization of firms. I contribute to this literature by providing evidence on the real effect of the information environment on the delegation of decision making, and by documenting that the information environment can affect investment decisions by facilitating delegation.

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Figure 1: Delegation by Country

This figure presents levels of delegation measure by country (for selected countries in the sample), at the 25th percentile (bottom line of the box), median (middle line of the box), and 75th percentile (top line of the box), as well as upper and lower adjacent values. Delegation is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing.
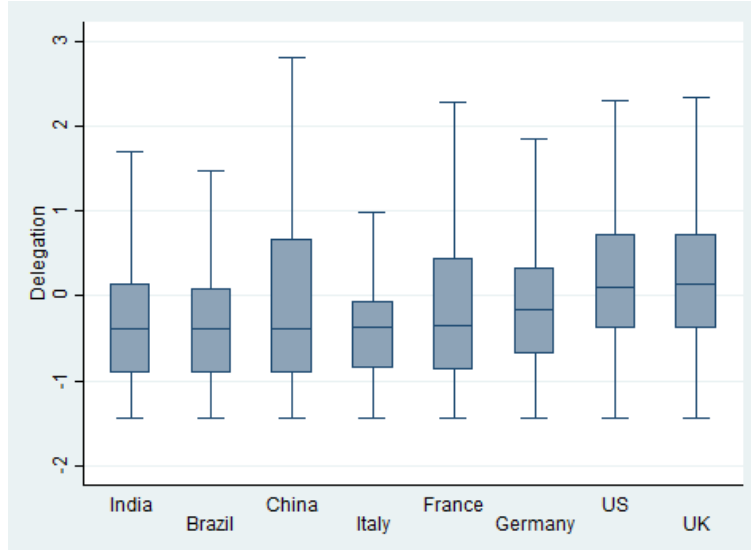
Table 1: Summary statistics

Panel A reports summary statistics for the variables used in the analyses exploring the effect of peer information on delegation. The sample includes public and private firms (5,738 firm-year observations) obtained from the World Management Survey. Panel B reports summary statistics for the variables used in the analyses exploring the effect of delegation on the investment sensitivity to growth opportunities. The sample includes public and private firms (1,065 firm-year observations). All variables are defined in the Appendix A.

Panel A. The peer information environment and delegation analyses

Variables	Mean	SD	P25	Median	P75
Peer Info Environment	0·50	0·22	0·33	0·56	0·67
Press Coverage	21·89	25·62	1·46	10·82	36·82
Accruals Quality	−0·08	0·05	−0·10	−0·07	−0·05
Earnings Sync	0·14	0·13	0·04	0·12	0·22
Delegation	−0·01	0·97	−0·75	−0·13	0·65
Employee Skill	0·17	0·19	0·05	0·11	0·23
Span of Control	6·36	20·25	1·00	2·00	5·00
Firm Size	1,156·23	4,741·96	160·00	350·00	900·00
Incentive Contracts	0·11	0·13	0·00	0·08	0·17
Division Size	0·68	3·76	0·29	0·63	0·89
MNC	0·45	0·50	0·00	0·00	1·00
Levels To CEO	0·86	1·00	0·00	1·00	1·00
Industry Q	2·00	0·68	1·48	1·92	2·37
Industry ROA	−0·03	0·14	−0·07	0·02	0·06

Panel B. Delegation and investment sensitivity to growth opportunities analyses

Variables	Mean	SD	P25	Median	P75
Investment	0·90	8·72	−1·86	−0·04	2·62
Sales Growth	0·09	0·27	−0·03	0·06	0·17
Cash	0·10	0·12	0·01	0·05	0·14
ROA	0·05	0·11	0·00	0·05	0·10
Leverage	0·10	0·15	0·00	0·01	0·15
Assets (in $Mil)	310·69	1,094·49	26·48	72·96	211·42

Table 2: The peer information environment and the degree of delegation

This table reports the results of regressing the degree of delegation on the lagged peer information environment, other determinants of delegation, and the survey noise controls. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. All variables are defined in the Appendix A. All specifications include survey interviewer fixed effects, and the specifications in Columns 2 and 3 include year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	*Delegation*		
	(1)	(2)	(3)
Peer Info Environment	0.213**	0.210**	0.249***
	(2.190)	(2.501)	(3.048)
Employee Skill			0.024**
			(2.159)
Division Size			0.085***
			(4.145)
Firm Size			0.037*
			(1.865)
MNC			0.093***
			(2.965)
Span of Control			0.039**
			(2.333)
Levels To CEO			-0.128***
			(-3.896)
Industry Q			0.113**
			(2.478)
Industry ROA			-0.080
			(-1.158)
Incentive Contracts			0.028**
			(2.103)
Observations	5,738	5,738	5,738
Adjusted R-squared	0.178	0.197	0.213
Noise Controls	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes
Year; Industry; and Cntry FEs	No	Yes	Yes

Table 3: The agency cost mitigation and managerial learning effects of peer information

Columns 1 and 2 (3-5) explore the agency cost mitigation (managerial learning) effect of the peer information environment. Columns 1 and 2 report the results of regressing the degree of delegation on the lagged peer information environment, proxies of alternative agency friction mitigation mechanisms (*High Trust* in Column 1 and *High Competition* in Column 2), and interaction terms between peer information and these proxies. Columns 3-5 report the results of regressing the degree of delegation on the lagged peer information environment, proxies for the benefits of managerial learning role of peer information (the degree of investment irreversibility in Columns 3 and 4 and uncertainty in Column 5), and interaction terms between peer information and these proxies. All specifications include other determinants of delegation and the survey noise controls. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. *High Trust* is an indicator that equals one for firms with corporate headquarters located in regions with above median trust. *High Competition* is an indicator that equals one for industries with above median product market competition. The proxies for investment irreversibility are *Comovement* and *PPE Sale*. *High Uncertainty* is an indicator that equals one for industries with above median uncertainty. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	Delegation				
	Agency cost mitigation		Managerial learning		
	(1)	(2)	(3)	(4)	(5)
Peer Info Environment × High Trust	-0.325**				
	(-2.390)				
Peer Info Environment × High Competition		-0.213*			
		(-1.966)			
Peer Info Environment × High Comovement			0.267**		
			(2.165)		
Peer Info Environment × Low PPE Sale				0.359***	
				(3.494)	
Peer Info Environment × High Uncertainty					0.248**
					(2.274)
Peer Info Environment	0.414***	0.337***	0.146	0.048	0.144
	(4.073)	(4.502)	(1.335)	(0.468)	(1.616)
High Trust	0.185**				
	(2.292)				
High Competition		0.122**			
		(2.118)			
High Comovement			-0.116*		
			(-1.878)		
Low PPE Sale				-0.231***	
				(-4.266)	
High Uncertainty					-0.133**
					(-2.040)
Observations	5,730	5,738	5,513	5,738	5,357
Adjusted R-squared	0.213	0.213	0.207	0.214	0.207
Control Variables	Yes	Yes	Yes	Yes	Yes
Noise Controls	Yes	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes	Yes	Yes	Yes

Table 4: The degree of delegation and investment sensitivity to growth opportunities

This table reports the results of regressing investment on sales growth, the degree of delegation, the interaction term between sales growth and delegation, the control variables, and the survey noise controls. *Investment* is the change in net fixed assets expressed as percentage points of beginning-of-year total assets. *Sales Growth* is the percentage change in sales. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. Column 3 also controls for sales growth's interactions with control variables, with country fixed effects, and with year fixed effects. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	Investment		
	(1)	(2)	(3)
Delegation × Sales Growth		2.258**	3.743***
		(2.254)	(3.016)
Sales Growth	6.706***	6.659***	
	(6.134)	(5.894)	
Delegation		-0.637**	-0.739**
		(-2.016)	(-2.344)
Peer Info Environment × Sales Growth		21.423***	17.055**
		(3.499)	(2.113)
Peer Info Environment		-3.425	-3.368
		(-1.499)	(-1.462)
Cash	2.134	1.958	3.661
	(0.873)	(0.807)	(1.456)
ROA	12.095***	12.684***	12.925***
	(4.658)	(4.863)	(4.750)
Leverage	-3.674*	-3.883*	-2.941
	(-1.741)	(-1.848)	(-1.363)
Ln_Assets	-0.036	-0.073	-0.046
	(-0.163)	(-0.334)	(-0.203)
Observations	1,065	1,065	1,065
Adjusted R-squared	0.114	0.131	0.168
Noise Controls	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes	Yes
Control Variables × Sales Growth	No	No	Yes
Year and Cntry FEs × Sales Growth	No	No	Yes

Table 5: Delegation and investment sensitivity to growth opportunities: Cross-sectional tests

Columns 1 and 2 report the results of regressing investment on sales growth, delegation, proxies of agency friction mitigation mechanisms (*High Trust* in Column 1 and *High Competition* in Column 2), and their two-way and three-way interaction terms. Columns 3 and 4 report the results of regressing investment on sales growth, delegation, the lagged peer information environment, and their two-way and three-way interaction terms. All specifications include control variables (*Cash*, *ROA*, *Leverage*, and *Ln_Assets*) and the survey noise controls. *Investment* is the change in net fixed assets expressed as percentage points of beginning-of-year total assets. *Sales Growth* is the percentage change in sales. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. *High Trust* is an indicator that equals one for firms with corporate headquarters located in regions with above median trust. *High Competition* is an indicator that equals one for industries with above median product market competition. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. Columns 1, 2 and 4 also control for sales growth's interactions with the control variables, with country fixed effects, and with year fixed effects. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:		*Investment*		
	Agency cost mitigation		*Peer info environment*	
	(1)	(2)	(3)	(4)
Delegation × High Trust × Sales Growth	1.482			
	(0.610)			
Delegation × High Competition × Sales Growth		4.647**		
		(1.985)		
Delegation × Peer Info Environment × Sales Growth			12.879*	17.473**
			(1.860)	(2.190)
Peer Info Environment × Sales Growth			19.758***	14.509*
			(3.191)	(1.782)
Delegation × Sales Growth	3.061	1.821	2.699***	3.969***
	(1.544)	(1.096)	(2.626)	(3.191)
High Trust × Sales Growth	3.453			
	(1.368)			
High Competition × Sales Growth		-1.083		
		(-0.412)		
Sales Growth			6.632***	
			(5.874)	
Observations	1,065	1,065	1,065	1,065
Adjusted R-squared	0.164	0.166	0.132	0.171
Controls Variables	Yes	Yes	Yes	Yes
Noise Controls	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes	Yes	Yes
Main and Two-way Interaction Effects	Yes	Yes	Yes	Yes
Control Variables × Sales Growth	Yes	Yes	No	Yes
Year and Cntry FEs × Sales Growth	Yes	Yes	No	Yes

Table 6: The peer information environment and delegation: Alternative fixed effect specifications

This table reports the results of regressing the degree of delegation on the lagged peer information environment, other determinants of delegation, and the survey noise controls, using alternative fixed effect specifications. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. All variables are defined in the Appendix A. Columns 1; 2; 3; and 4 include year×industry and country; year×country and industry; year and industry×country; and year×industry, year×country, and industry×country fixed effects, respectively. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	*Delegation*			
	(1)	(2)	(3)	(4)
Peer Info Environment	0.228***	0.250***	0.212*	0.402**
	(2.644)	(2.923)	(1.783)	(2.366)
Employee Skill	0.027**	0.024**	0.025**	0.026**
	(2.364)	(2.167)	(2.179)	(2.312)
Division Size	0.089***	0.086***	0.087***	0.086***
	(4.308)	(4.123)	(4.174)	(4.027)
Firm Size	0.039**	0.037*	0.038*	0.040**
	(1.988)	(1.850)	(1.955)	(1.985)
MNC	0.092***	0.093***	0.092***	0.093***
	(2.816)	(2.950)	(2.854)	(2.814)
Span of Control	0.040**	0.039**	0.040**	0.038**
	(2.297)	(2.343)	(2.342)	(2.162)
Levels To CEO	-0.132***	-0.131***	-0.134***	-0.138***
	(-3.856)	(-3.904)	(-3.986)	(-3.952)
Industry Q	0.161**	0.113**	0.047	0.084
	(2.343)	(2.416)	(0.649)	(0.634)
Industry ROA	-0.057	-0.086	-0.204**	-0.202
	(-0.576)	(-1.237)	(-2.473)	(-1.470)
Incentive Contracts	0.026*	0.027**	0.027**	0.027**
	(1.945)	(2.026)	(2.034)	(1.996)
Observations	5,738	5,738	5,738	5,738
Adjusted R-squared	0.212	0.212	0.214	0.205
Noise Controls	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes
Year FEs	-	-	Yes	-
Industry FEs	-	Yes	-	-
Cntry FEs	Yes	-	-	-
Year × Industry FEs	Yes	No	No	Yes
Year × Cntry FEs	No	Yes	No	Yes
Industry × Cntry FEs	No	No	Yes	Yes

Table 7: The peer information environment and delegation: Shock to the peer information environment (IFRS adoption) and shock to agency frictions (import tariff rate reductions)

Panel A. Shock to the peer information environment (IFRS adoption)

This panel reports the results of regressing the degree of delegation on lagged Post_IFRS, other determinants of delegation, and the survey noise controls. The sample includes firms with observations both before and after IFRS adoption. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Post_IFRS* is an indicator variable that equals one for firms in IFRS-mandating countries in fiscal years after the mandatory adoption date in the firm's country. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	*Delegation*	
	(1)	(2)
Post_IFRS	0.151***	0.102***
	(3.217)	(3.495)
Employee Skill		0.061**
		(2.731)
Division Size		0.141***
		(5.846)
Firm Size		0.056
		(1.806)
MNC		0.120*
		(2.189)
Span of Control		0.068***
		(3.802)
Levels To CEO		-0.124**
		(-2.611)
Industry Q		0.247***
		(5.784)
Industry ROA		-0.104
		(-0.550)
Incentive Contracts		0.019
		(0.885)
Observations	2,108	2,108
Adjusted R-squared	0.149	0.180
Noise Controls	Yes	Yes
Interviewer FEs	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes

Panel B. Shock to agency frictions (import tariff rate reductions)

This panel reports the results of difference-in-differences regressions examining the effect of the peer information environment (*Peer Info Environment*) on the degree of delegation (*Delegation*) due to the agency cost mitigation effect of peer information. The dependent variable is *Delegation*, a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. Large tariff rate reductions occur when the change in an industry-year tariff rate is negative and three times larger than the median tariff rate reduction of the same industry during the sample period. *Post_Cut* is an indicator variable that equals one if the division is located in the U.S. and operates in an industry that has experienced a large tariff rate reduction in any of the last three years. Columns 1 and 2 include the full sample and Columns 3 and 4 include U.S. firms. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	Full Sample		US Sample	
	Delegation			
	(1)	(2)	(3)	(4)
Peer Info Environment × Post_Cut	-0.805***	-0.892***	-0.769*	-1.089**
	(-4.018)	(-4.158)	(-1.873)	(-2.215)
Peer Info Environment	0.217**	0.257***	0.368**	0.386***
	(2.570)	(3.130)	(2.657)	(3.303)
Post_Cut	0.447***	0.492***	0.427	0.607*
	(2.928)	(2.991)	(1.517)	(1.919)
Employee Skill		0.024**		0.049
		(2.184)		(1.465)
Division Size		0.085***		0.137***
		(4.156)		(5.889)
Firm Size		0.037*		0.048
		(1.869)		(1.647)
MNC		0.093***		0.034
		(2.955)		(0.685)
Span of Control		0.039**		0.060**
		(2.332)		(2.416)
Levels To CEO		-0.129***		-0.151**
		(-3.908)		(-2.175)
Industry Q		0.115**		0.112
		(2.502)		(0.622)
Industry ROA		-0.081		-0.193
		(-1.167)		(-1.523)
Incentive Contracts		0.027**		0.047*
		(2.093)		(1.813)
Observations	5,738	5,738	1,164	1,164
Adjusted R-squared	0.197	0.213	0.081	0.109
Noise Controls	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes	Yes	Yes

Table 8: Delegation and investment sensitivity to growth opportunities: Alternative fixed effect specifications

This table reports the results of regressing investment on sales growth, the degree of delegation, the interaction term between sales growth and delegation, using alternative fixed effect specifications (e.g., Column 1 includes country fixed effects, country fixed effects × sales growth, year × industry fixed effects, and year × industry fixed effects × sales growth). All specifications include control variables (*Cash*, *ROA*, *Leverage*, and *Ln_Assets*), the survey noise controls, and the control variables × sales growth. *Investment* is the change in net fixed assets expressed as percentage points of beginning-of-year total assets. *Sales Growth* is the percentage change in sales. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. All variables are defined in the Appendix A. All specifications include survey interviewer. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	Investment			
	(1)	(2)	(3)	(4)
Delegation × Sales Growth	4.158***	3.695***	4.668***	4.556***
	(2.899)	(2.865)	(3.282)	(2.775)
Peer Info Environment × Sales Growth	18.843	16.522*	22.945	-8.879
	(1.534)	(1.652)	(1.213)	(-0.220)
Observations	1,065	1,065	1,065	1,065
Adjusted R-squared	0.147	0.184	0.204	0.080
Controls Variables	Yes	Yes	Yes	Yes
Noise Controls	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes
Main Effects	Yes	Yes	Yes	Yes
Control Variables × Sales Growth	Yes	Yes	Yes	Yes
Year FEs; Year FEs × Sales Growth	-	-	Yes	-
Industry FEs; Industry FEs × Sales Growth	-	Yes	-	-
Cntry FEs; Cntry FEs × Sales Growth	Yes	-	-	-
Year FEs × Industry FEs; Year FEs × Industry FEs × Sales Growth	Yes	No	No	Yes
Year FEs × Cntry FEs; Year FEs × Cntry FEs × Sales Growth	No	Yes	No	Yes
Industry FEs × Cntry FEs; Industry FEs × Cntry FEs × Sales Growth	No	No	Yes	Yes

Table 9: Delegation and investment sensitivity to growth opportunities: Shock to growth opportunities (corporate income tax rate changes) and shock to the peer information environment (IFRS adoption)

Panel A. Shock to growth opportunities (corporate income tax rate changes)

This table reports the results of using staggered changes in country-level corporate income tax rates as shocks to growth opportunities. The results are from regressing investment on the tax rate change, delegation, and the interaction term between the tax rate change and delegation. All specifications include control variables (*Cash*, *ROA*, *Leverage*, and *Ln_Assets*) and the survey noise controls. Column 2 also includes the interaction between the control variables and the tax rate change. *Investment* is the change in net fixed assets expressed as percentage points of beginning-of-year total assets. *Tax Rate Change* is the negative value of the percentage point change in the country-level corporate income tax rate in the headquarters' country of location during the fiscal year. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Peer Info Environment* is the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by the headquarters' country of location. Column 2 also controls for the tax rate change's interactions with country fixed effects and with year fixed effects. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	*Investment*	
	(1)	(2)
Delegation × Tax Rate Change	0.387**	0.351*
	(2.726)	(1.929)
Peer Info Environment × Tax Rate Change	7.063***	5.702***
	(5.624)	(3.353)
Observations	1,065	1,065
Adjusted R-squared	0.082	0.101
Controls Variables	Yes	Yes
Noise Controls	Yes	Yes
Interviewer FEs	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes
Main Effects	Yes	Yes
Control Variables × Tax Rate Change	No	Yes
Year and Cntry FEs × Tax Rate Change	No	Yes

Panel B. Delegation and investment sensitivity to growth opportunities: Shock to peer information (IFRS adoption)

This table reports the results of regressing investment on the interaction term between sales growth, delegation, and the lagged Post_IFRS, as well as standalone variables, and two-way and three-way interaction terms (except variables fully absorbed by fixed effects). The sample includes firms with observations both before and after the IFRS adoption. All specifications include the survey noise controls. Column 2 also includes control variables (*Cash*, *ROA*, *Leverage*, and *Ln_Assets*) and the interaction between these control variables and sales growth. *Investment* is the change in net fixed assets expressed as percentage points of beginning-of-year total assets. *Sales Growth* is the percentage change in sales. *Delegation* is a z-score index measured as the average across z-scored measures of division manager autonomy over hiring, capital investment, production, and sales and marketing. *Post_IFRS* is an indicator variable that equals one for firms in IFRS-mandating countries in fiscal years after the mandatory adoption date in the firm's country. All variables are defined in the Appendix A. All specifications include survey interviewer, year, industry, and country fixed effects. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country. Column 2 also controls for sales growth's interactions with country fixed effects and with year fixed effects. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Dependent Variable:	*Investment*	
	(1)	(2)
Delegation × Post_IFRS × Sales Growth	19.971*	20.681*
	(1.920)	(1.828)
Delegation × Sales Growth	11.524***	8.805***
	(12.219)	(3.953)
Post_IFRS × Sales Growth	16.496**	20.647***
	(3.040)	(5.207)
Observations	325	325
Adjusted R-squared	0.340	0.370
Controls Variables	No	Yes
Noise Controls	Yes	Yes
Interviewer FEs	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes
Main and Two-way and Three-way Interaction Effects	Yes	Yes
Control Variables × Sales Growth	No	Yes
Year and Cntry FEs × Sales Growth	No	Yes

Appendix A: Variable definitions

Table A1: Variable definitions

Variable	Definition
Accruals Quality	Negative one times the cross-sectional standard deviation of the residuals obtained from the modified Dechow and Dichev's (2002) model. The residuals are obtained from regressing accruals on the last period, current period, and next period cash flows from operations; PPE; and the change in revenue, using all firms within each country-industry-year. All variables in the model are scaled by average total assets.
Cash	Beginning-of-year cash and short-term investments scaled by beginning-of-year total assets.
Delegation of Capital Investment	The division manager's autonomy over capital investment (Table B1 in the Appendix B presents the questions and scoring grids used in the WMS survey).
Delegation of Hiring	The division manager's autonomy over hiring new full-time permanent employees (Table B1 in the Appendix B presents the questions and scoring grids used in the WMS survey).
Delegation of Production	The division manager's autonomy over decisions on the introduction of new products (Table B1 in the Appendix B presents the questions and scoring grids used in the WMS survey).
Delegation of Sales_Marketing	The division manager's autonomy over sales and marketing decisions (Table B1 in the Appendix B presents the questions and scoring grids used in the WMS survey).
Delegation	The average across four z-scored measures (mean zero and unit standard deviation) of the division manager's autonomy over four decisions: *Delegation of Hiring*, *Capital Investment*, *Production*, and *Sales_Marketing*.
Disp. Shares	An indicator variable that equals one for firms with dispersed shareholders. Specifically, the WMS classifies a firm's ownership as dispersed when the firm has no shareholder with more than 25% of the shares.
Division Size	The number of employees in the division as a percentage of the number of employees in the firm.
Duration	The duration of the interview in minutes.
Earning Sync	For each firm-year, the firm-level earnings synchronicity is defined as the adjusted R-squared obtained from the following regression using the last ten annual earnings data (and requiring a minimum of eight observations): $E_{i,j,c,t} = \alpha + \beta E_{j,c,t} + e_{i,j,c,t}$ where i, j, c, and t index firms, industries, countries, and years, respectively; $E_{i,j,c,t}$ is operating earnings scaled by lagged total assets; and $E_{j,c,t}$ is the industry-country-year's aggregate earnings scaled by aggregate lagged total assets. *Earnings Sync* is the average firm-level earnings synchronicity across all firms within each industry-country-year.

Table A (Continued)

Variable	Definition
Employee Skill	The portion of the division's employees with college degrees.
Firm Size	The natural logarithm of the number of employees in the firm.
High Comovement	An indicator variable that equals one if the firm-year belongs to an industry-country-year whose *Comovement* value is above the median. *Comovement* is the average value of industry betas across all firms in each industry-country-year; where the industry beta for each firm-year obtained by regressing monthly returns on a value-weighted industry return index and a value-weighted market return index.
High Competition	An indicator variable that equals one if the firm-year belongs to an industry-country-year whose *Competition* is above the median. *Competition* is one minus the average value of income divided by sales across all firms in each industry-country-year.
High Incentive Contracts	An indicator variable that equals one when *Incentive Contracts* is above the median.
High Trust	An indicator variable that equals one if the firm's corporate headquarters is in a region with an above median value of *Trust*. *Trust* is obtained using data on trust in people from several waves of the World Values Survey and European Values Study Survey over the sample period (WVS 2005-2009, EVS 2008, and WVS 2010-2014). Survey respondents answer the following question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" *Trust* is defined as the percentage of individuals who agreed with the statement "most people can be trusted" in the firm's headquarters region of location.
High Uncertainty	An indicator variable that equals one if the firm-year belongs to an industry-country-year whose *Uncertainty* is above the median. *Uncertainty* is the standard deviation of the firm-level market-adjusted returns across all firms in each industry-country-year.
IFRS	An indicator variable that equals one for firms in countries that adopt IFRS.
Incentive Contracts	The percentage of the division manager's compensation that is bonus-based.
Industry Q	The average Tobin's Q across all firms within each industry-country-year. Tobin's Q is defined as the market value of equity plus the book value of total assets minus the book value of equity divided by the book value of total assets.
Industry ROA	The average ROA across all firms within each industry-country-year. The ROA is the ratio of net income before extraordinary items to beginning-of-year total assets.

Table A (Continued)

Variable	Definition
Investment	The change in net fixed assets (PPE from Compustat for U.S. public firms and fixed assets from ORBIS for other firms), expressed as percentage points of beginning-of-year total assets.
Levels To CEO	The natural logarithm of one plus the number of managers between the CEO and the division manager.
Leverage	Beginning-of-year long-term debt scaled by beginning-of-year total assets.
Ln_Assets	The natural logarithm of beginning-of-year total assets, converted into millions of USD.
Low PPE Sale	An indicator variable that equals one if the firm-year belongs to an industry-country-year whose *PPE Sale* is below the median. *PPE Sale* is the average value of firm-level PPE sales across all firms in each industry-country-year; where the firm-level PPE sales is the ratio of PPE sales to beginning-of-year total PPE.
MNC	An indicator variable that equals one if the division belongs to a multinational company.
Noise Controls	Noise controls include *Duration*, *Seniority*, and *Reliability*.
Peer Info Environment	The average quartile ranks of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one.
Post_Cut	An indicator variable that equals one if the division is located in the U.S. and operates in an industry that has experienced a large tariff reduction in any of the last three years. Large tariff reductions occur when the change in an industry-year tariff rate is negative and three times larger than the median tariff rate reduction of the same industry during the sample period.
Post_IFRS	An indicator variable that equals one for firms in IFRS-mandating countries in fiscal years after the mandatory adoption date in the firm's country.
Post	An indicator variable that equals one for fiscal years after the mandatory adoption date in the firm's country or 2005 for firms in countries that do not adopt IFRS.
Press Coverage	The average number of press articles written about a firm in each country-industry-year.
Public	An indicator variable that equals one for publicly traded firms.
Reliability	A subjective score based on the interviewer's judgment of the interviewee's willingness to reveal information and patience, capturing the reliability of the information collected.
ROA	The ratio of net income before extraordinary items to beginning-of-year total assets.
Sales Growth	The percentage change in sales.
Seniority	A score measuring the manager's seniority.
Span of Control	The natural logarithm of the number of divisions in the firm.

Table A (Continued)

Variable	Definition
Tax Rate Change	The negative value of the percentage point change in the country-level corporate income tax rate in the headquarters' country of location during the fiscal year.
z_Peer Info Environment	The average across three z-scored measures (mean zero and unit standard deviation) of *Accruals Quality*, *Earning Sync*, and the natural logarithm of one plus *Press Coverage*.

Appendix B: World Management Survey

This section discusses the World Management Survey, which is detailed and used in Bloom et al. (2012).

B.1   Collecting Accurate Responses

A key challenge in surveys is obtaining unbiased responses to questions. A range of steps were taken to help obtain accurate responses. First, the survey targeted division (plant) managers because they are typically senior enough to have an overall view of organization practices but junior enough to be familiar with day-to-day operations.

Second, the survey was conducted by telephone, and managers were not told in advance that they were being scored on organizational or management practices. They were told that they were being interviewed for "a piece of work." This blind survey helped to obtain the firms' actual organizational practices, rather than their aspirations, managers' perceptions, or the interviewer's impressions. To avoid biasing respondents by providing response options, the survey employed a scoring approach based on open questions rather than closed questions. For instance, managers were asked "To hire a full-time permanent shop floor worker, what agreement would your plant need from corporate headquarters?" rather than the yes-or-no question "Can you hire workers without authority from corporate headquarters?" The first question on each practice was broad, and follow-up questions were detailed to fine-tune the scoring. The interviewer continued the discussion and asked for examples until he or she could make an accurate assessment of the firm's typical practices. For example, if the manager responded "It is my decision, but I need sign-off from corporate headquarters," the interviewer would ask the manager "How often would sign-off typically be given?" or "Could you give me a recent example?" Using open questions and interviewers' assessments helped the survey to capture the firm's actual organizational structure.

Third, if the interviewer had any preconceptions about the firm, those preconceptions might have led to biases. To avoid such biases, the survey tool was "double blind." Not only did the managers not know they were being scored, but the interviewers also did not know anything about the firm's performance or financial information. To that end, firms were selected from medium-sized firms, and the interviewers were provided with only firm names and contact details. All interviews were conducted in the manager's native language.

Fourth, since the survey used open questions, the interviewers could have scored answers in subtly different ways. To address concerns about inconsistent interpretations of categorical responses, several steps were taken. These steps are discussed in section B.4 below.

Fifth, the survey collected detailed information on the interview process itself (duration of the interview), the manager (seniority and location), and the interviewer (individual interviewer fixed effects and a reliability score). This information can be included in regression analyses as "noise controls" variables to help reduce residual variations.

B.2   Obtaining interviews with division managers and the response rate

Interviews, on average, took approximately 55 minutes. The survey attained a relatively high response rate of 45%, achieved through several steps. First, the interviewers did not ask for financial data to maximize the firms' participation and ensure that the interviewers were truly "blind" as to the firms' financial performance. Second, interviewers' performance and some interviews were monitored by supervisors to encourage persistent follow-ups. The interviewers conducted about two interviews per day and spent the rest of their working time (about 6 hours per day) contacting managers to schedule interviews. Third, the survey obtained written endorsements from many senior officials from respected institutions such as the Central Bank and Finance Ministry of

the division's country. These endorsements helped demonstrate that the survey was an important academic exercise. Fourth, the survey hired high-quality interviewers (mainly MBA students) with business experience and training to signal to the managers that the interviews would be of high quality. Due to the high overhead costs to run the survey, each interview was budgeted as costing between USD 400 and USD 500. The responding firms were not systematically different from non-responders on the observable measures. The only exception was size: The responders were slightly larger than firms in the sampling frame.

B.3 Sampling Frame

The sampling frame for the survey was based on the Bureau van Dijk Orbis dataset for Europe, Brazil, Canada, China, and Singapore; the Orbis and CMIE Firstsource 2005 dataset for India; the Orbis and Dun & Bradstreet dataset for Australia; and the Orbis and Compustat dataset for the U.S. In each country, firms were randomly selected to be representative of private and public medium-sized manufacturing firms (between 50 and 10,000 employees). Very small firms are less likely to have a formal corporate hierarchy (e.g., the CEO can make all decisions). Very large firms are likely to be more heterogeneous across divisions. Firms were selected from a sampling population of firms with sufficient information to conduct a stratified telephone survey (company name, address, and size measured by the number of employees). Except for size, the survey did not require any other financial data to form the sampling population.

B.4 Ensuring international comparability

The survey included firms from several countries, and thus, ensuring the comparability of responses was important. To maximize comparability, the survey undertook three steps. First, all interviewers participated in the same initial interview training before the survey to learn the scoring grid. The training was three days long and included several "calibration" exercises. In each of these exercises, interviewers participated in a mock interview run by a lead researcher, and all the interviewers scored different firm practices individually and then discussed the outcomes as a group to align their scoring. These exercises aimed at ensuring that the interviewers had a common interpretation of the scoring grid. Furthermore, once a week throughout the survey period, the group met for 90 minutes to discuss any issues regarding the interpretation of the survey responses. Second, the team conducting interviews at one location . Thus, different national survey teams were managed and organized in the same way (e.g., they used the same telephone, computer, and software technology). They also were able to discuss their issues regarding the interpretation of different responses with each other. Third, each interviewer conducted multiple interviews with firms in multiple countries. All interviews were conducted in the manager's native language. All interviewers spoke their native language plus English, enabling them to interview managers from their own country plus the United Kingdom, the U.S., and Australia. This design allowed for rotating interviewers across groups. Interviewers conducted multiple interviews, allowing for the inclusion of interviewer fixed effects in all empirical specifications to remove interviewer effects. Furthermore, I include country fixed effects in my specifications.

Table B1: Details of the delegation survey questions

Question D1: "To hire a FULL-TIME PERMANENT SHOPFLOOR worker what agreement would your plant need from CHQ (central headquarters)?" Probe until you can accurately score the question; for example, if they say "It is my decision, but I need sign-off from corporate HQ," ask "How often would sign-off be given?"			
	Score 1	Score 3	Score 5
Scoring grid	No authority, even for replacement hires	Requires sign-off from CHQ based on the business case; typically agreed (i.e., approximately 80% or 90% of the time)	Complete authority; it is my decision entirely
Question D2: "What is the largest CAPITAL INVESTMENT your plant could make without prior authorization from CHQ?" Notes: (a) Ignore form-filling. (b) Please cross check any zero response by asking "What about buying a new computer would that be possible?" and then probe .... (c) Challenge any very large numbers (e.g., >0.25 million in U.S. dollars) by asking "To confirm, your plant could spend $X on a new piece of equipment without prior clearance from CHQ?" (d) Use the national currency and do not omit zeros (i.e., for a U.S. firm twenty thousand dollars would be 20,000).			
Question D3: "Where are decisions taken on new product introductions—at the plant, at the CHQ, or both?" Probe until you can accurately score the question—for example, if they say "It is complex, we both play a role," ask "Could you talk me through the process for a recent product innovation?".			
	Score 1	Score 3	Score 5
Scoring grid	All new product introduction decisions taken at the CHQ	New product introductions jointly determined by the plant and CHQ	All new product introduction decisions taken at the plant level
Question D4: "How much of sales and marketing is carried out at the plant level (rather than at the CHQ)?" Probe until you can accurately score the question. Also take an average score for sales and marketing if they are taken at different levels.			
	Score 1	Score 3	Score 5
Scoring grid	None; sales and marketing run by CHQ	Sales and marketing decisions split between the plant and CHQ	The plant runs all sales and marketing

Note. For Questions D1, D3, and D4 any score can be given, but the scoring guide is only provided for scores of 1, 3, and 5. The electronic survey, training materials, and survey video footage are available at http://worldmanagementsurvey.org/. Table is taken from Bloom et al. (2014).

Appendix C: Additional analyses and robustness tests

To explore the validity of my main inferences, I conduct several additional analyses and robustness tests. Table C1 reports on the main analyses. The next two sections discuss these additional tests on the relation between peer information and delegation and on the relation between delegation and investment sensitivity to growth opportunities, respectively.

C.1   The peer information environment and the degree of delegation

In this section, I review additional tests exploring the validity of my main finding suggesting that peer information increases delegation.

C.1.1   Alternative functional forms of peer information and delegation measure

First, for my analyses discussed in the paper, I aggregate my three proxies for the richness of peer information (i.e., *Press Coverage*, *Accruals Quality*, and *Earnings Sync*) to mitigate potential concerns about measurement errors and to obtain a summary measure (Dechow et al., 2010; Leuz and Wysocki, 2016; Shroff et al., 2017). In this section, I test whether my main result is robust to alternative weightings of the individual proxies. Panel A of Table C1 reports the results of regressing *Delegation* on three proxies of my main proxy for peer information (i.e., *Press Coverage*, *Accruals Quality*, and *Earnings Sync*) as well as a continuous version of my proxy (*z_Peer Info Environment*), which is the average value across the z-scored measures of these three proxies. The results show that the coefficients for all proxies of peer information are positive and statistically significant, suggesting that my results are robust to alternative functional forms of peer information. I similarly study alternative functional forms of the degree of delegation. Panel B of Table C1 reports the results of regressing the z-scored measure of four individual measures of delegation on *Peer Info Environment*. The coefficient for *Peer Info Environment* is positive across all four columns and, with the exception of *Sales_Marketing*, statistically significant.[37] The results imply that peer information affects the delegation of authority related to different types of decisions (Hofmann and Indjejikian, 2018).

C.1.2   Agency frictions between the CEO and shareholders

Peer information can reduce the information asymmetry between shareholders and the CEO (Shroff et al., 2017), thereby decreasing agency problems between the two parties and increasing the importance of making informed decisions for the CEO. As decisions become more important to CEOs, they are less likely to delegate (Garicano, 2000; Graham et al., 2015). However, to the extent that richer peer information increases the net benefits of greater delegation for the firm and thus shareholders (i.e., due to the reduced agency costs of delegation and managerial learning), a CEO whose preferences are more aligned with those of shareholders is more likely to delegate. I study whether potential agency frictions between the CEO and shareholders affects the relation between peer information and delegation. Agency frictions between the CEO and shareholders are arguably more severe among firms with dispersed ownership than among firms with concentrated ownership (e.g., firms with private equity or family ownership) because the shareholders of latter can better internalize their monitoring costs (i.e., more limited free-riding problem) and have lower coordination costs in monitoring the CEO and implementing policy changes (Shleifer and Vishny, 1986; Asker et al., 2014). The WMS contains data on whether a firm's ownership is dispersed. Specifically, the data include an indicator variable, *Disp. Shares*, that equals one when the firm has

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[37]Studying the effect of trust on delegation, Bloom et al. (2012) also find that the relation between trust and *Sales_Marketing* is insignificant. They argue that the reason is that division managers rarely have control over sales and marketing decisions, so perhaps an insignificant coefficient is not too surprising.

no shareholder owning more than 25% of the shares. Using this variable, I test whether the relation between peer information and delegation (as documented in Table 2) and the effect of a shock to the information environment due to the mandatory IFRS adaption (as documented in Table 7) vary with the firm's ownership status. Specifically, I include *Disp. Shares* and its interaction with *Peer Info Environment* in my main specification. I also modify my specification for the IFRS test by including *Disp. Shares* and its interactions with *Post_IFRS*, with *IFRS*, and with *Post*. Panel C of Table C1 reports the results. Column 1 shows that the interaction between *Disp. Shares* and *Peer Info Environment* is insignificant. Similarly, the interaction between *Disp. Shares* and *Post_IFRS* is not significant (Column 2). These results suggest that agency frictions between the CEO and shareholders do not appear to influence the relation between peer information and delegation.

C.1.3 Division manager incentive contracts

I argue and provide evidence suggesting that the CEO uses peer information to reduce agency frictions with the division manager. The CEO could also use incentive contracts to mitigate agency frictions. To the extent that incentive contracts better align the manager's and CEO's incentives (Abernethy et al., 2004; Indjejikian and Matějka, 2012; Milgrom and Roberts, 1992), the agency cost mitigation role of peer information is reduced. Thus, I predict that the relation between peer information and delegation is weaker when incentive contracts are stronger. Consistent with this prediction, Panel D of Table C1 shows the relation between peer information and delegation is weaker when *Incentive Contracts*, measured as the percentage of the division manager's compensation that is bonus-based, is above the median.

C.1.4 Firm's own information environment

In this section, I explore whether firm's own information environment affects the relation between peer information and delegation. Since most firms in my sample are private firms, I do not have sufficient data to measure the three individual proxies of information environment (i.e., press coverage, accruals quality, and earnings synchronicity) for them. I use a firm's listing status as a proxy for the information environment. The intuition for this proxy is that public firms have a richer information environment than private firms. For instance, public firms have greater ownership dispersion and greater owner-manager separation, resulting in higher agency costs and greater information demands from investors and creditors (Minnis and Shroff, 2017). Consistent with these arguments, prior studies, exploring US firms (Hope et al., 2013) and European firms (Burgstahler et al., 2006), find that public firms have higher financial reporting quality than private firms. I modify Equation 1 by including an indicator variable for public firms, *Public* and its interaction with peer information and estimate the modified equation. Panel E of Table C1 presents my results. The coefficients on *Peer Info Environment×Public* is statistically insignificant. The insignificant coefficient suggests that firm's own information environment does not appear to affect the relation between peer information and delegation.

C.1.5 IFRS adoption and Firm's own information environment

The mandatory adoption of IFRS not only can improve the peer information environment but also can improve the firm's own information environment (Shroff, 2017a). In this section, I provide evidence to mitigate the concern that the positive effect of IFRS adoption documented in section 5.1.2 is driven by the potential improvement in the firm's own information environment. Specifically, I remove public firms from my sample and study whether *private* firms located in IFRS-adopting countries increased delegation after the IFRS adoption date as compared to *private* firms in countries that had not adopted IFRS. The results reported in Panel F of Table C1 show

that the coefficient on Post_IFRS remains positive and statistically significant, suggesting that my inferences on the IFRS adoption are robust to removing public firms from the sample. This results further support my prediction that an improvement in the peer information environment increases delegation. One limitation of this test is that to the extent that private firms voluntarily adopt IFRS, their own information environment might be affected. Ideally, private firms that voluntarily adopt IFRS on the adoption date must also be removed from my sample. However, I do not have data on these firms.

C.1.6 Peer firms size

In my main tests, I use all public firms to obtain peer information proxy. My sample includes both public and private firms and thus my sample firms, on average, are smaller than public firms. One alternative is to use only peer firms that have a comparable size to that of my sample firms. I choose to use all peer firms regardless of their size because prior research shows that the effect of peer firms is asymmetric. Specifically, smaller, less successful firms are highly affected by their larger, more successful peers, but not vice versa (e.g., Leary and Roberts, 2014). In addition, to the extent that the CEO uses *common size* ratios of peer firms (e.g., ROA) to evaluate the performance of division managers, the difference in size is less likely to affect the comparison. However, to mitigate the concern that my results are affected by using larger peer firms, I study the robustness of my main result to using peer firms that have a comparable size to that of my sample divisions. The division in my sample with the 95th percentile value of size (measured using the number of employees) has 1000 employees. I obtain peer information proxy using peer firms that have less than 1000 employees and estimate Equation 1. The results are reported in Panel G of Table C1. The coefficient on peer information remains positive and significant, suggesting that my results are robust to using peer firms with a comparable size to that of sample firms. Untabulated results show that my inferences are unchanged when I use peer firms with size below the 90th or 99th percentile values.

C.1.7 Robustness tests

Finally, I conduct a number of untabulated robustness tests. First, my main inferences are robust to dropping individual countries from the sample. Second, in my analyses, I require each country-industry-year to have more than 15 observations. My results are robust to requiring more than 5, 10, and 20 observations for each country-industry-year. Third, I obtain financial data using WorldScope for non-U.S. firms and Compustat for U.S. firms. The only industry classification for which data are available in both databases is the SIC codes. For my analyses, I define industries using two-digit SIC codes, because using narrower industry codes significantly reduces the sample size (i.e., from 5,738 when two-digit SIC codes are used to 1,535 when three-digit SIC codes are used). My main results are also robust to alternative industry classifications (one-digit SIC codes, three-digit SIC codes, and three-digit SIC codes for U.S. firms and two-digit SIC codes for non-U.S. firms). Fourth, I take steps to avoid the loss of precision and improve the generalizability of my results: When a control variable obtained from survey data has missing observations, I, following Bloom et al. (2012), set the control variable equal to a common value, create a new indicator that equals one if the variable is missing and zero otherwise, and augment my regression models by including the indicator variable to control for any systematic effects of including missing observation in my sample. My inferences are robust to using only observations with complete data for all variables. Fifth, I use quartile ranks to aggregate three proxies of peer information. My inferences are robust to using quintile, decile, and percentiles ranks. Sixth, my results are robust to clustering standard errors on different dimensions (industry, country).

C.2 Delegation and investment sensitivity to growth opportunities

This section provides additional evidence for my main finding suggesting that delegation increases investment sensitivity to growth opportunities. First, similar to the previous section, I test whether my main result indicating that delegation increases investment sensitivity to growth opportunities is robust to using an alternative proxy for delegation: *Delegation of Capital Investment*. Panel H of Table C1 demonstrates that my main result is robust. As discussed before, I also find that my results are robust to using corporate tax rate changes as an alternative proxy for growth opportunities.

I also study whether agency frictions between shareholders and the CEO affects the relation between delegation and investment sensitivity. I add *Disp. Shares* and its interaction term with *Delegation×Growth Opportunities* to Equation 2. I also include *Delegation×Disp. Shares*, *Disp. Shares×Growth Opportunities* in the equation. Panel I of Table C1 shows that the coefficient for *Delegation×Disp. Shares×Growth Opportunities* is statistically insignificant. This finding suggests that agency frictions between the CEO and shareholders do not appear to affect the relation between delegation and investment sensitivity.

Finally, I conduct a number of untabulated robustness tests and find that the positive relation between delegation and investment sensitivity is robust to dropping individual countries from the sample, and to clustering standard errors on different dimensions (industry, country).

Table C1: Additional analyses

Panels A-G (H and I) present additional analyses for the main test exploring the peer information environment and delegation (delegation and investment sensitivity to growth opportunities). Panels A and B report the results for using alternative functional forms of the peer information measure and the degree of delegation measure, respectively. Panel C studies whether the relation between peer information and delegation varies with the extent of agency frictions between the CEO and shareholders. Panel D studies whether the relation between peer information and delegation varies with the division manager incentive contracts. Panel E studies whether the relation between peer information and delegation varies with a firm's ownership status. Panel F explores the effect of IFRS adoption on delegation after removing public firms from the sample. Panel G reports the results from estimating Equation 1, where peer information proxy is measured using peer firms that have less than 1000 employees (which is the 95th percentile value of division size in the sample). Panel H reports the results for using division manager autonomy over capital investment as an alternative proxy for the degree of delegation. Panel I studies whether the relation between delegation and investment sensitivity varies with the extent of agency frictions between the CEO and shareholders. All specifications in Panels A-C and E-G include the control variables and fixed effects used in Column 3 of Table 2. The specification in Panel D includes the control variables and fixed effects used in Column 3 of Table 2, expect *Incentive Contracts*. All specifications in Panels H and I include the control variables and fixed effects used in Column 3 of Table 4. The proxies for peer information in Panel A are the quartile rank of press coverage (*Press Coverage*), the quartile rank of accruals quality (*Accruals Quality*), the quartile rank of earnings synchronicity (*Earnings Sync*), and *z_Peer Info Environment*. The first three proxies are scaled to be between zero, and one and *z_Peer Info Environment* is a z-score index measured as the average across z-scored measures of press coverage, accruals quality, and earnings synchronicity. The proxy for peer information in Panels B-E and G is *Peer Info Environment* defined as the average quartile rank of *Press Coverage*, *Accruals Quality*, and *Earning Sync*, scaled to be between zero and one. The dependent variables in Panel B are z-score indices measuring the division manager's autonomy over hiring (*Delegation of Hiring*), capital investment (*Delegation of Capital Investment*), production (*Delegation of Production*) and sales and marketing (*Delegation of Sales_Marketing*). The dependent variable in Panels A, C-G is *Delegation*, defined as a z-score index measured as the average across z-scored measures of the division manager autonomy over hiring, capital investment, production, and sales and marketing. The dependent variable in Panels H and I is *Investment*, defined as the change in fixed assets expressed as percentage points of beginning-of-year total assets. The proxy for growth opportunities is *Sales Growth*, defined as the percentage change in sales. *Post_IFRS* is an indicator variable that equals one for firms in IFRS-mandating countries in fiscal years after the mandatory adoption date in the firm's country. *Disp. Shares* is an indicator variable that equals one for firms with dispersed shareholders. *High Incentive Contracts* is an indicator variable that equals one when *Incentive Contracts*, measured as the percentage of the division manager's compensation that is bonus-based, is above the median. *Public* is an indicator variable that equals one for public firms. All variables are defined in the Appendix A. The *t*-statistics are in parentheses and are based on robust standard errors clustered by country-industry (except for panel F and Column 2 of panel C, where the standard errors are clustered by country). *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed t-test.

Panel A. Alternative functional forms of the peer information measure

Dependent Variable:	*Delegation*			
	(1)	(2)	(3)	(4)
Press Coverage	0.149**			
	(2.061)			
Accruals Quality		0.090**		
		(2.360)		
Earnings Sync			0.071*	
			(1.875)	
z_Peer Info Environment				0.038**
				(2.068)
Observations	5,738	5,738	5,680	5,738
Adjusted R-squared	0.212	0.212	0.209	0.212
Control Variables	Yes	Yes	Yes	Yes
Noise Controls	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes	Yes	Yes

Table C1 (Continued)

Panel B. Alternative functional forms of the delegation measure

Dependent Variable:	Delegation of Hiring (1)	Delegation of Capital Investment (2)	Delegation of Production (3)	Delegation of Sales_Marketing (4)
Peer Info Environment	0.145*	0.319***	0.187*	0.030
	(1.699)	(2.944)	(1.968)	(0.327)
Observations	5,716	5,135	5,516	5,582
Adjusted R-squared	0.155	0.100	0.140	0.165
Control Variables	Yes	Yes	Yes	Yes
Noise Controls	Yes	Yes	Yes	Yes
Interviewer FEs	Yes	Yes	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes	Yes	Yes

Panel C. Peer information and delegation: Agency frictions between the CEO and shareholders

Dependent Variable:	Delegation	
	(1)	(2)
Peer Info Environment × Disp. Shares	-0.065	
	(-0.475)	
Post_IFRS × Disp. Shares		-0.075
		(-0.823)
Peer Info Environment	0.274***	
	(2.841)	
Post_IFRS		0.128*
		(1.865)
Observations	5,733	2,108
Adjusted R-squared	0.213	0.180
Control Variables	Yes	Yes
Noise Controls	Yes	Yes
Interviewer FEs	Yes	Yes
Year; Industry; and Cntry FEs	Yes	Yes
Main and Two-way Interaction Effects	Yes	Yes

Table C1 (Continued)

Panel D. Peer information and delegation: Division manager incentive contracts

Dependent Variable:	Delegation
	(1)
Peer Info Environment × High Incentive Contracts	-0.256*
	(-1.836)
Peer Info Environment	0.398***
	(3.365)
High Incentive Contracts	0.160**
	(2.015)
Observations	4,613
Adjusted R-squared	0.180
Control Variables	Yes
Noise Controls	Yes
Interviewer FEs	Yes
Year; Industry; and Cntry FEs	Yes

Panel E. Peer information and delegation: Firm's own information environment

Dependent Variable:	Delegation
	(1)
Peer Info Environment × Public	-0.160
	(-0.928)
Peer Info Environment	0.272***
	(3.198)
Public	0.078
	(0.812)
Observations	5,738
Adjusted R-squared	0.213
Control Variables	Yes
Noise Controls	Yes
Interviewer FEs	Yes
Year; Industry; and Cntry FEs	Yes

Table C1 (Continued)

Panel F. Peer information and delegation: IFRS adoption test using private firms

Dependent Variable:	*Delegation*
	(1)
Post_IFRS	0.274***
	(7.278)
Observations	1,736
Adjusted R-squared	0.190
Control Variables	Yes
Noise Controls	Yes
Interviewer FEs	Yes
Year; Industry; and Cntry FEs	Yes

Panel G. Peer information and delegation: Peer firms size

Dependent Variable:	*Delegation*
	(1)
Peer Info Environment	0.188**
	(2.139)
Observations	4,277
Adjusted R-squared	0.206
Control Variables	Yes
Noise Controls	Yes
Interviewer FEs	Yes
Year; Industry; and Cntry FEs	Yes

Table C1 (Continued)

Panel H. Alternative proxy for the delegation measure

Dependent Variable:	*Investment*
	(1)
Delegation of Capital Investment × Sales Growth	4.083***
	(3.768)
Peer Info Environment × Sales Growth	20.802**
	(2.400)
Observations	965
Adjusted R-squared	0.161
Controls Variables	Yes
Noise Controls	Yes
Interviewer FEs	Yes
Year; Industry; and Cntry FEs	Yes
Main Effects	Yes
Control Variables × Sales Growth	Yes
Year and Cntry FEs × Sales Growth	Yes

Panel I. Delegation and investment sensitivity to growth opportunities: Agency frictions between the CEO and shareholders

Dependent Variable:	*Investment*
	(1)
Delegation × Disp. Shares × Sales Growth	3.290
	(1.503)
Delegation × Sales Growth	1.739
	(1.070)
Disp. Shares × Sales Growth	-9.867***
	(-4.046)
Observations	1,063
Adjusted R-squared	0.175
Controls Variables	Yes
Noise Controls	Yes
Interviewer FEs	Yes
Year; Industry; and Cntry FEs	Yes
Main and Two-way Interaction Effects	Yes
Control Variables × Sales Growth	Yes
Year and Cntry FEs × Sales Growth	Yes

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1. Information Environment, the Organization of Firms, and Investment Decisions

Publication

2. "Disclosure Incentives When Competing Firms Have Common Ownership" (with Jihwon Park, Nemit Shroff, and Hal White)
    Journal of Accounting and Economics April-May 2019: 387-415

Working Papers

3. "Intangible Assets and the Trend in the Accruals-Cash Flow Association" (with Jeremiah Green and Henock Louis)

4. "Public Firm Presence and Sell-Side Analysts" (with Badryah Alhusaini, Kimball Chapman, and Hal White)

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