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THREE ESSAYS ON CORPORATE FINANCE

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I dedicate this dissertation to my parents.

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SUMMARY

This dissertation contains three essays on corporate finance. The first essay examines the role of government directors (outside directors with past work experience in government agencies) in corporate governance and their effect on firm performance. We find that unlike nongovernment outside directors, government directors on the board are not associated with an increase in CEO turnover-performance sensitivity. Government directors are also more likely to miss board meetings than nongovernment directors, although not when firms have a major trading relationship with the government. Further, compared to firms without government directors, firms with government directors experience weaker annual operating performance and more negative merger announcement returns, but their mergers are less likely to be challenged by antitrust authorities. We also find that announcements of government director appointments are greeted more negatively by investors than those of nongovernment director appointments. However, our results for operating performance and announcement returns are not observed when firms with government directors operate in regulated industries. Our results highlight the ineffectiveness of government directors as monitors and advisors as well as the circumstances under which they add value.

Essay two investigates the governance role of customer blockholders -- blockholders who are also firms' corporate customers. We find significant differences between customer deals, where acquirers are targets' customers, and noncustomer deals, where acquirers hold only equity stakes in targets after the deals. In particular, customer deals elicit larger announcement effects, lead to more involuntary top executive turnovers among poorly performing targets, and result in greater improvements in target firms' operating performance, than do noncustomer deals. Moreover, we find that these differences are especially pronounced when targets' managerial agency problems are likely to be highly detrimental to their product market relationships. Our evidence supports the view that customer blockholders'

nonfinancial claims arising from the product market relationships enhance their incentives to strengthen target firms' corporate governance and improve target firms' operating performance.

Essay three examines how friendly directors affect firm innovation. We find that firms with friendly directors have more research and development expenditures. These investments translate into greater innovation using patents and patent citations to measure the quantity and quality of innovation. Firms with CEO-board social connections create more patents and have more citations than firms without CEO-board social connections. We also find that institutional origin of the social connection matters. While nonprofessional connections due to shared educational and non-business antecedents increase innovation, professional connections formed due to common prior employment have no impact on innovation. The positive effects of nonprofessional connections are more pronounced when firms have more R&D expenditure, when they have more advisory needs, when they are from industries where innovation is more important, and when their outside directors have relevant industry expertise. Our results support a "friendly board" perspective in which directors are not merely monitors but also provide advice and counsel to CEOs.

Chapter one: From backroom to boardroom--role of government directors in corporate governance and firm performance

Abstract

We examine the role of government directors (outside directors with past work experience in government agencies) in corporate governance and their effect on firm performance. We find that unlike nongovernment outside directors, government directors on the board are not associated with an increase in CEO turnover-performance sensitivity. Government directors are also more likely to miss board meetings than nongovernment directors, although not when firms have a major trading relationship with the government. Further, compared to firms without government directors, firms with government directors experience weaker annual operating performance and more negative merger announcement returns, but their mergers are less likely to be challenged by antitrust authorities. We also find that announcements of government director appointments are greeted more negatively by investors than those of nongovernment director appointments. However, our results for operating performance and announcement returns are not observed when firms with government directors have a major trading relationship with the government or when they operate in regulated industries. Our results highlight the ineffectiveness of government directors as monitors and advisors as well as the circumstances under which they add value.

1. Introduction

The number of publicly listed firms that appoint former government officials as their outside directors has increased dramatically in recent decades. For example, while in 1990 only 31.47% of our sample firms had former government officials on their boards, by 2007 this number had increased to 54.53%.¹ However, despite the increasing presence of retired bureaucrats on corporate boards, their role as effective monitors/advisors has been called into question. For example, former U.K. Conservative cabinet minister John Wakeham drew international attention through his directorship at Enron, the bankrupt U.S. energy group, when he was summoned to appear before a Senate committee to explain his role in the collapse of Enron. Similarly, activist investors accused the Hollinger International board of failing to stop its CEO's alleged looting and wrongdoing and hence of failing to fulfill their fiduciary duties.²

In this paper we investigate several important issues regarding the role of government directors (outside directors with work experience in government agencies) in corporate governance and the effect of their board presence on firm performance. Specifically, we examine the following issues: What motivates firms to appoint government directors? Do government directors perform an important monitoring role or do they just rubber-stamp the decisions of top management? Do government directors provide top management valuable advice with respect to major corporate decisions or do they offer no valuable insight into corporate decision making? Finally, do government directors help firms perform better or are they just high-profile, high-priced window dressing?

¹ For example, in 2006 Lockheed Martin had thirteen outside directors on its board, of which five were former government officials including former Under Secretary of Department of Defense Pete Aldridge Jr., former Admiral of U.S. Strategic Command James O. Ellis Jr., and former Deputy Secretary of Homeland Security James M. Loy.

² In 2006, the board of Hollinger International included high profile former government officials such as former Secretary of State Henry Kissinger, former U.S. Ambassador to Germany Richard Burt, and former Assistant Defense Secretary Richard Perle ("Directors' role under scrutiny at Hollinger International", *Reuters News*, May 13, 2004).

There are two competing views on the role of government directors, namely, the view that government directors play an important value-enhancing role in establishing corporate strategies and policies (the “monitoring/advising view”) and the view that they exercise no such role but rather rubber-stamp the decisions of chief executives (the “rubber-stamp view”).

According to the monitoring/advising view, government directors can bring benefits to a firm by providing it with valuable connections and unique information about the public policy process. With their connections to the government and prior experience in the public sector, government directors can also facilitate sales to the government and may even influence government actions in the firm’s best interest, a benefit that is especially valuable when the actions of regulatory agencies have important consequences for firm performance (Agrawal and Knoeber, 2001).

In contrast, the rubber-stamp view suggests that government directors lack business experience in areas such as industry, accounting, finance, and corporate governance, which limits their ability to effectively perform a monitoring/advising function.³ Furthermore, government directors frequently hold multiple board appointments, which can make them too busy to monitor management adequately. Thus, according to the rubber-stamp view, government directors are not part of the solution but rather are part of the problem, and as a consequence have an adverse effect on firm performance.

Using a large sample of 78,803 firm-year observations from 1990 to 2007, we find that the presence of a government director on the board is prevalent in many publicly listed firms in the U.S. Specifically, we find that approximately 43% of our sample firms have at least one government director on their board. Conditional on the presence of a government director, one

³ Consistent with the rubber-stamp view, the shareholder advisory firm Glass Lewis & Co. criticized American International Group (AIG) Inc, which was beset by bookkeeping and governance problems, for having too many government directors (such as former U.S. ambassador to the United Nations Richard Holbrooke and former Defense Secretary William Cohen) on its board. Glass Lewis further claimed that AIG needed to “increase the level of business expertise, including expertise in the insurance industry on its board.” (“Lifting the Lid: Ex-politicians draw scrutiny over board roles”, *Reuters News*, July 29, 2005).

out of four outside directors (23.76%) is a government director. Furthermore, government directors are appointed to firms across all industries, with the highest prevalence in industries in which firms have extensive trading relationships with the government (e.g., shipbuilding/railroad, aircraft, and defense industries) and regulated industries (e.g., utilities industry).⁴

Using a sample of 20,101 outside director appointments shows the similar results: The likelihood of government director appointments is higher when firms have closer trading relationships with the government or when firms operate in regulated industries. The appointment likelihood is also higher when government directors share an educational and social background with the CEO or when the CEO is the chairman of the board. These results suggest that although some firms appoint former government officials to improve sales to the government and strengthen their position in highly regulated environments, others hire them for unproductive reasons. At the director level, we find that older former government officials, those with a law degree, and those holding more board seats in other firms are more likely to be appointed as government directors, suggesting that firms prefer government directors with more public service background and higher profiles.

We next perform several tests to distinguish between the monitoring/advising view and the rubber-stamp view on the role of government directors. In performing the tests, whenever possible we mitigate the potential endogeneity bias caused by omitted unobservable firm characteristics by controlling for firm fixed effects in the regressions. First, we estimate a logit regression of the effect of government directors on the likelihood of top executive turnover. Consistent with the rubber-stamp view of government directors, we find that while the

⁴ Following O'Brien and Bhushan (1990), we define regulated industries as those with the following three-digit SIC codes: 421 (trucking and couriers services), 483 (radio and television broadcasting), 493 (utility services), 612 (savings institutions), 621 (security brokers and dealers), 633 (insurance), 805 (nursing and personal care facilities), and 809 (health and allied services). As an alternative measure, in untabulated test we define regulated industries as those in finance (SIC codes 6000-6999) and utility (SIC codes 4900-4999) industry and finds all our results do not change.

sensitivity of CEO turnover to performance increases significantly with the proportion of nongovernment outside directors, no such relation obtains for the proportion of government directors.

Second, we examine whether directors' attendance rate at board meetings is different between government and nongovernment outside directors. We find that government directors are more likely to have attendance problems than nongovernment directors, especially when they hold multiple directorships or when they are socially connected to the CEO. These results further support the rubber-stamp view. However, government directors' attendance problems are likely to be less severe when their firms have a major trading relationship with the government or when they operate in regulated industries, suggesting that the role of government directors in corporate governance varies across the product market and regulatory environments in which firms operate.

Third, we examine the link between merger announcement returns and the presence of government directors on the board. Consistent with the rubber-stamp view, we find that acquiring firms with a government director experience negative and significant abnormal announcement returns while acquiring firms without a government director experience positive and significant abnormal announcement returns. The announcement returns for firms with a government director are especially lower when they have higher agency problems (i.e., lower institutional ownership) or when they have greater advisory needs (i.e., boards consisting of more inexperienced nongovernment outside directors). However, their announcement returns are statistically indistinguishable from those of firms without a government director when they maintain extensive trading relationships with the government or when they operate in regulated industries. These results suggest that government directors' unique information about the public policy process and their ability to influence government policy increase firm value, thereby offsetting the potential costs associated with having retired bureaucrats on corporate boards. Further supporting the view that government directors bring

benefits to a firm, we find that mergers by acquirers with a government director are less likely to be challenged by antitrust authorities.

Fourth, we examine stock market reactions to appointments of government directors to a board. Using a sample of 176 announcements of government director appointments with no contaminating events, we find that the mean three-day abnormal announcement return for firms appointing a government director is a significant -0.56%. However, this negative announcement effect is largely alleviated when firms with higher sales dependence on the government or firms in regulated industries appoint government directors, suggesting that the stock market does not view the appointment of government directors who can potentially facilitate a close trading relationship with the government or play an important advisory role in regulatory environments as a value-decreasing event.

Fifth, we next examine whether the presence of a government director affects a firm's operating performance. We find that firms with a government director observe significantly lower industry-adjusted return on assets (ROA) than those without a government director. However, this result is evident only when the government is not a major customer of a firm or when firms operate in nonregulated industries.

Finally, to mitigate potential endogeneity concerns that arise because of the endogeneity of board composition before merger announcements, reverse causality between board structure and firm performance, or unobservable firm characteristics driving the results in the event that firms' mergers are challenged, we perform several robustness checks -- including an instrumental variables approach -- and find that our results are qualitatively unchanged. We also repeat all regression analyses reported in the paper using only post-1999 firm-year observations to minimize potential sample selection bias caused by low BoardEx (our main data source for identifying government directors) coverage of Compustat/CRSP firms during the early part of our sample period. We obtain almost identical results as those reported in the paper.

Overall, our findings suggest that government directors are not effective monitors/advisors, but their ability to facilitate business with the government and their insights about public policy procedures can bring benefits to a firm and as a result offset the costs associated with having government directors on the board.

Our study contributes to the literature in at least three ways. First, it extends the literature on the monitoring/advising roles performed by different types of outside directors and their effect on firm value. Prior studies examine the monitoring/advising roles performed by various types of outside directors such as bank directors (Kroszner and Strahan, 2001; Güner, Malmendier, and Tate, 2008), CEO directors (Fahlenbrach, Low, and Stulz, 2010), female directors (Adams and Ferreira, 2009), and foreign directors (Masulis, Wang, and Xie, 2010) and show that each of these outside directors performs a different monitoring/advising role in establishing corporate strategies and policies.

For example, Kroszner and Strahan (2001) find that bank directors are less common in smaller, more volatile firms, where conflicts of interest are more severe, and Güner, Malmendier, and Tate (2008) find that financially unconstrained firms with a bank director obtain larger loans, while financially constrained firms with a bank director do not. Fahlenbrach, Low, and Stulz (2010) find that appointing CEO directors certifies firm quality to the market, but these directors have no significant impact on firm value. Adams and Ferreira (2009) find that female directors have better board meeting attendance records and their board attendance improves the attendance record of other male directors. They also find that firms with female directors exhibit higher CEO turnover-performance sensitivity. Finally, Masulis, Wang, and Xie (2010) show that foreign directors are more likely to miss board meetings than U.S.-based directors, and firms with foreign directors pay excess CEO compensation and are more likely to commit financial misreporting. In this study we examine various roles performed by government directors in monitoring and advising the firm and their

effect on firm value, shedding further light on the importance of board composition to firm value.⁵

Second, our paper expands the literature on the effect of political connections on firm value. Previous studies that investigate the link between political connections and firm value focus largely on firms in developing countries and find evidence of a positive relation between them (Faccio, 2006; Faccio, Masulis, and McConnell, 2006; Charumilind, Kali, and Wiwattanakantang, 2006). More recently, Goldman, Rocholl, and So (2009) use U.S. firms to examine this issue and find that after the change in control in both the House and the Senate following the 1994 midterm election, and after the change in the Presidency following the 2000 election, firms connected to the winning party experienced an increase in value whereas those connected to the losing party experienced a decrease in value. However, while these studies enhance our understanding of the valuation implications of political connections, no prior study to our knowledge examines the role of government directors⁶ (which include both politicians and nonpoliticians) in corporate governance or the relative benefits and costs of appointing such directors to a firm's board, especially in a developed economy. We show that government directors, irrespective of whether politicians are included or not, are generally ineffective monitors/advisors and that the presence of government directors on the board adversely affects firm performance. This adverse effect is largely alleviated, however, for

⁵ Compare to other types of outside directors, government directors constitute a significant proportion of directors on the board. As discussed above, more than 40% of our sample firms have at least one government director and conditional on the presence of government directors, 24% of our sample outside directors are government directors. In comparison, Güner, Malmendier, and Tate (2008), Adams and Ferreira (2009), and Masulis, Wang, and Xie (2010) find that 27% (16%), 9.3%, and 12.74% of their sample firms have commercial (investment) bank directors, female directors, and foreign directors, respectively, and Fahlenbrach, Low, and Stulz (2010) report that CEO director appointments account for 11% of their sample appointments.

⁶ Compare to Goldman, Rocholl and So (2008), our definition of government director is broader. For example, their definition of "politically connected director" only includes former politicians from certain organizations and served certain positions, while our definition of "government director" include former officials from all government agencies served all positions.

firms with high government sales or those operating in regulated industries.⁷ Our paper therefore suggests both positive and negative roles performed by government directors and identifies circumstances under which government directors add or destroy firm value.

Third, in terms of methodology, our study contributes to prior research on political connections and finance by using a sample that is much more comprehensive and that covers a longer period of time, which substantially increases the power of our tests and allows us to control for unobserved heterogeneity at the firm level through the use of firm fixed effects regressions. Furthermore, previous papers in this area focus on high level politicians and officials. For example, “politically connected director” in Goldman, Rocholl and So (2008) only includes former politicians from certain organizations and served certain positions, Faccio (2006) consider directors who is a Member of Parliament or head of state. Compare to these papers, our definition for government director is broader, including former officials from all government agencies served all positions. With this broader definition, we are able to capture a much more comprehensive skill set associated with government officials’ public service experience.

The remainder of the paper proceeds as follows. In Section 2, we review the relevant literature and discuss our main hypothesis. Section 3 describes the data and sample characteristics, and reports empirical evidence on the determinants of government director appointments. In Section 4, we provide results from various tests on the monitoring/advising roles performed by government directors, including tests of the likelihood of CEO turnover, the likelihood of government directors’ board meeting attendance, merger announcement returns, and the likelihood of merger deals being challenged by the antitrust authorities. In

⁷ Although some government directors in our sample are politicians (about 10% of the total sample), as opposed to other types of government officials, our results are not driven by firms with these politicians on the board. For example, when we exclude firms that have politician government directors (who only worked in law-making institutions such as congress) from the sample and reestimate all regressions reported in the paper for the subsample of firms that have nonpolitician government directors, our key results still hold.

Section 5, we examine the effect of government directors on firm performance by analyzing announcement returns of government director appointments and a firm's operating performance. Section 6 provides some findings from additional test. Section 7 presents results from robustness tests that address endogeneity bias and Section 8 reports results from subperiod tests that address sample selection bias. Finally, we present summary and concluding remarks in Section 9.

2. Literature review and main hypothesis

There are two competing views on the role of government directors. The monitoring/advising view posits that government directors provide firms with valuable connections and unique information about the public policy process that help firms improve performance. In contrast, the rubber-stamp view emphasizes the costs that government directors impose on firms due to their lack of business experience and the fact that they often hold multiple board appointments, and thus predicts that government directors adversely affect firm performance. Below we discuss both of these views and our main hypothesis.

2.1. The monitoring/advising view

One of the important benefits that government directors can bring to firms is their unique insights about the public policy process, which otherwise can be expensive and often difficult to obtain due to its complexity (Hillman, Zardkoohi, and Bierman, 2009). For example, Yamamoto (1975) finds that in bidding for public projects, Japanese firms that hire former government officials submit bids that are 99.92% of the ceiling prices. Government directors' unique information about the public policy process is likely to be especially beneficial when the actions of regulatory agencies such as the Food and Drug Administration and the Environmental Protection Agency have significant consequences for firm performance (e.g.,

when firms operate in regulated industries). Consistent with this view, Agrawal and Knoeber (2001) find that firms that are significantly influenced by government policy are more likely to appoint outside directors with government work experience.

A second benefit of having government directors on the board is that they can influence government actions in their firm's best interest (Agrawal and Knoeber, 2001). Government actions can affect almost every aspect of business. For example, government policy can affect firms' competitive positions and influence their growth opportunities by influencing the size of their markets, establishing entry or exit barriers, and providing special tax or subsidy treatment (Schuler, Rehbein, and Cramer, 2002). The government can also affect firm costs through legislation on employment, safety, or environmental protection standards (Shaffer, 1995). With the contacts they acquire working in the public sector, government directors may be able to influence policy makers so that their firms receive favorable treatment. Consistent with this view, Yu and Yu (2010) find that firms with more connections to government are treated more favorably by the Securities and Exchange Commission (SEC) in the event of accounting fraud. Correia (2009) also finds that connected firms face lower enforcement costs by the SEC, are less likely to have a restatement initiated by the SEC, are less likely to be involved in an SEC enforcement action, and face lower penalties on average. There is also evidence that connected firms in emerging countries receive favorable regulatory treatment (Bunkanwanicha and Wiwattanakantang, 2009) and are more likely to be bailed out during a financial crisis (Faccio, Masulis, and McConnell, 2006).

Another important benefit that government directors can bring to firms is their ability to facilitate business with the government. The government often serves as a large customer or an important source of financing for many firms. For example, the U.S government has long been the single-most important customer for firms in the defense industry. With their connections to the government, their knowledge of government businesses and their ability to predict government actions, government directors are able to identify the services or products

that the government wants to buy (Miwa and Ramseyer, 2005) and thus are able to facilitate transactions with the government. Supporting this argument, Goldman, Rocholl, and So (2011) show that U.S. firms with connections to the winning party of an election are awarded more government contracts.⁸ Similarly, using data from Pakistan, Khwaja, and Mian (2005) find that firms with a director who is connected to the government receive preferential access to loans from government-owned banks.⁹

Taken together, the arguments above suggest that government directors play an important value-enhancing role in monitoring and advising the firms, particularly when firms operate in a regulatory environment or when they have a major trading relationship with the government.

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We empirically evaluate these arguments for the monitoring and advisory role of government directors as follows. First, we investigate how the presence of government directors on the board affects the likelihood of top executive turnover. We examine top executive turnover since removal of the top executive is considered to be one of the most aggressive actions taken by outside directors in the course of corporate governance. Outside

⁸ Anecdotal evidence also supports the argument that through their connections and influence, government directors bring more government purchases and contracts. For example, in 2004 the U.S. Department of Defense awarded a \$7 billion sole-source contract to rebuild oil fields in Iraq to Halliburton Inc., in which former Vice President Dick Cheney once served as chairman of the board of directors. Senior Pentagon officials later disclosed that Cheney's top aide, Lewis Libby, participated in high-level discussions on the impending Halliburton contract ("Democrat Probes Cheney-Aide Role in Iraq Contract", *Wall Street Journal*, June 14, 2004).

⁹ Several other papers also show that political connections positively affect firm value and access to financing. For example, Fisman (2001) finds that Indonesian firms connected to the Suharto family lost value following rumors about the deteriorating health of President Suharto, and in cross-country analyses Faccio (2006) finds that the value of connected firms increases when their executives enter politics. Using data from Thailand, Charumilind, Kali, and Wiwattanakantang (2006) further show that connected firms enjoy greater access to bank loans. In an U.S. study, Houston, Jiang, Lin and Ma (2011) find that the cost of bank loans is significantly lower for companies that have board members with political ties.

¹⁰ One potential concern is that the monitoring role of government directors is clear ex ante: because of their insight and connection, firms appoint government directors for their advisory rather than monitoring. However, we still expect that government director will perform the fiduciary duty to monitor management, as a result of the significant legal liability they have. For example, in January 2005, former outside directors of WorldCom and Enron agreed to pay a combined total of \$31 million out of their own pockets in settlements of suits brought under US securities law (Black, Cheffins, and Klausner, 2005).

directors are generally believed to perform an important corporate governance function in the U.S. For example, Weisbach (1988) finds that when the board is comprised of a majority of outside directors, the likelihood of CEO turnover in the U.S. is inversely related to firm performance. Thus, the monitoring/advising view predicts that, if government directors play an important governance role in top executive turnover, the sensitivity of top executive turnover to performance is higher when firms have government directors on their board.

Second, we examine whether the likelihood of directors missing a board meeting is different between government and nongovernment directors. As Adams and Ferreira (2009) point out, examining attendance records can serve as an important test for the monitoring/advising view for at least two reasons. First, attendance records are the only observable measure of director performance, which allows us to investigate whether government directors behave differently compared to nongovernment directors. Second, attendance behavior is important from a governance point of view because attendance at board meetings is a way for directors to directly obtain the information necessary to carry out their duties and exert influence over firm managers. The importance of attendance records as a measure of director performance is also emphasized by institutional investor and governance activists. For example, the 2008 Council of Institutional Investors Corporate Governance Policies proposes that directors who have attended fewer than 75% of meetings over the past two years should not be re-nominated. Consistent with this view, Cai, Garner, and Walking (2009) find that directors with poor attendance records receive fewer votes for their re-election. Our arguments above for the monitoring/advising view suggest that government directors miss fewer board meetings than nongovernment directors.

Third, we examine whether the merger announcement returns for acquiring firms with a government director are different from those for acquiring firms without a government director. We study merger activity because managerial objectives play an important role when managers acquire other firms and it can also have a significant effect on firm value. To the

extent that government directors play an important monitoring and advisory role in a firm's M&A decisions, the monitoring/advising view predicts higher merger announcement returns for firms with a government director than for firms without a government director. To further test the monitoring/advising view, we also examine whether the probability of merger deals being challenged by the antitrust authorities is related to the presence of government directors on acquiring firms' board. If government directors' valuable government connections and unique prior experience in the government sector help firms deal with the regulatory authorities in negotiating merger transactions, we expect this probability to be lower for acquiring firms with a government director than those without a government director

Fourth, we investigate whether the stock market reacts differently to announcements of government and nongovernment director appointments and how the presence of government directors on the board affects a firm's operating performance. If government directors can provide firms with valuable connections and unique information about the public policy process and these benefits translate into better firm performance, we expect that firms that announce appointments of government directors realize more positive returns than those that announce appointments of nongovernment directors. We also expect that firms with a government director experience higher annual operating performance than firms without a government director.

Finally, to the extent that government directors' connections to the government and their knowledge in the public sector are especially valuable when firms have large sales to the government or when they are significantly influenced by government policy, we expect the above predicted effects to be more pronounced when the government is firms' major customer or when firms operate in regulated industries.

2.2. The rubber-stamp view

In contrast to the above monitoring/advising view, the rubber-stamp view regards government directors as inefficient monitors/advisors because, compared to their counterparts in the corporate world, they tend to have less business experience. Government agencies and private enterprises pursue fundamentally different goals and require different skill sets of their employees. To the extent that government directors, who spend more of their career in government agencies and less time in the corporate world, have less business experience, they are likely to have less understanding of how a firm's investment and financing decisions impact its profitability.

From a monitoring/advising perspective, perhaps the most important business experience that government directors lack is industry-specific experience. Several studies show that directors' industry experience is positively related to firm performance, as it plays an important role in the decision making and management succession processes. For example, Custódio and Metzger (2010) find that CEOs with work experience in a target firm's industry increase their shareholders' wealth during takeovers, and Fich (2005) shows that markets react favorably when firms appoint executives with industry expertise to their boards. Similarly, Papakonstantinou (2007) documents a positive effect of board industry experience on firm performance and Kroll, Walters, and Wright (2008) show that boards with more industry experience are associated with superior acquisition outcomes. Thus, to the extent that directors with less industry experience incur greater information search and monitoring costs and have more difficulty interpreting the information within the firm, the lack of industry experience is likely to adversely affect government directors' incentives to undertake active monitoring and advisory roles.

Government directors are also likely to lack accounting and financial knowledge about public corporations. Krishnan and Visvanathan (2008) and Cohen, Krishnamoorthy, and Wright (2008) show that directors' accounting and financial expertise is important for

effective monitoring and advising. These results suggest that government directors' lack of accounting and financial knowledge is likely to make them less effective monitors/advisors.

The monitoring/advisory capacity of government directors can also be impaired to the extent that they hold directorships in multiple firms. Firms that regularly deal with government agencies or have significant procurement government contracts are likely to have strong demand for government directors, due to these directors' ability to facilitate business with government agencies and influence governmental decisions (Agrawal and Knoeber, 2001). However, the supply of government directors is often limited, for at least two reasons. First, to avoid conflicts of interest, government officials are not allowed to serve on corporate boards when they still work for government agencies. Second, even after retirement, many government officials turn down offers to be a director because of the significant amount of time they have to put into fulfilling their directorship responsibilities and the potential legal risk associated with investor lawsuits, especially after the passage of the Sarbanes-Oxley Act (SOX).¹¹ This limited supply of government directors provides retired government officials an opportunity to sit on more than one board. For example, former U.S. Labor Secretary Elaine L. Chao served on six different boards, including C.R. Bard, Clorox, Columbia/HCA Healthcare, Dole Food, Northwest Airlines, and Protective Life, before sitting on George W. Bush's cabinet.¹²

However, outside directorships require a significant time commitment (Lipton and Lorsh, 1992). Because of the significant amount of time required to fulfill their duties, directors that overextend themselves by accepting too many outside directorships may not be able to effectively monitor and advise top management. Consistent with this view, Fich and Shivdasani (2006) find that firms with a majority of outside directors holding three or more

¹¹ "Declining a place at the table: more politicians, executives say 'no, thanks' to director seats", *The Washington Post*, February 27, 2003.

¹² "Multiple seats of power—companies are cracking down on number of directorships board members can hold", *Wall Street Journal*, January 23, 2001.

directorships are associated with weak corporate governance. They also find that firms with a “busy board” have lower market-to-book ratios, lower profitability, and lower sensitivity of CEO turnover to firm performance. These results suggest that overcommitted government directors have little time to monitor and advise firm management, resulting in lower firm performance and value.

Taken together, the arguments above suggest that government directors’ lack of business experience and multiple directorships limit their ability to perform an effective monitoring/advising role and thus have an adverse effect on firm performance. The predictions of the rubber-stamp view for various tests discussed in the previous section (i.e., the likelihood of top executive turnover, the likelihood of board meeting attendance, merger announcement returns, the likelihood of merger deals being challenged by the antitrust authorities, announcement returns of government director appointments, and annual operating performance) are thus exactly opposite to those of the monitoring/advising view.

3. Sample selection and determinants of government director appointments

Our initial sample includes all firms covered in Management Diagnostics Ltd’s BoardEx database for the period 1990 to 2007. BoardEx contains information on board structures as well as detailed profiles of more than 30,000 executives and board members and has been used in several recent studies, such as Ferreira and Mato (2007), Cohen, Frazzini, and Mally (2008), and Schmidt (2009).

To be included in our sample, we require that firms’ stock returns and financial data be available in CRSP and Compustat, respectively.¹³ These restrictions result in a sample of

¹³ Following previous studies, we match firm names in BoardEx to the universe of firms in Compustat/CRSP (Chidambaran, Kedia, and Prabhala, 2010; Ishii and Xuan, 2010; Kang and Kim, 2011). Specifically, we first match firm names in BoardEx to firms in a comprehensive set of databases including Compustat, Compustat Global, CRSP, Dealscan, the Bank Regulatory Database of the Chicago Federal Reserve, Jay Ritter’s IPO Adviser ranking table, and SDC Platinum. We use the SAS function *compged* to perform fuzzy string matching. Then, for each name matched, we verify the

78,083 firm-year observations. Of these 78,083 observations, 18,144 are in regulated industries (hereafter called “regulated firms”) and 59,939 are in nonregulated industries (hereafter called “nonregulated firms”).

We define government directors as directors who have worked in government agencies prior to being appointed to a sample firm’s board. To identify prior work experience in the government, we use the director’s employment profile from BoardEx. Specifically, we search for the names of all institutions that a director had worked with prior to his/her appointment to a firm’s board of directors. We then manually check whether the director worked with one of the government institutions listed on the U.S. government’s web site.¹⁴

Panel A of Table 1 presents the distribution of sample firms with at least one government director by year. We find that on average 43.32% of our sample firms have at least one government director on the board. Further, the proportion of firms with a government director increases over time, from 31.47% in 1990 to 54.53% in 2007. The last column shows that among firms with a government director, on average one out of four outside directors (23.76%) is a government director.

Panel B of Table 1 presents the distribution of sample firms by industry in 1999, which is the middle year of our sample period. We find that government directors are appointed to firm boards in all industries, with a higher prevalence in industries where government sales and contracts are particularly important or in industries where firms are heavily influenced by government regulations. For example, we find that in 1999 government directors are most prevalent in the shipbuilding and railroad industries, followed by the utilities, defense, and aircraft industries with, respectively, 77.78%, 71.65%, 71.43%, and 70.59% of the firms in these industries having at least one government director on the board.

identity of the company by hand checking company websites, *Business Week* magazine, and Hoovers’ databases. We thank Y. Han Kim for sharing the link table between BoardEx and Compustat.

¹⁴ www.usa.gov/Agencies/Federal/All_Agencies/.

In Table 2, we present summary statistics of board-, director-, firm-, and CEO-specific characteristics for firms that appoint a government director (sample size = 3,502) versus for firms that appoint a nongovernment director (sample size = 16,599). We assume that a new director appointment takes place when the director's name appears for the first time on the list of a firm's director names. All variables are measured as of the fiscal year-end that immediately precedes the director appointments.

Several observations in Table 2 are noteworthy. First, board characteristics are significantly different between firms that appoint a government director and those that appoint a nongovernment director. In particular, compared to the latter, the former have a larger board size (a mean of 8.59 compared to 8.45), a higher percentage of existing government directors on the board (a mean of 16.62% compared to 11.62%), and more departing government directors (a mean of 0.16 compared to 0.10). These results suggest that firms with a larger board size, those with more existing government directors, and those with more departing government directors are more likely to appoint new government directors.

Second, characteristics of newly appointed government directors are significantly different from those of newly appointed nongovernment directors. We find that new government directors are older, more likely to have a law degree,¹⁵ and more likely to be female than new nongovernment directors. In addition, prior to the appointment, they hold more board seats in other firms than new nongovernment directors (a mean of 2.50 compared to 1.98). When we define outside directors who serve on three or more boards as “busy” directors (Fich and Shivdasani, 2006), we find that 37.20% (28.22%) of new government (nongovernment) directors are classified as busy directors.

Using director profiles provided by BoardEx, we are also able to examine if a newly appointed director is socially connected to the CEO. We find that compared to new

¹⁵ Agrawal and Knoeber (2001) argue that government directors with a law degree can help firms through their knowledge of government procedures and their ability to predict government actions.

nongovernment directors, new government directors are more likely to be appointed to the board when they share common educational (i.e., attend the same university) and social (i.e., are a member of the same club or work at the same not-for-profit organization) backgrounds with the CEO (13.02% of new government directors compared to 9.07% of new nongovernment directors). To the extent that socially connected directors are friendly to CEOs, less likely to confront management, and less likely to take an active role in disciplining management (Hwang and Kim, 2009), these findings suggest that CEOs appoint government directors because these directors are less likely to exert influence over them¹⁶.

Third, firms appointing a government director have significantly different financial characteristics than firms appointing a nongovernment director. The former are larger, older, and less risky (lower return volatility), they spend less on R&D expenditures, they have more government sales and higher institutional ownership, and they perform better. In particular, we find that while 12.4% of firms appointing a government director have a government body as their major customer, the corresponding number for firms appointing a nongovernment director is only 6.4%.¹⁷ Thus, to the extent that government directors can use their connections to the government and their public service knowledge to boost sales to the government¹⁸, these results indicate that one potential motivation for firms to appoint government directors is to promote sales to the government. Further, regulated firms are more likely to appoint government directors to their boards than nonregulated firms, suggesting that firms hire a

¹⁶ It is worth noting there are two possible explanations for this finding: from the demand side, firm may appoint government director because they are friendly, while from the supply side, government director who are appointed due to their connection may be reluctant to contribute into the decision making process or confront the management.

¹⁷ We define major customers as those that account for 10% or more of firm sales. We use the Compustat Segment Customer database field *customer name* to identify whether firms have major government customers.

¹⁸ Goldman, Rocholl and So (2011) examine whether political connections of boards of directors in US affect the allocation of government procurement contracts. They find that after the elections, companies connected to the winning (losing) party are significantly more likely to experience an increase in procurement contracts.

government director potentially to get valuable insight about government policies or even influence actions of regulatory agencies.

Moreover, using the geographic distance between the firm's headquarters and the closest state capital (or Washington D.C. if the firm is located closer to Washington D.C. than to the state capital) to measure a firm's access to the local government director pool, we find that firms appointing a government director tend to locate closer to the state capital city (or Washington D.C.) than those appointing a nongovernment director. This finding is consistent with Knyazeva, Knyazeva, and Masulis (2010), who show that the local director pool is an important determinant of a firm's board structure.

Finally, we find that compared to CEOs in firms appointing a nongovernment director, those in firms appointing a government director are more likely to serve as the chairman of the board, are more likely to be a founder of the firm, are older, and have longer tenure. To the extent that chairman CEOs, founder CEOs, older CEOs, and CEOs with longer tenure are more powerful and have more discretion with respect to important firm decisions such as director appointments (Shivdasani and Yermack, 1999), these results suggest that powerful CEOs are more likely to appoint retired bureaucrats as directors on the board.¹⁹

To better understand the cross-sectional determinants of government director appointments, we estimate a logit regression in which the dependent variable equals one if a government director is appointed to the board, and zero if a nongovernment director is

¹⁹ To further show why firms appoint a government director, we examine whether a government director's committee membership is different from that of a nongovernment director. We classify directors' committee assignments into two groups: committees that perform a monitoring role and committees that perform an advisory role. Following Klein (1998), we consider audit, compensation, and nominating/corporate governance committees as those that perform a monitoring role (monitoring committee), and executive, investment, and finance committees as those that perform an advisory role (advisory committee). In untabulated test, we find that while the proportion of government directors who are assigned to the advisory committee is 7.50%, the corresponding number for nongovernment directors is 6.31%. The difference in these ratios is statistically significant at the 0.01 level. On the other hand, the proportion of government directors who are assigned to the monitoring committee is 84.79%, whereas the proportion of nongovernment directors who are assigned to the monitoring committee is 89.71%. This difference is also significant at the 0.01 level. Thus, it appears that compared to nongovernment directors, government directors are more likely to be hired for their advisory services than for their monitoring role.

appointed. We use the variables discussed above as the explanatory variables. We also include year and Fama-French (1997) 48 industry fixed effects to control for potential time trends and industry effects, respectively. Since firms in regulated industries such as utilities and financial industries are highly regulated and their financial characteristics and governance structure are significantly different from those of industrial firms, our regression analyses throughout the paper focus on the subsample of nonregulated firms. However, we include regulated firms in our tests when we examine whether the monitoring and advisory roles of government directors are different between nonregulated and regulated firms.

The results are presented in Table 3. We report both the regression coefficients and the marginal effects that measure the effect of a one unit change in the continuous explanatory variables (moving from zero to one for dummy variables) on the dependent variable. In model (1), we use the subsample of nonregulated firms. We find that only two board characteristics variables (i.e., the proportion of government directors and the number of departing government directors) have positive and significant coefficients in the logit regression. We also find that all director characteristic variables that are significant in the univariate tests (i.e., director age, dummy variable for directors with a law degree, dummy variable for female directors, dummy variable for busy directors, and dummy variable for socially connected directors) have positive and significant coefficients in the logit regression.

In contrast, we find that several firm characteristic variables that are significant in the univariate tests are no longer significant in the logit regression. The only positive and significant variables in the logit regression are firm size, a dummy variable for having a major government customer, and Tobin's q . In particular, we find that the coefficient on the dummy variable for having a major government customer is 0.427, significant at the 0.01 level. Its marginal effect has a coefficient of 0.056, suggesting that the probability of appointing government directors is approximately 5.6% higher for firms with a major government customer than for firms without such a customer. Given that the unconditional probability of

appointing government directors is only 17.4% for our sample firms, this effect seems to be both economically large and significant.

We also find that firms with lower leverage and firms that locate closer to the state capital (or Washington D.C.) are more likely to appoint government directors. To the extent that a large pool of potential retired government officials is located near the state capital city (or Washington D.C.), the latter result suggests that firms located closer to a large pool of prospective directors are able to attract more government directors to their boards.

Finally, we find that firms that have more powerful CEOs (i.e., firms in which the top executive is the chairman of the board) are more likely to appoint government directors. To the extent that powerful CEOs prefer directors who are less likely to challenge their decisions and are able to exert a stronger influence over the director selection process (Shivdasani and Yermack, 1999), these results, together with our finding that socially connected government directors are more likely to be appointed to the board, suggest that firms with higher agency problems are more likely to have government directors on their board.

Firms in regulated industries may be of particular interest for our study because these firms are more likely to be influenced by public policy and thus to benefit more from the presence of government directors. To test this conjecture, in models (2) and (3) of Table 3, we use the full sample of regulated and nonregulated firms. In model (2), we use the same set of independent variable as in model (1) and find that the results do not change. In model (3), we add a dummy variable for regulated firms. We find that the coefficient on this dummy variable is positive and significant at the 0.01 level, suggesting that regulated firms are more likely to appoint government directors than nonregulated firms.

Overall, these results suggest multiple motivations for firms to hire retired government officials as members of their board of directors. On the positive side, firms may appoint government directors to boost their sales to the government or to strengthen their position in

the regulatory environment. On the negative side, however, firms may hire retired government officials simply because these officials are friendly to CEOs or are less likely to confront management.

4. Do government directors perform an active monitoring and advisory role?

To investigate whether government directors play active monitoring and advisory roles, in this section we perform several tests including the likelihood of top executive turnover, the likelihood of directors' board meeting attendance, merger announcement effects, and the likelihood of mergers being challenged by the antitrust authorities.

4.1. Likelihood of top executive turnover

To examine the likelihood of top executive turnover, we perform logit regressions in which the dependent variable equals one if a top executive turnover event occurs and zero otherwise. We obtain information about top executive turnover from BoardEx by examining changes in the name of a firm's top executive. We assume that a turnover event occurs in a given year when the name of a top executive disappears from the director employment profile reported in BoardEx. Since this procedure for identifying turnover events requires the director employment profile for two consecutive years, we exclude firms whose director employment profile in previous or next year is not available in BoardEx. Following Denis, Denis, and Sarin (1997) and Kang and Kim (2008), we define the top executive as the CEO. If a firm does not have a CEO, we take the chairman of the board to be the top executive. We restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. Our final sample consists of 7,161 top executive turnover events.

The management changes we identify based upon this procedure include both routine and nonroutine top executive turnovers. To the extent that routine top executive turnovers occur

due to nongovernance- and nonperformance-related reasons, they add noise to turnover regressions, reducing the power of tests in regression analyses. However, including routine top executive turnover in the analysis leaves our tests unbiased and consistent.²⁰

Table 4 presents the results of the logit regressions. Our key variable of interest is the interaction term between past stock performance and the proportion of government directors. Following Kaplan and Miton (2006), the regression includes as explanatory variables previous one-year Fama-French (1997) 48 industry-adjusted stock return, the proportion of outside directors, previous one-year market return, the difference between the previous one-year industry and market returns, and a dummy variable that equals one if the CEO's age is greater than 60 years old. Further, following Denis, Denis, and Sarin (1997), we include top executive tenure and institutional ownership as additional control variables. The regressions also include a dummy variable for having the government as a major customer (equals one if the firm discloses the government as a customer that accounts for greater than 10% of its sales, and zero otherwise). Finally, to control for industry effects and potential time trends, we include industry and year fixed effects, respectively. In untabulated tests, to control for omitted unobservable firm characteristics, we include firm fixed effects in the regressions and reestimate the regressions with a linear probability model (LPM). We find qualitatively similar results using this specification for our models.

In models (1) through (8), we use the subsample of nonregulated firms in estimating the regressions. Model (1) is our baseline regression. We include the interaction between prior stock performance and the proportion of government directors. We find that the coefficient on

²⁰ In untabulated tests, we classify a management change as normal if the retiring manager is between the ages of 64 and 66 and delete these cases from the analysis. We obtain results that are qualitatively similar to those reported in the paper.

this interaction term is not significant, suggesting that government outside directors do not play a significant role in top executive turnover.²¹

In model (2), we replace the proportion of government directors with the proportion of nongovernment directors. We find that the coefficient on the interaction between prior stock performance and the proportion of nongovernment directors is negative and significant²², suggesting that nongovernment outside directors play an instrumental role in internal governance.

In model (3), we add the interaction between prior stock performance and the proportion of outside directors to model (1). We find that the coefficient on this interaction term is negative and significant while the effect of the interaction between the proportion of government directors and prior stock performance remains unchanged.

In models (4) through (9), we divide the sample according to whether firms have at least one busy government director, whether firms have at least one government director who is socially connected to the CEO, and whether firms have the government as a major customer. We then reestimate model (3) separately for each of these subsamples. We find that, across all of the subsamples, the coefficients on the interaction between prior stock performance and the proportion of government directors are insignificant. In contrast, the coefficients on the interaction between prior stock performance and the proportion of outside directors are negative and significant in the subsamples of firms with and without busy government directors, without socially connected government directors, and without government customers. Thus, compared to nongovernment directors, government directors are less

²¹ This result is consistent with the perspective of industry practitioners. For example, Sarah Teslik, executive director of the Council of Institutional Investors, said in a CNN interview that “in situations where a CEO is performing sufficiently poorly, that he or she has to be removed, typically people find out afterwards who the directors were, who led that movement. And it’s interesting that to my knowledge there have not been any ex-senators and governors, who have been the lead person in these efforts.” (*CNN market coverage*, December 12, 2002).

²² Powers (2005) suggests that computing marginal effect to get the correct test statistics. Doing so confirms our findings. For example, in regression 3 we find that the marginal effect is -0.044 and significant at 1% level. We have similar results for the interaction term in other regressions.

actively engaged in top executive turnover activity, irrespective of their multiple directorships, social connections, and firms' trading relationship with the government.²³

In model (10), we focus on the subsample of regulated firms and find that the coefficient on the interaction between prior stock performance and the proportion of government directors is not significant. Thus, the governance role of government directors is absent in regulated firms as well as nonregulated firms. Overall, these results support the rubber-stamp view of government directors²⁴.

4.2. Board meeting attendance

In this section we examine whether the likelihood of directors missing a board meeting is different between government and nongovernment directors. Public firms in the U.S. are required to disclose directors' board meeting attendance records in their annual proxy statement. In particular, they are required to disclose a director's attendance record if the director attended less than 75% of the board meetings during a fiscal year. We obtain this information from Riskmetrics (formerly IRRC) database and match it with director information from BoardEx. We also obtain information about director meeting fees from ExecuComp database. Our final sample consists of 55,193 director-firm-year observations.

²³ Table 3 shows that firms with a more powerful CEO are more likely to appoint government directors. This result suggests that the insignificant coefficient estimates on the interaction between prior stock performance and the proportion of government directors documented in Table 4 are due to strong CEO power rather than a lack of monitoring by government directors. To address this issue, in untabulated tests we divide the sample of nonregulated firms according to whether a firm's top executive is the chairman of the board (founder of the firm) and reestimate model (3) in Table 4 for these two subsamples. We find that in both subsamples, the coefficient estimate on the interaction between prior stock performance and the proportion of government directors is not significant, suggesting that the weak monitoring role of government directors shown in Table 4 is not due to strong CEO power.

²⁴ To test the impact of Sarbanes-Oxley Act (SOX) on socially connected directors, in untabulated test, we run these regressions separately on the pre-SOX period (before 2002) sample and post-SOX period (after 2002) sample. Results show that for both sample period, presence of socially connected government director do not have a positive impact on the turnover performance sensitivity. For example, the coefficient for interaction term between proportion of government directors and stock performance is -0.335 and 1.232 for pre-SOX and post-SOX sample respectively. Both are not statistically significant.

Using these director-firm-year observations we estimate logit regressions in which the dependent variable is a dummy variable that equals one if a director attended less than 75% of a firm's board meetings during the past fiscal year, and zero otherwise. We use as explanatory variables those used in Adams and Ferreira (2009) and Masulis, Wang, and Xie (2010). The regressions also include a dummy variable for firms that have the government as a major customer.

The results are presented in Table 5. In models (1) through (8), we use the subsample of nonregulated firms in estimating the regulations. Model (1), which controls for year and industry fixed effects, shows that the probability of missing more than 25% of board meetings is significantly higher for government directors than for nongovernment directors. The result is similar when we include firm fixed effects in model (2). These results support the rubber-stamp view.

To further examine the rubber-stamp view of government directors, in model (3) we divide the sample directors into three subgroups: busy government directors, nonbusy government directors, and nongovernment directors. We use nongovernment directors as the reference group for comparisons. The results show that the coefficient on the dummy variable for busy government directors is positive and significant at the 5% level, indicating that the probability of missing more than 25% of board meetings is significantly higher for busy government directors than for nongovernment directors. In contrast, the coefficient on the dummy variable for nonbusy government director is not significant. Thus, the likelihood of directors missing a board meeting is more or less similar between nonbusy government director and nongovernment directors. Controlling for firm fixed effects in model (4) does not change the significance of the coefficient on the dummy variable for busy government directors. In an untabulated test, we find that the marginal effect of the dummy variable for busy government directors is 0.006, suggesting that the probability of missing more than 25% of board meetings is approximately 0.6% higher for busy government directors than for

nongovernment directors. Given that the unconditional probability of missing at least 25% of board meetings is 2.7% for our full sample of directors, a 0.6% probability of missing board meetings seems to be economically large and significant.

In models (5) and (6), we divide the sample directors into three subgroups: socially connected government directors, socially non-connected government directors, and nongovernment directors. We again use nongovernment directors as the reference group for comparisons. We find that the coefficient on the dummy variable for socially connected government directors is positive and significant, while the coefficient on the dummy variable for socially non-connected government directors is not significant. In an untabulated test, we find that the marginal effect of the dummy variable for socially connected government directors in model (6) is 0.008, suggesting that the probability of missing more than 25% of board meetings is approximately 0.8% higher for socially connected government directors than for nongovernment directors. These results suggest that relative to nongovernment directors, only connected government directors are more likely to miss board meetings.

Models (7) and (8) include the dummy variable for government directors of firms with a major government customer and the dummy variable for government directors of firms without a major government customer, using nongovernment directors as the reference group for comparison. We find that in both models, the coefficient on the dummy variable for government directors of firms with a major government customer is negative and significant while the coefficient on the dummy variable for government directors of firms without a major government customer is insignificant. Thus, unlike government directors whose firms do not have a major government customer, those whose firms have a major government customer are more likely to attend board meetings than nongovernment directors.

In models (9) and (10), we use the full sample of regulated and nonregulated firms and disaggregate the dummy variable for government directors into dummy variables for government directors in regulated and nonregulated firms, using nongovernment directors as

the reference group for comparison. We find that only the coefficient on the dummy variable for government directors in nonregulated firms is positive and significant. Thus, relative to nongovernment directors, government directors whose firms operate in nonregulated industries are more likely to miss board meetings, whereas those whose firms operate in regulated industries are not.

In sum, we find that government directors, especially those with multiple directorships, those who are socially connected to the CEO, and those whose firms operate in nonregulated industries, are more likely to miss board meetings. These results support the rubber-stamp view. In contrast, government directors whose firms have a major trading relationship with the government are more likely to attend board meetings, suggesting that board attendance behavior of government directors depends in part on a firm's product market relationship with the government.

4.3. Merger announcement returns

As another test of whether government directors serve a monitoring and advisory role, we examine how acquirers' merger announcement returns are affected by the presence of government directors on their board. Our sample consists of 5,188 mergers between 1990 and 2007. We obtain an initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. We then exclude cases in which the acquirer is not covered in BoardEx. We also exclude those mergers in which the transaction value is less than one million dollars or less than 1% of the acquirer's market value of equity.

We employ a market model to measure abnormal bidder announcement-day returns. To obtain our estimates of the market model we use 200 days of return data, beginning 220

trading days before and ending 21 trading days before the merger announcement date. We use the CRSP value-weighted return as a proxy for the market return.²⁵

Table 6 reports the bidders' cumulative abnormal returns (CARs) for several different event windows. For most of the event windows we consider, the mean CARs are not significant while the median CARs are negative and significant. These results are consistent with those of previous studies, which show that bidder returns in mergers are at best close to zero or sometimes significantly negative (Jensen and Ruback, 1983). The subsample analysis shows that, for firms with a government director, their mean and median CARs for all event windows are negative and significant, whereas the corresponding CARs for firms without a government director are positive and significant. The differences in these mean and median CARs between firms with and without a government director are highly significant, suggesting that firms with a government director undertake more value-destructing mergers than firms without a government director.

To more closely investigate how the presence of a government director on an acquiring firm's board affects its merger performance, we perform ordinary least squares (OLS) regressions in which the dependent variable is the CAR (-1, +1). Our control variables include those used in Masulis, Wang, and Xie (2007) and two additional firm characteristics that measure the extent of a firm's agency problem (a dummy variable for low institutional ownership that equals one if a firm's institutional ownership is below the sample median, and zero otherwise) and the extent of the firm's advisory need (a dummy variable for inexperienced nongovernment outside directors that equals one if nongovernment directors' average years of experience in the same Fama-French (1997) 48 industry is below the sample median, and zero otherwise). The regressions also include a dummy variable for firms that have the government as a major customer.

²⁵ Using CRSP equally weighted returns as a proxy for the market return does not change our results.

The results are reported in Table 7. In estimating models (1) through (6) we limit attention to the subsample of nonregulated firms. Model (1) shows that there is a significant difference in CAR (-1, 1) between acquirers with and without government directors, even after controlling for firm- and deal-specific characteristics.

In model (2), we interact the dummy variable for government directors with a dummy variable for low institutional ownership. Shleifer and Vishny (1986) argue that large shareholders have strong incentives to monitor managerial performance and take firm value-increasing actions. Supporting this argument, Demsetz and Lehn (1985) show that blockholders with a long-term investment horizon have strong incentives to monitor management and Carleton, Nelson, and Weisbach (1998) find that institutional investors play an important monitoring function. These studies suggest that firms with low institutional ownership suffer greater agency problems than those with high institutional ownership. Thus, to the extent that government directors are effective (ineffective) monitors of firm managers, the coefficient on the interaction term between the dummy variable for government directors and the dummy variable for low institutional ownership is expected to be positive (negative) and significant. Consistent with the prediction of the rubber-stamp view, we find that the coefficient on the interaction term is significantly negative at the 0.01 level.

In model (3), we include a dummy variable for inexperienced nongovernment outside directors, which is a measure of nongovernment outside directors' advising ability, and its interaction with the dummy variable for government directors. The advisory role of government directors, if it exists, is likely to be more valuable when other nongovernment outside directors have less advising ability. Thus, the monitoring/advising (rubber-stamp) view of government directors predicts a positive (negative) coefficient on this interaction term. We find that the coefficient on the interaction term is negative and significant at the 0.05 level, supporting the rubber-stamp view.

In model (4), we divide the sample firms into three subgroups: firms with at least one busy government director, firms with government directors who are all not busy, and firms without government directors. We use firms without government directors as the reference group for comparisons. We find that the coefficients on both the dummy variable for firms with at least one busy government director and the dummy variable for firms with government directors who are all not busy are negative and significant, suggesting that relative to firms with only nongovernment directors, those with government directors experience more negative merger announcement returns, irrespective of the government directors' busyness.

In model (5), we divide the sample firms into three subgroups: firms with at least one socially connected government director, firms with government directors who are all socially not connected, and firms without government directors. We again use firms without government directors as the reference group for comparisons. We find that the coefficients on both dummy variables are negative and significant, suggesting that firms with government directors experience more negative merger announcement returns than those without government directors, irrespective of the government directors' social connection.

Model (6) includes the dummy variable for firms with a government director that have the government as a major customer and the dummy variable for firms with a government director that do not have the government as a major customer, using firms without government directors as the reference group for comparison. We find while the coefficient on the latter dummy variable is negative and significant at the 0.01 level, the coefficient on the former dummy variable is insignificant. Thus, the negative impact of having government directors on the board is particularly severe when firms do not maintain major customer relationships with the government.

In model (7), we use the full sample of regulated and nonregulated firms and include the dummy variable for firms with a government director that operate in regulated industries and the dummy variable for firms with a government director that operate in nonregulated

industries. We find that the coefficient on the latter dummy variable is negative and significant at the 0.01 level, but the coefficient on the former dummy variable is positive and insignificant, suggesting that the adverse effect of government directors on merger valuation effects is particularly pronounced when firms operate in nonregulated environments.

Furthermore, to address the concern of outlier, in untabulated test we use a dummy variable that equals one if the CAR (-1, +1) is positive and zero otherwise. We repeat the analysis using this dummy as dependant variable and find similar results. For example, the coefficient on dummy variable for firms with government director is -0.39, significant at 5% level.

Overall, our findings from merger announcement return analyses provide strong support for the rubber-stamp view. However, we find that the adverse effects of having government directors on the board are largely alleviated when government directors' experience and knowledge in the public sector and their connections to the government can bring benefits to firms, such as when firms have close trading relationships with the government or when firms operate in regulated environments.

4.4. Likelihood of merger deals being challenged by antitrust authorities

To identify the circumstances under which government directors' connections to the government and unique prior experience in the public sector help firms deal with the regulatory authorities, we examine whether the probability of merger deals being challenged by the antitrust authorities is related to the presence of government directors on acquiring firms' board.

Following Fee and Thomas (2004), we define a deal as challenged if the Justice Department or Federal Trade Commission (FTC) brought suit or threatened to sue to block the deal, or if the firm voluntarily restructured the deal or entered into a consent agreement to satisfy regulatory demands. We obtain information on merger challenges from "Annual

Report to Congress Pursuant to Subsection (j) of the Clayton Act Hart-Scott-Rodino Antitrust Improvements Act of 1976” jointly issued by the Justice Department or FTC for fiscal years from 1990 to 2007 (13th to 30th reports). We find that out of the 5,188 merger deals in our sample, 128 are challenged by the Justice Department or FTC.

We next estimate probit regressions in which the dependent variable is a dummy variable that equals one if the merger is challenged by antitrust authorities and zero otherwise. We use as explanatory variables those in Masulis, Wang, and Xie (2010) plus year and Fama-French (1997) 48 industry fixed effects.

The results are presented in Table 8. In model (1), we use the full sample of regulated and nonregulated firms in estimating the regressions. The coefficient on the dummy variable for firms with a government director is negative and significant at the 0.01 level, suggesting that the probability of merger deals being challenged by the antitrust authorities is lower for firms with a government director than for those without a government director. In model (2), we include an interaction term of dummy variable for firms with a government director and the log value of total assets. We find that this interaction term is positive and significant at 10% level, suggesting that the effect of government director on reducing the probability of merger deals being challenged by the antitrust authorities is less pronounced in large firms²⁶.

Overall, these results suggest that government directors help firms work with the antitrust authorities in negotiating merger transactions, possibly due to their valuable government connections and their knowledge about the public policy process obtained from their prior experience in the government sector.²⁷

²⁶ One explanation is that large firms are more likely to be challenged by antitrust regulated due to their significant market share and the concern about monopoly.

²⁷ One concern is that firms with government director may be less likely to do acquisition in the first place. To address this issue, for each year in my sample, we calculate the percentage of firms engaged in acquisition activity. We find that across all sample years, this percentage is higher for firms with government director than firms without government director, suggesting that there is actually higher probability of an acquisition for firms with government director. If there is difference in the probability

5. Government directors and firm performance

5.1. Announcement returns of government director appointments

In this section, to investigate the effect of government directors on firm performance, we examine how the stock market reacts to announcements of government director appointments. Several papers examine the valuation effect of announcements of various types of outside director appointments/departures and find that announcement effects differ across director types. For example, Fich (2005) finds that market reactions to director appointments are higher when appointees are CEOs of other companies, Fich and Shivdasani (2006) show that departures of busy outside directors are associated with positive announcement effects, and Masulis, Wang, and Xie (2009) document that the stock market reacts negatively to a firm's decision to appoint a foreign independent director. These studies suggest that the expected benefits of having outside directors on corporate boards vary with director types.

We begin our sample selection with the universe of firms in BoardEx that appoint new government directors during the 1990 to 2007 period. For each government director appointment, we use the date a director appointment is first mentioned in *Factiva* as the initial announcement date. In addition, we search *Factiva* for major confounding corporate news (e.g., dividend payments, earnings announcements, and management turnover) within one trading day before and after the initial announcement and exclude observations associated with such news. These sample criteria yield a final sample of 176 government director appointments.

We next obtain announcements of nongovernment director appointments made by the firms that appoint the 176 government directors and use these announcements as a matching

of acquisition for firms with and without government director, it seems that this difference would bias against our finding.

sample. We are able to identify 163 matching nongovernment director announcements. In the event of multiple matching appointments, we select the nongovernment director appointment that is closest to the government director appointment in terms of appointment date.

Table 9 reports the mean and median CAR (-1, 1) for government and nongovernment director appointments. The mean CAR (-1, 1) for government director appointments is -0.56%, which is significant at the 0.05 level. In contrast, the corresponding CAR for nongovernment director appointments is a significant 0.63%. The difference in mean CARs between these two groups of director appointments is significant at the 0.01 level. The median CARs show a similar pattern. Thus, government director appointments are greeted more negatively by investors than nongovernment director appointments²⁸.

To examine whether this negative effect of government director appointments on firm value holds even after controlling for board-, director-, and firm-specific characteristics, we regress CAR (-1, 1) on several key explanatory and control variables used in Table 3.

The results are reported in Table 10. In models (1) through (3), we limit attention to the subsample of nonregulated firms in estimating the regulations. In model (1), we find that the coefficient estimate on the dummy variable for government director appointments is -0.012 with a *p*-value of 0.03. This estimate indicates that the average announcement effect for government director appointments is on average 1.2% lower than that for nongovernment director appointments.

In model (2), we decompose the dummy variable for government director appointments into dummy variables for busy and nonbusy government director appointments, using nongovernment director appointments as the reference group for comparisons. We find that the coefficients on both dummy variables are negative and significant, suggesting that the

²⁸ Goldman, Rocholl and So (2008) find positive abnormal return following the announcement of politically connected director appointment. We followed their definition to pick out 36 “politically connected directors” appointments in our sample and find that the abnormal return for this sample is 0.84%, significant at 10% level.

stock market reacts more negatively to government director appointments than nongovernment director appointments, irrespective of the government directors' busyness. However, the magnitude of the coefficient for a busy government director appointment dummy is about two times larger than that for a nonbusy government director appointment dummy (-0.018 compared to -0.010). The difference in coefficients between these two dummy variables is significant at the 0.05 level (not reported). Thus, the negative effect of having government directors on firm value is significantly stronger for busy government director appointments than nonbusy government director appointments.

In model (3), we disaggregate the dummy variable for government director appointments into dummy variables for government director appointments whose firms do and do not have a major government customer. The results show that the negative and significant coefficient is evident only for a dummy variable for government director appointments whose firms do not have a major government customer, suggesting that investors perceive the appointment of government directors by firms that do not have a major government customer as a particularly value-decreasing event.

In model (4), we use the full sample of regulated and nonregulated firms and include dummy variables for government director appointments by regulated and nonregulated firms. We find that only the dummy variable for government director appointments by nonregulated firms takes a negative and significant coefficient, suggesting that the negative effect of government director appointments on firm value is particularly severe when firms operate in nonregulated industries.

5.2. Industry-adjusted annual operating performance

To further investigate how the presence of government directors on the board affects firm performance, in this section we use an OLS regression in which the dependent variable is the

Fama-French (1997) 48 industry-adjusted annual ROA. As in the previous regressions, we use the dummy variable for firms with a government director as our key explanatory variable. Following Adams and Ferreira (2009), we include board size, the proportion of outside directors, and firm size (log (total assets)) as explanatory variables. The regressions also include as additional explanatory variables the proportion of busy directors, the proportion of socially connected directors, and a dummy variable for firms that have the government as a major customer. To control for unobservable firm characteristics and potential time trends, we also include firm and year fixed effects in all regressions.

The results are presented in Table 11. In models (1) through (4), we use the subsample of nonregulated firms in estimating the regressions. In model (1) we find that the coefficient on the dummy variable for firms with a government director is a significant -0.015, suggesting that the industry-adjusted ROA for firms with a government director is approximately 1.5% lower than that for firms without a government director. Given that the median industry-adjusted ROA for our full sample is about 2.9%, the impact of the presence of government directors on annual accounting performance is both statistically and economically significant.

Following models (4), (5), and (6) of Table 7, in models (2), (3), and (4), we divide the sample firms into three subgroups, respectively, according to whether firms have a busy government director, whether firms have a socially connected government director, and whether firms with a government director have a trading relationship with the government. We find that relative to firms with only nongovernment directors, those with government directors experience worse operating performance, irrespective of the government directors' busyness and social connection (models (2) and (3)). We also find while the coefficient on the dummy variable for firms with a government director that do not have the government as a major customer is negative and significant, the coefficient on the dummy variable for firms with a government director that have the government as a major customer is insignificant (model (4)). Thus, the negative impact of having government directors on the board is

particularly severe when firms do not maintain major customer relationships with the government.

In model (5), we use the full sample of regulated and nonregulated firms and include dummy variables for firms with a government director that operate in regulated and nonregulated industries, using firms without government directors as the reference group for comparison. We find that the coefficient on the latter dummy variable is negative and significant, but the coefficient on the former dummy variable is not significant, suggesting that the adverse effect of government directors on firm performance is only evident when firms operate in nonregulated environments.

Overall, these results echo those from the analysis of merger announcement returns and suggest that government directors' negative effect outweighs their positive effect, especially when firms with a government director do not maintain a trading relationship with the government or when they operate in nonregulated industries.

6. Additional test

We perform several additional tests in this session to provide more details about the role of government directors.

6.1 Ranking and industry relatedness of former government officials

Until now, we treat all government directors as a homogenous group. To provide a more detailed picture about their government working experience, we further classify the government directors according to whether they had senior positions²⁹ in the government agency, and whether that agency is related to the industry in which the firm operates. For

²⁹ Our definition of "senior positions" includes (deputy) secretary, director, commissioner, ambassador, governor, major etc. A full list is available upon request.

example, a government director who served for Food and Drug Administration (FDA) and joins the board of a pharmaceutical firm is classified as related.

In untabulated test, we repeat our analysis using these two variables. In the top executive turnover regression, we separate the sample according whether the firm has senior government directors, and whether the firm has related government directors. We find that across all samples, government director does not have an impact on the top executive turnover when firm has poor stock performance.

In the analysis of board attendance, we find that senior government directors are more likely to miss the board meeting than junior government directors, directors from related agency are less likely to miss the board meeting than directors from non-related agency. However, some coefficients are not statistically significant.

In the analysis of merger performance, we find that the negative effect of government director is pronounced in firms with junior government director. We also find that firms with both related and non-related government directors underperform other firms in merger.

In the analysis of operating performance, we find that the negative effect of government director is pronounced in firms with junior government director. We also find that firms with both related and non-related government directors underperform other firms.

Overall, our results suggest that both related and nonrelated government directors have negative impact on corporate governance and firm performance. These results further suggest that compared to junior government directors, the negative impact of senior government director is less pronounced.

6.2 Change of sales following director appointment

Government directors can facilitate business transaction with government agencies. Supporting this argument, Goldman, Rochell and So (2010) show that companies connected to the winning (losing) party, on average receive more (less) government contract after the

election. Similarly, we would expect that firms will experience increasing sales to government customers after they appoint former government officials on board. To test this hypothesis, we calculated change of sales to government customer, change of sales to other customers, and change of total sales following director appointment. Change of sales is calculated as average sales after appointment minus average sales before appointment, and the difference is scaled by average sales before appointment. If firms appoint different types of directors at the same time during the event year from year t to year $t+3$, they are deleted from the analysis. We match government director appointing firms with nongovernment director appointing firms by industry, size and year. The result is presented in Table 12. We find that firms appointing government directors experience significantly increase for sales to government customers. For example, firms appointing government directors increase their sales to government customers by 9.8% from year $t-1$ to year $t+3$, while firms appointing non-government directors only increase their sales to government customers by 1.2%. We also compare change of total sales following firms appointing government and nongovernment directors and find that firms appointing government directors have significantly higher increase in total sales. Taken together, our results suggest that one benefit of hiring former government officials as board of directors is that they can bring more government contract.

6.3 Horizon of government contract

In our analysis of operating performance, we use the ROA as our performance measure. One concern is that ROA is a year to year performance measure while the government contract may be rewarded over multi-year period. For example, in 2004 the U.S. Department of Defense awarded a \$7 billion sole-source multiple year contracts to rebuild oil fields in Iraq to Halliburton Inc., in which former Vice President Dick Cheney once served as chairman of the board of directors. To address this issue, we perform sensitivity test using average ROA over a three-year rolling window and repeat our analysis.

Our results are reported in Table 15. We find that using this average ROA calculated from a rolling window, firms with government directors significantly underperform other firms. We also find that this negative effect is more pronounced in firms with busy government director, firms with socially connected government directors, firms with no trading relationship with government, and in firms operate in non-regulated industry.

7. Endogeneity bias

Thus far, we have not explicitly taken into account the endogeneity of board structure other than correcting for potential omitted variable bias by including firm fixed effects in our regression analyses. In this section, to further mitigate endogeneity bias concerns related to board structure, we consider three possibilities: 1) board structure is endogenously determined prior to the mergers, 2) unobservable firm characteristics affect the results in the event that firms' mergers are challenged, and 3) there exists reverse causality between board structure and firm performance

7.1. Optimally determined board structure before merger announcements

If merger opportunities are predictable, then it is possible that firms will choose to optimally adjust their board structure before the merger announcements. For example, if poorly performing firms anticipating a future acquisition are more likely to appoint government directors prior to the acquisition, and if merger announcement returns simply reflect this adjustment in board structure, we might detect a spurious relation between the presence of a government director and merger announcement returns. To address this issue, we reestimate the regressions in Table 7 by dividing the sample acquirers into three subgroups: acquirers with government directors who are all newly appointed, acquirers with at

least one non-newly appointed government director, acquirers without government directors.³⁰

We use acquirers without government directors as the reference group for comparisons. We define newly (non-newly) appointed government directors as those whose tenure at the firm prior to the merger announcement is below (above) the sample median tenure, 4 years. For non-newly appointed government directors, it is unlikely that they were chosen because the firms anticipate a future merger. Thus, the effect based on the above endogeneity concern should be more pronounced for newly appointed government directors than for non-newly appointed government directors.

The results are reported in Table 13. In models (1) through (3), we focus on the subsample of nonregulated firms in estimating the regulations. In model (1), we find that the coefficient on the dummy variable for firms with at least one non-newly appointed government director is negative and significant at the 0.01 level, but the coefficient on the dummy variable for firms with all newly appointed government directors is not significant. These results do not support the board adjustment explanation.

In models (2) and (3), we find that our key findings for the negative coefficients on the interaction terms shown in Table 7 are still evident for the interaction terms that involve the dummy variable for firms with at least one non-newly appointed government director.

In model (4), we use the full sample of regulated and nonregulated firms. We include a dummy variable for regulated firms and an interaction term between this dummy and a dummy variable for firms with non-newly (newly) appointed government directors. Here, the dummy variable for firms with non-newly (newly) appointed government directors measures the effect of the presence of non-newly (newly) appointed government directors on CARs for nonregulated firms. We find that the coefficient on this dummy variable is negative and significant at the 0.01 (0.10) level, suggesting that acquiring firms in a nonregulated industry

³⁰ Hirshleifer, Low and Teoh (2010) use a similar approach to address the endogenous match between firm and its CEO.

with non-newly (newly) appointed government directors experience significantly more negative returns.

Furthermore, the coefficient on the interaction term between the dummy variable for regulated firms and the dummy variable for firms with non-newly (newly) appointed government directors is positive and significant. Thus, relative to the acquiring firms in a nonregulated industry, the acquiring firms in a regulated industry that have non-newly (newly) appointed government directors realize higher merger announcement returns.

It is also possible that firms expecting their merger deals to be challenged by the antitrust authorities appoint government directors prior to the mergers to better comply with the potential antitrust issues that they might face in the future. To address this possibility, in untabulated tests we reestimate the regressions in Table 8 by separating the dummy variable for firms with government directors into dummy variables for firms with newly and non-newly appointed government directors. We find that the coefficient on the dummy variable for firms with at least one non-newly appointed government director is negative and significant at the 0.05 level, but the coefficient on the dummy variable for firms with all newly appointed government directors is not significant.

Overall, our analysis in this section finds little support for the board adjustment explanation but yields additional support for the rubber-stamp explanation, although we do find some evidence that government directors' connections and their unique knowledge and experience in the government sector can add value to firms pursuing a merger.

7.2. Unobservable firm characteristics affecting the likelihood of firms' mergers being challenged

Another important endogeneity issue that we do not explicitly consider is the possibility that some unobservable firm characteristics simultaneously affect both the board's structure and the likelihood of the firm's merger being challenged, resulting in a spurious correlation

between these two variables. For example, top executives of some firms may maintain a better relationship with government officials than those of other firms. Because of their close relationship with government officials, these firms may be able to hire government directors more easily and at the same time face less government challenges to their mergers.

To address this concern, in an untabulated test we perform two-stage least squares (2SLS) regressions. In the first stage, we estimate a probit regression of the likelihood of the presence of a government director, where we use as explanatory variables two instruments for the presence of a government director on the board, namely, the fraction of nongovernment directors who sit on other boards in which there are government directors and the logarithm of the physical distance between a firm's headquarters and the closest state capital (or Washington D.C.), and the other variables used in Table 8.

To the extent that social connections are an important determinant of director appointments, firms whose nongovernment directors are socially connected to government directors in other firms will be more likely to have government directors on their board. We also expect that firms located closer to the state capital (or Washington D.C.) have better access to a large pool of prospective government directors and thus are able to attract government directors to their boards. Thus, both of our instruments are likely to be highly correlated with a selection variable (i.e., the presence of a government director).

In the second stage, we estimate a probit regression of the likelihood of a firm's merger being challenged by the antitrust authorities using as explanatory variables the predicted value of the presence of a government director from the first stage and the other control variables used in Table 8. We find that in the second-stage regression, the coefficient estimate on the predicted indicator for the presence of a government director is negative and significant at the 0.05 level, suggesting that the probability of merger deals being challenged by the antitrust authorities is lower for firms with a government director than for those without a government director even after controlling for unobservable firm characteristics.

7.3. Reverse causality between board structure and firm performance

Another issue that we have not explicitly considered thus far is the endogeneity bias caused by reverse causality between board structure and firm performance. For example, it could be the case that poorly performing firms appoint more government directors on their boards, so that firms with a government director have worse operating performance than firms without a government director. In such a case, the causation goes from poor operating performance to the presence of a government director, and not the other way around. To the extent that this reverse causality problem exists, the coefficient estimates from the OLS tests in Table 11 will be biased and inconsistent.

To alleviate this concern, we perform 2SLS regressions. In the first stage, we estimate a probit regression of the likelihood of the presence of a government director using as explanatory variables the two instrumental variables discussed in the previous section and the other variables used in Table 11.

In the second stage, we estimate an OLS regression of a firm's raw (industry-adjusted) ROA using as explanatory variables the predicted value of the presence of a government director from the first stage and the other variables used in Table 11.

The results are presented in Table 14. In the first-stage regression (model (1)), the coefficient on our first instrumental variable is positive and significant at the 0.01 level, suggesting that social connections increase the likelihood of the presence of a government director, while the coefficient on our second instrumental variable is negative and significant at the 0.01 level, suggesting that firms located near the state capital (or Washington D.C.) are more likely to appoint government directors. In the second-stage regressions (models (2) and (3)), the coefficients on the predicted indicator for the presence of a government director are negative and significant at the 0.01 level, suggesting that the presence of a government director adversely affects a firm's operating performance.

In unreported tests, we use the proportion of government directors rather than a dummy variable for the presence of a government director as a dependent variable in the first stage. We find that the coefficient on the predicted indicator for the presence of a government director is still negative and significant at the 0.05 level. Using the continuous variable in the first-stage regression also allows us to test the validity of our instrumental variables. To do so, we first conduct the Cragg-Donald test. We find that the Cragg-Donald (1993) F -statistic is 82.78, which is greater than the Stock-Yogo (2005) critical value of 8.75, confirming the relevance (i.e., high correlations between the instrumental variables and the presence of a government director) of our instrumental variables. We then conduct Hansen's J overidentification test (Hansen, 1982) to examine the joint hypothesis of the instrumental variables' exogeneity (i.e., low correlations between the instrumental variables and the error term in the second stage) and their relevance. We find a test statistic of 1.14 (p -value = 0.29), which suggests that our instruments are valid from an econometric perspective. Thus, our key finding that firms with a government director perform poorly appears to be robust to controlling for reverse causality.

8. Sample selection bias: Analysis using a subsample of post-1999 observations

Although the coverage of BoardEx database has increased over the past 20 years, its coverage was notably lower in the earlier part of our sample period than in the later part of our sample period. For example, in 1990, 1999, and 2007, BoardEx covers approximately 74%, 88%, and 97% of the firms in Compustat/CRSP, respectively. The lower coverage of Compustat/CRSP firms by BoardEx in the earlier part of our sample period may create sample selection bias in our regression estimates.

To address this concern, in an untabulated test we exclude firm-year observations before 1999 and repeat all regression analyses reported in the paper using the subsample of post-1999

firm-year observations. We find almost identical results in logit regression analyses of the likelihood of government director appointments, the likelihood of top executive turnover, and the likelihood of board meeting attendance and in OLS regression analyses of operating performance and abnormal returns around government director appointments. In OLS regression analyses of merger announcement returns, we find that all of our key results remain unchanged. These results suggest that our results are robust to excluding the sample period during which BoardEx's coverage is relatively low.

9. Summary and Conclusion

In this paper, we examine two competing views about the role of government directors in corporate governance and the effect of their board presence on firm performance: the monitoring/advising view and the rubber-stamp view.

We find several important results that support the rubber-stamp view of government directors, but we also identify circumstances under which government directors add value to a firm. First, we find that CEO turnover-performance sensitivity increases with the proportion of nongovernment outside directors, but not with the proportion of government directors. Government directors are also more likely to have board meeting attendance problems than nongovernment directors, especially when they hold multiple directorships, when they are socially connected to the CEO, or when their firms operate in nonregulated industries. However, government directors are more likely to attend board meetings than nongovernment directors when their firms maintain a major trading relationship with the government.

Second, when firms with a government director acquire other firms, their merger announcement returns are significantly lower than those for acquiring firms without a government director. These lower returns are particularly pronounced when firms with a government director have lower institutional ownership or when their nongovernment outside

directors have less industry experience. However, their announcement returns are statistically indistinguishable from those of firms without a government director when they maintain extensive trading relationships with the government or when they operate in regulated industries. Moreover, compared to mergers by firms without a government director, those by firms with a government director are less likely to be challenged by antitrust authorities. These results suggest that in circumstances in which government directors' connections and experience in the public policy process help firms deal with regulatory authorities, their presence on the board can offset its potential costs and sometimes add value to the firm.

Third, we find that announcements of government director appointments are greeted more negatively by investors than announcements of nongovernment director appointments. However, this result is evident only when firms with government directors do not maintain a major trading relationship with the government or when they operate in nonregulated industries.

Finally, firms with government directors experience worse operating performance than firms without government directors, but only when they do not maintain a major trading relationship with the government or when they operate in nonregulated industries.

Overall, we find that the role of government directors is consistent with the rubber-stamp view. However, in circumstances in which government directors are expected to play an instrumental role in facilitating sales to the government or influencing the actions of regulatory agencies, we find that the positive impact of having government directors on firm performance largely offsets the potential costs associated with their presence on corporate boards. Our results have important policy implications for firms in practice, particularly given the increased use of government directors in many U.S. listed firms over the past few decades.

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Table 1
Distribution of sample firms with government directors by year and industry

This table shows the distribution of sample firms with government directors by year and industry. The initial sample includes all firms covered in Management Diagnostics Ltd's BoardEx database for the period 1990 to 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. To identify the government director, we use the director employment profile from BoardEx. Specifically, using this profile, we search for the names of all institutions that a director had worked with prior to his/her appointment to a firm's board of directors. We then manually check whether the director worked with one of the government institutions listed on the U.S. government's web site.

Panel A: Distribution of sample firms by year

Year	Number of total sample firms: (a)	Number of firms with at least one government director: (b)	Proportion of firms with at least one government director: (b / a)	Ratio of number of government directors to number of outside directors conditional on the presence of a government director
1990	1,805	568	31.47%	30.55%
1991	2,399	744	31.01%	30.75%
1992	2,706	867	32.04%	29.87%
1993	3,071	1,025	33.38%	30.17%
1994	3,403	1,156	33.97%	29.59%
1995	3,998	1,368	34.22%	28.81%
1996	4,450	1,616	36.31%	27.57%
1997	4,702	1,821	38.73%	26.84%
1998	5,251	2,057	39.17%	25.62%
1999	5,490	2,236	40.73%	24.70%
2000	5,344	2,321	43.43%	23.38%
2001	5,235	2,442	46.65%	22.43%
2002	5,213	2,516	48.26%	21.64%
2003	5,239	2,608	49.78%	21.09%
2004	5,572	2,873	51.56%	20.56%
2005	5,360	2,805	52.33%	20.44%
2006	4,997	2,627	52.57%	20.18%
2007	4,568	2,491	54.53%	20.10%
Total	78,803	34,141	43.32%	23.76%

Panel B: Distribution of sample firms by industry (in year 1999)

Industry	Number of sample firms: (a)	Number of firms with at least one government director: (b)	Proportion of firms with at least one government director: (b / a)
Agriculture	20	8	40.00%
Food Products	80	35	43.75%
Candy & Soda	9	6	66.67%
Beer & Liquor	23	9	39.13%
Tobacco Products	9	5	55.56%
Recreation	44	13	29.55%
Entertainment	71	31	43.66%
Printing and Publishing	47	26	55.32%
Consumer Goods	81	34	41.98%
Apparel	75	26	34.67%
Healthcare	96	36	37.50%
Medical Equipment	185	73	39.46%
Pharmaceutical	342	151	44.15%
Chemicals	92	53	57.61%
Rubber and Plastic	39	14	35.90%
Textiles	22	6	27.27%
Construction Materials	88	43	48.86%
Construction	53	23	43.40%
Steel Works Etc	75	28	37.33%
Fabricated Products	22	6	27.27%
Machinery	173	77	44.51%
Electrical Equipment	67	31	46.27%
Automobiles/Trucks	68	30	44.12%
Aircraft	17	12	70.59%
Shipbuilding/Railroad	9	7	77.78%
Defense	7	5	71.43%
Precious Metals	42	6	14.29%
Mining	31	6	19.35%
Coal	6	4	66.67%
Petroleum and Natural	195	78	40.00%
Utilities	127	91	71.65%
Communication	188	65	34.57%
Personal Services	56	28	50.00%
Business Services	841	260	30.92%
Computers	262	84	32.06%
Electronic Equipment	364	120	32.97%
Measuring and Control	123	43	34.96%
Business Supplies	65	25	38.46%
Shipping Containers	17	9	52.94%
Transportation	132	65	49.24%
Wholesale	204	65	31.86%
Retail	262	94	35.88%
Restaurants/Hotels	105	39	37.14%
Banking	253	155	61.26%
Insurance	165	92	55.76%
Real Estate	44	18	40.91%
Financial Trading	135	73	54.07%
Other	59	28	47.46%
Total	5,490	2,236	40.73%

Table 2
Summary statistics by director appointment types

The table shows summary statistics on board-, director-, firm-, and top executives-specific characteristics for a sample of 20,101 outside director appointments between 1990 and 2007. The initial sample includes all outside director appointments by firms covered in BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. We assume that a new director appointment takes place when the director's name appears for the first time on the list of a firm's director names. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside director appointments as nongovernment director appointments. All variables are measured as of the fiscal year-end that immediately precedes the director appointments. Appendix provides a detailed description of the construction of the variables. N denotes the number of director appointment observations. Numbers in test-of-difference columns are p -values.

Variables	Government director appointment: A (N = 3,502)		Nongovernment director appointment: B (N = 16,599)		Test of difference (A-B)	
	Mean	Median	Mean	Median	t -test	Wilcoxon z -test
Board characteristics:						
Board size	8.594	8	8.449	8	(0.01)	(0.00)
Proportion of outside directors	74.812	80	74.623	80	(0.31)	(0.19)
Proportion of government directors	16.624	14.300	11.620	9.100	(0.00)	(0.00)
Number of departing government directors	0.157	0	0.102	0	(0.00)	(0.00)
Number of departing nongovernment directors	0.589	0	0.681	0	(0.00)	(0.00)
Change in number of board seats (%)	13.091	0	14.785	0	(0.30)	(0.08)
Director characteristics:						
Director age (year)	58.393	59	54.622	55	(0.00)	(0.00)
Proportion of directors with a law degree	26.321	0	10.075	0	(0.00)	(0.00)
Proportion of female directors	15.512	0	10.725	0	(0.00)	(0.00)
Number of other board seats director holds	2.502	1	1.975	0	(0.00)	(0.00)
Proportion of busy directors	37.201	0	28.218	0	(0.00)	(0.00)
Proportion of socially connected directors	13.015	0	9.065	0	(0.00)	(0.00)
Firm characteristics:						
Total assets (\$ billions)	13.512	1.205	9.672	0.730	(0.00)	(0.00)
Firm age (years)	21.084	14.000	17.444	11.000	(0.00)	(0.00)
Return volatility	0.031	0.025	0.034	0.028	(0.00)	(0.00)
Leverage	0.239	0.207	0.235	0.200	(0.19)	(0.03)
Capital expenditures / total assets	0.055	0.040	0.054	0.038	(0.34)	(0.06)
R&D expenditures / total assets	0.045	0	0.054	0	(0.00)	(0.00)
Firm has the government as a major customer (dummy)	0.124	-	0.064	-	(0.00)	(-)
Government sales / total sales	0.047	0	0.020	0	(0.00)	(0.00)
Institutional ownership	0.503	0.523	0.459	0.470	(0.00)	(0.00)
Previous one year sales growth	0.134	0.094	0.127	0.095	(0.19)	(0.06)
Cash flow / total assets	0.019	0.072	0.002	0.069	(0.01)	(0.00)
Industry-adjusted ROA	0.035	0.029	0.015	0.024	(0.00)	(0.00)
Previous one-year industry-adjusted return	0.186	0.055	0.149	0.025	(0.00)	(0.00)
Tobin's q	2.266	1.572	2.149	1.519	(0.00)	(0.00)
Proportion of firms in regulated industry	0.268	-	0.212	-	(0.00)	(-)
Distance between a firm's headquarters and the closest state capital (or Washington D.C.) (km)	20.446	17.593	21.490	19.421	(0.00)	(0.00)
Top executive characteristics:						
Top executive is a chairman (dummy)	0.635	-	0.560	-	(0.00)	(-)
Top executive is a founder (dummy)	0.109	-	0.092	0.000	(0.00)	(-)
Top executive age (years)	54.164	54	53.261	53	(0.00)	(0.00)
Top executive tenure (years)	5.097	3	4.906	3	(0.01)	(0.00)

Table 3
Determinants of government director appointments

This table presents the results of logit regressions in which the dependent variable is equal to one if a government director is appointed to the board, and zero if other outside directors are appointed to the board. The initial sample includes all outside director appointments by firms covered in BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. We assume that a new director appointment takes place when the director's name appears for the first time on the list of a firm's director names. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside director appointments as nongovernment director appointments. All independent variables are measured as of the fiscal year-end that immediately precedes the director appointments. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Independent variables	Subsample of nonregulated firms		Total sample of regulated and nonregulated firms			
	Coefficient (1)	Marginal Effect	Coefficient (2)	Marginal Effect	Coefficient (3)	Marginal Effect
Board characteristics:						
Board size	0.006 (0.50)	0.001	-0.003 (0.72)	-0.000	-0.003 (0.62)	-0.000
Proportion of outside directors	-0.091 (0.60)	-0.011	-0.037 (0.81)	-0.005	-0.039 (0.80)	-0.005
Proportion of government directors	1.159*** (0.00)	0.135	1.084*** (0.00)	0.134	1.167*** (0.00)	0.145
Number of departing government directors	0.122** (0.04)	0.014	0.170*** (0.00)	0.021	0.185*** (0.00)	0.023
Number of departing nongovernment	-0.005 (0.88)	-0.001	-0.018 (0.48)	-0.002	-0.017 (0.50)	-0.002
Change in number of board seats	-0.021 (0.39)	-0.002	-0.004 (0.83)	-0.001	-0.001 (0.95)	-0.000
Director characteristics:						
Log (director age)	3.411*** (0.00)	0.397	3.304*** (0.00)	0.408	3.315*** (0.00)	0.412
Director has a law degree (dummy)	1.215*** (0.00)	0.193	1.194*** (0.00)	0.197	1.199*** (0.00)	0.199
Director is female (dummy)	0.685*** (0.00)	0.096	0.660*** (0.00)	0.097	0.656*** (0.00)	0.097
Director is busy (dummy)	0.115** (0.01)	0.013	0.120*** (0.00)	0.015	0.122*** (0.00)	0.015
Director is socially connected to CEO (dummy)	0.210*** (0.00)	0.026	0.240*** (0.00)	0.032	0.249*** (0.00)	0.033
Firm characteristics:						
Log (total assets)	0.072*** (0.00)	0.008	0.063*** (0.00)	0.008	0.056*** (0.00)	0.007
Log (firm age)	0.006 (0.81)	0.001	0.002 (0.93)	0.000	-0.002 (0.94)	-0.000
Leverage	-0.255** (0.03)	-0.030	-0.176* (0.09)	-0.022	-0.164* (0.09)	-0.020
Capital expenditures / total assets	-0.063 (0.89)	-0.007	-0.200 (0.63)	-0.025	0.022 (0.95)	0.003
R&D expenditures / total assets	-0.185 (0.54)	-0.022	-0.168 (0.57)	-0.021	0.049 (0.83)	0.006
Firm has the government as a major customer (dummy)	0.427*** (0.00)	0.056	0.431*** (0.00)	0.060	0.465*** (0.00)	0.066
Previous one-year sales growth	0.021 (0.74)	0.002	0.009 (0.87)	0.001	0.012 (0.84)	0.001
Industry adjusted ROA	0.003 (0.98)	0.000	0.040 (0.78)	0.005	0.163 (0.19)	0.020
Tobin's <i>q</i>	0.048*** (0.00)	0.006	0.048*** (0.00)	0.006	0.050*** (0.00)	0.006

Return volatility	-0.969 (0.50)	-0.113	-1.751 (0.19)	-0.216	-1.598 (0.21)	-0.198
Institutional ownership	-0.141 (0.18)	-0.016	-0.115 (0.22)	-0.014	-0.148* (0.10)	-0.018
Log (distance between a firm's headquarter and state capital (or Washington D.C.))	-0.054** (0.02)	-0.006	-0.062*** (0.00)	-0.008	-0.071*** (0.00)	-0.009
Firm is in a regulated industry (dummy)					0.223*** (0.00)	0.029
Top executive characteristics:						
Top executive is a chairman (dummy)	0.046* (0.10)	0.005	0.057* (0.08)	0.007	0.067** (0.03)	0.008
Top executive is a founder (dummy)	0.115 (0.13)	0.014	0.090 (0.21)	0.011	0.089 (0.21)	0.011
Log (top executive age)	-0.001 (0.87)	-0.000	0.001 (0.71)	0.000	-0.000 (0.99)	-0.000
Log (top executive tenure)	0.001 (0.76)	0.000	0.001 (0.83)	0.000	0.001 (0.88)	0.000
Fama-French (1997) 48 industry fixed	Yes		Yes		No	
Year fixed effects	Yes		Yes		Yes	
Number of observations	17,035		17,035		20,101	
Pseudo R^2	0.105		0.105		0.102	

Table 4
Regression estimates of the likelihood of top executive turnover

The table presents the results of logit regressions in which the dependent variable is equal to one if a top executive turnover event occurs in a given year, and zero otherwise. The initial sample includes all firm-year observations covered in BoardEx between 1990 and 2007. We also exclude the first and last year observation the firm is in our sample. To be included in the final sample, the firm must be covered in both Compustat and CRSP. We define the top executive as the CEO. If a firm does not have a CEO, we take the chairman of the board as the top executive. A turnover event is assumed to occur in a given year when the name of a top executive disappears from the director employment profile provided in BoardEx. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. All independent variables are measured as of the fiscal year-end that immediately precedes the turnover year. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Susample of nonregulated firms									Subsample of regulated firms
				Firms with busy government directors	Firms without busy government directors	Firms with socially connected government directors	Firms without socially connected government directors	Firms with government customers	Firms without government customers	Regulated firms
	All firms	All firms	All firms							
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Previous one-year industry-adjusted return: a	-0.248*** (0.00)	-0.119 (0.22)	0.007 (0.95)	0.065 (0.70)	0.002 (0.99)	-0.046 (0.91)	0.024 (0.84)	-0.322 (0.33)	0.008 (0.94)	-0.352 (0.33)
Proportion of government directors: b	0.155 (0.40)		0.236 (0.20)	0.004 (0.99)	0.355 (0.22)	-0.033 (0.92)	0.462** (0.03)	0.224 (0.69)	0.215 (0.26)	-0.246 (0.52)
Proportion of nogovernment directors: c		-0.280* (0.07)								
Proportion of outside directors: d			-0.309 (0.11)	-0.627*** (0.00)	-0.451 (0.12)	-1.151*** (0.00)	-0.187 (0.40)	0.477 (0.49)	-0.366* (0.07)	-0.811*** (0.00)
a*b	-0.339 (0.28)		-0.189 (0.54)	-0.265 (0.52)	-0.115 (0.80)	0.862 (0.17)	-0.520 (0.15)	0.997 (0.29)	-0.126 (0.67)	-1.909 (0.12)
a*c		-0.274* (0.08)								
a*d			-0.396** (0.01)	-0.447* (0.07)	-0.411** (0.05)	-0.416 (0.44)	-0.406** (0.02)	-0.713 (0.24)	-0.360** (0.03)	0.599 (0.38)
Firm has the government as a major customer (dummy)	-0.083 (0.57)	-0.094 (0.52)	-0.088 (0.54)	0.005 (0.98)	-0.189 (0.23)	-0.358* (0.09)	-0.044 (0.79)			0.233 (0.31)
Previous one-year market return	6.263*** (0.00)	6.767*** (0.00)	6.828*** (0.00)	6.323*** (0.00)	7.931*** (0.00)	3.103 (0.21)	8.040*** (0.00)	6.635* (0.08)	6.984*** (0.00)	5.592* (0.06)
Previous one-year industry return – previous one-year market return	0.129 (0.39)	0.134 (0.37)	0.128 (0.39)	-0.153 (0.48)	0.493** (0.01)	-0.124 (0.57)	0.227 (0.21)	1.015 (0.10)	0.032 (0.81)	-0.433 (0.52)

Institutional ownership	0.356*** (0.00)	0.393*** (0.00)	0.406*** (0.00)	0.265** (0.03)	0.450*** (0.00)	0.656*** (0.00)	0.446*** (0.00)	0.311 (0.37)	0.414*** (0.00)	0.995*** (0.00)
Top executive is older than 60 (dummy)	0.785*** (0.00)	0.776*** (0.00)	0.777*** (0.00)	0.768*** (0.00)	0.819*** (0.00)	0.999*** (0.00)	0.706*** (0.00)	0.419** (0.03)	0.811*** (0.00)	0.938*** (0.00)
Top executive tenure	-0.030*** (0.00)	-0.031*** (0.00)	-0.031*** (0.00)	-0.020*** (0.00)	-0.035*** (0.00)	-0.026*** (0.00)	-0.032*** (0.00)	-0.044** (0.01)	-0.029*** (0.00)	-0.044*** (0.00)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	47,326	47,326	47,326	22,782	24,544	12,094	35,232	3539	43,787	9953
Pseudo R^2	0.0359	0.0364	0.0366	0.0317	0.0504	0.0506	0.0428	0.112	0.0365	0.0425

Table 5
Regression estimates of the likelihood of directors' board meeting attendance

This table presents the results of logit and linear probability model (LPM) regressions in which the dependent variable is equal to one if a director attended less than 75% of board meetings during a fiscal year, and zero otherwise. The initial sample includes all outside directors covered by the BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in Compustat, CRSP, RiskMetrics (formerly IRR), and ExecuComp. Board meeting attendance information is obtained from RiskMetrics database. Director meeting fee information is obtained from ExecuComp database. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have work experience in the government prior to the appointment to the board of director in the sample firm. We refer to all other outside directors as nongovernment directors. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Independent variables	Subsample of nonregulated firms								Total sample of regulated and nonregulated firms	
	Logit (1)	LPM (2)	Logit (3)	LPM (4)	Logit (5)	LPM (6)	Logit (7)	LPM (8)	Logit (9)	LPM (10)
Government director is on the board (dummy)	0.061* (0.08)	0.004* (0.09)								
Government director is busy (dummy)			0.215** (0.02)	0.009** (0.01)						
Government director is not busy (dummy)			-0.129 (0.23)	-0.002 (0.57)						
Government director is socially connected to CEO (dummy)					0.362** (0.01)	0.016** (0.02)				
Government director is not socially connected to CEO (dummy)					-0.012 (0.89)	0.001 (0.66)				
Firm with a government director has the government as a major customer (dummy)							-0.374* (0.09)	-0.001* (0.07)		
Firm with a government director does not have the government as a major customer (dummy)							0.089 (0.24)	0.004 (0.15)		
Firm with a government director is in a regulated industry (dummy)									0.026 (0.83)	-0.004 (0.41)
Firm with a government director is in a nonregulated industry (dummy)									0.080* (0.07)	0.003* (0.10)
Firm has the government as a major customer (dummy)	-0.216 (0.14)	0.003 (0.59)	-0.208 (0.16)	0.003 (0.60)	-0.210 (0.15)	0.003 (0.59)			-0.007 (0.95)	0.001 (0.90)
Board size	0.053*** (0.00)	0.001* (0.09)	0.053*** (0.00)	0.001* (0.08)	0.052*** (0.00)	0.001* (0.08)	0.053*** (0.00)	0.001* (0.09)	0.052*** (0.00)	0.000 (0.74)

Proportion of outside directors	0.851*** (0.01)	0.013 (0.45)	0.845*** (0.01)	0.013 (0.43)	0.855*** (0.01)	0.013 (0.45)	0.848*** (0.01)	0.013 (0.45)	1.181*** (0.00)	0.024 (0.12)
Log (director age)	-1.242*** (0.00)	-0.031*** (0.00)	-1.249*** (0.00)	-0.031*** (0.00)	-1.246*** (0.00)	-0.031*** (0.00)	-1.242*** (0.00)	-0.031*** (0.00)	-1.285*** (0.00)	-0.033*** (0.00)
Director is female (dummy)	-0.339*** (0.00)	-0.007** (0.02)	-0.340*** (0.00)	-0.007** (0.02)	-0.329*** (0.00)	-0.007** (0.03)	-0.338*** (0.00)	-0.007** (0.02)	-0.323*** (0.00)	-0.007** (0.02)
Log (total assets)	-0.034 (0.16)	-0.004 (0.32)	-0.039 (0.11)	-0.004 (0.31)	-0.037 (0.13)	-0.004 (0.32)	-0.035 (0.15)	-0.004 (0.33)	-0.079*** (0.00)	-0.003 (0.40)
Industry-adjusted ROA	0.045 (0.89)	-0.002 (0.91)	0.043 (0.90)	-0.002 (0.90)	0.044 (0.90)	-0.002 (0.91)	0.050 (0.88)	-0.002 (0.92)	0.203 (0.52)	-0.000 (0.98)
Institutional ownership	-0.223 (0.17)	-0.002 (0.84)	-0.220 (0.18)	-0.002 (0.84)	-0.222 (0.17)	-0.002 (0.83)	-0.223 (0.17)	-0.002 (0.85)	-0.187 (0.19)	0.002 (0.80)
Top executive is a chairman (dummy)	0.006 (0.93)	0.002 (0.41)	0.003 (0.96)	0.002 (0.40)	-0.000 (1.00)	0.002 (0.45)	0.006 (0.93)	0.002 (0.41)	-0.026 (0.65)	0.000 (0.95)
Top executive is a founder (dummy)	-0.017 (0.88)	-0.012 (0.17)	-0.014 (0.91)	-0.012 (0.17)	-0.017 (0.88)	-0.011 (0.17)	-0.012 (0.92)	-0.012 (0.16)	-0.005 (0.97)	-0.005 (0.56)
Director meeting fee	-0.057 (0.13)	-0.003 (0.19)	-0.057 (0.13)	-0.003 (0.20)	-0.056 (0.13)	-0.003 (0.19)	-0.059 (0.12)	-0.003 (0.18)	-0.083** (0.01)	-0.003 (0.15)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fama-French (1997) 48 industry fixed effects	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Firm fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	42,391	42,391	42,391	42,391	42,391	42,391	42,391	42,391	55,193	55,193
Pseudo / Adjusted R^2	0.02	0.04	0.02	0.04	0.02	0.04	0.02	0.04	0.02	0.04

Table 6
Acquirers' mean and median cumulative abnormal returns (CARs) around the merger announcement date

This table reports acquirers' mean and median cumulative abnormal returns (CARs) for different event windows around the merger announcement date. The sample consists of 5,188 mergers between 1990 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. We then exclude cases in which the acquirer is not covered in BoardEx. We also exclude those mergers in which the transaction value is less than one million dollars or less than 1% of the acquirer's market value of equity. We estimate the market model by using 200 days of return data ending 21 trading days before the merger announcement date. We use the CRSP value-weighted return as a proxy for the market return. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. N denotes the number of sample observations. The numbers in the test-of-difference columns denote p -values. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Event window	Full sample (N = 5,188)		Subsample of acquirers with a government director: A (N = 2,379)		Subsample of acquirers without a government director: B (N = 2,809)		Test of difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	t -test	Wilcoxon
	(%)	(%)	(%)	(%)	(%)	(%)		z -test
(-1, 1)	0.23	-0.26	-0.39**	-0.43**	0.95**	0.25**	(0.00)***	(0.00)***
(-2, 2)	0.13	-0.22**	-0.45*	-0.38*	0.82**	0.08*	(0.00)***	(0.04)**
(-3, 3)	0.26	-0.27*	-0.52*	-0.58**	1.17**	0.34**	(0.00)***	(0.01)***
(-5, +5)	0.20	-0.31**	-0.66**	-0.62**	1.21**	0.22**	(0.00)***	(0.00)***

Table 7
OLS regression of acquirers' cumulative abnormal return (-1, 1) on explanatory variables

This table presents the results of OLS regressions in which the dependent variable is the acquirer's cumulative abnormal return (CAR) from one day before to one day after the merger announcement date. The sample consists of 5,118 mergers between 1990 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. We then exclude cases in which the acquirer is not covered in BoardEx. We also exclude those mergers in which the transaction value is less than one million dollars or less than 1% of the acquirer's market value of equity. We estimate the market model by using 200 days of return data ending 21 trading days before the merger announcement date. We use the CRSP value-weighted return as a proxy for the market return. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. All independent variables are measured as of the fiscal year-end that immediately precedes the merger announcement date. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Independent variables	Subsample of nonregulated firms						Total sample of regulated and nonregulated firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm has a government director (dummy): a	-0.010*** (0.00)	-0.001 (0.61)	-0.001 (0.83)				
Low institutional ownership (dummy): b		0.016*** (0.00)					
Inexperienced nongovernment outside director (dummy): c			0.016*** (0.00)				
a*b		-0.020*** (0.00)					
a*c			-0.013** (0.03)				
Firm has at least one busy government director				-0.011*** (0.00)			
Firm has government directors who are all not busy				-0.024*** (0.00)			
Firm has at least one socially connected government director (dummy)					-0.019*** (0.00)		
Firm has government directors who are all socially not connected (dummy)					-0.012*** (0.00)		
Firm with a government director has the government as a major customer (dummy)						-0.006 (0.22)	
Firm with a government director does not have the						-0.013***	

government as a major customer (dummy)						(0.00)	
Firm with a government director is in a regulated industry (dummy)							0.007 (0.13)
Firm with a government director is in a nonregulated industry (dummy)							-0.013*** (0.00)
Board size	0.001* (0.07)	0.001* (0.09)	0.001** (0.03)	0.001* (0.08)	0.002*** (0.00)	0.001 (0.11)	0.000 (0.58)
Proportion of outside directors	0.014 (0.19)	0.015 (0.15)	0.010 (0.36)	-0.000 (0.98)	-0.012 (0.62)	0.001 (0.94)	0.000 (0.99)
Log (total assets)	-0.005*** (0.00)	-0.004*** (0.00)	-0.005*** (0.00)	-0.006*** (0.00)	-0.003* (0.07)	-0.005*** (0.00)	-0.005*** (0.00)
Leverage	0.000 (0.97)	-0.000 (0.99)	-0.002 (0.90)	-0.006 (0.75)	-0.018 (0.36)	-0.006 (0.74)	0.001 (0.95)
Cash flow / total assets	-0.002*** (0.00)	-0.002*** (0.00)	-0.002*** (0.00)	-0.037*** (0.00)	-0.033* (0.05)	-0.038*** (0.00)	-0.027* (0.09)
Tobin's q	-0.022*** (0.01)	-0.018** (0.03)	-0.020** (0.01)	-0.001*** (0.00)	-0.001*** (0.00)	-0.001*** (0.00)	-0.001*** (0.00)
Private target (dummy)	-0.013** (0.03)	-0.012** (0.04)	-0.012** (0.04)	-0.019** (0.04)	-0.018* (0.05)	-0.019** (0.04)	-0.016** (0.04)
Public target (dummy)	-0.045*** (0.00)	-0.045*** (0.00)	-0.045*** (0.00)	-0.055*** (0.00)	-0.053*** (0.00)	-0.055*** (0.00)	-0.048*** (0.00)
All cash payment (dummy)	0.010** (0.01)	0.010** (0.01)	0.010** (0.01)	0.010** (0.03)	0.007 (0.15)	0.010** (0.03)	0.008** (0.05)
All stock payment (dummy)	-0.005 (0.25)	-0.005 (0.24)	-0.006 (0.23)	-0.006 (0.22)	-0.005 (0.23)	-0.006 (0.23)	-0.005 (0.22)
Same industry merger (dummy)	-0.005 (0.11)	-0.004 (0.15)	-0.004 (0.16)	-0.008** (0.02)	-0.008 (0.13)	-0.007** (0.02)	-0.007*** (0.01)
Tender offer (dummy)	0.028*** (0.00)	0.028*** (0.00)	0.028*** (0.00)	0.030*** (0.00)	0.027*** (0.00)	0.030*** (0.00)	0.027*** (0.00)
Competing offer (dummy)	-0.010 (0.36)	-0.010 (0.33)	-0.009 (0.40)	-0.011 (0.34)	-0.014 (0.30)	-0.012 (0.33)	-0.010 (0.33)
Deal value / market value of equity	0.000*** (0.00)	0.000*** (0.00)	0.000*** (0.00)	0.000*** (0.00)	0.000*** (0.00)	0.000*** (0.00)	0.000*** (0.00)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3,944	3,944	3,944	3,944	3,944	3,944	5,188
Adjusted R^2	0.07	0.08	0.07	0.07	0.06	0.06	0.06

Table 8
Probit regression of probability of merger deals being challenged by antitrust authorities

This table presents the results of probit regressions in which the dependent variable is equal to one if a merger deal is challenged by the antitrust authorities, and zero otherwise. The sample consists of 5,188 mergers between 1990 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. We then exclude cases in which the acquirer is not covered in BoardEx. We also exclude those mergers in which the transaction value is less than one million dollars or less than 1% of the acquirer's market value of equity. Following Fee and Thomas (2004), we define a deal as challenged if the Justice Department or Federal Trade Commission (FTC) brought suit or threatened to sue to block the deal, or if the firm voluntarily restructured the deal or entered into a consent agreement to satisfy regulatory demands. We obtain information on merger challenges from "Annual Report to Congress Pursuant to Subsection (j) of the Clayton Act Hart-Scott-Rodino Antitrust Improvements Act of 1976" jointly issued by the Justice Department or FTC for fiscal years from 1990 to 2007 (13th to 30th reports). All independent variables are measured as of the fiscal year-end that immediately precedes the director appointments. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Independent variables	Total sample of regulated and nonregulated firms			
	Coefficient (1)	Marginal Effect	Coefficient (2)	Marginal Effect
Firm has a government director(dummy): a	-0.534*** (0.00)	-0.003	-1.469** (0.010)	-0.013
Log (total assets): b	0.329*** (0.00)	0.002	0.274*** (0.000)	0.001
a*b			0.119* (0.092)	0.001
Board size	0.025 (0.15)	0.000	0.026 (0.145)	0.000
Proportion of outside directors	0.235 (0.49)	0.001	0.257 (0.453)	0.001
Leverage	0.069 (0.85)	0.000	0.104 (0.779)	0.001
Cash flow / total assets	0.010 (0.71)	0.000	0.012 (0.675)	0.000
Tobin's <i>q</i>	2.784*** (0.00)	0.016	2.801*** (0.001)	0.015
Private target (dummy)	-0.167 (0.59)	-0.001	-0.192 (0.540)	-0.001
Public target (dummy)	0.614** (0.03)	0.004	0.609** (0.028)	0.004
All cash payment (dummy)	-0.173 (0.26)	-0.001	-0.178 (0.252)	-0.001
All stock payment (dummy)	-0.036 (0.79)	-0.000	-0.028 (0.833)	-0.000
Same industry merger (dummy)	0.235* (0.05)	0.001	0.234* (0.057)	0.001
Tender offer (dummy)	-0.309* (0.06)	-0.001	-0.296* (0.073)	-0.001
Competing offer (dummy)	0.141 (0.57)	0.001	0.137 (0.581)	0.001
Deal value / market value of equity	0.005 (0.58)	0.000	0.005 (0.626)	0.000
Year fixed effects	Yes		Yes	
Industry fixed effects	Yes		Yes	
Number of observations	5,188		5,188	
Pseudo <i>R</i> ²	0.317		0.319	

Table 9
Mean and median cumulative abnormal returns (-1, 1) around the announcement date of director appointments

This table reports mean and median cumulative abnormal returns (CARs) for firms that announce outside director appointments from one day before to one day after the announcement date. The sample consists of 339 outside director appointments between 1990 and 2007. Of 339 appointments, 176 are government director appointments and 163 are nongovernment director appointments made by the same firms that appoint the government directors. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. Data on new director appointments comes from the BoardEx. When the name of a new director appears for the first time on the list of a firm's director names reported in the BoardEx, a new director appointment is assumed to take place. For each of these new director appointments, we use the date a director appointment is first mentioned in *Factiva* as the initial announcement date. In addition, we search *Factiva* for major confounding corporate news (e.g., dividend payments, earnings announcements, and management turnover) within one trading day before and after the initial announcement and exclude observations associated with such news. We estimate the market model by using 200 days of return data ending 21 trading days before the director appointment date. We use the CRSP value-weighted return as a proxy for the market return. N denotes the number of sample observations. The number in the test-of-difference columns denotes p -values. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Full sample (N = 339)	Subsample of a government director appointment: A (N = 176)	Subsample of a nongovernment director appointment: B (N = 163)	Test of difference (A-B)
CARs (-1, 1)				
Mean	0.01% (0.95)	-0.56% ** (0.04)	0.63% * (0.08)	(0.00)***
Median	-0.30% (0.53)	-0.64% ** (0.03)	0.58% (0.27)	(0.01)**

Table 10
OLS regression of cumulative abnormal returns (-1, 1) around the announcement date of director appointments on explanatory variables

This table presents the results of OLS regressions in which the dependent variable is the cumulative abnormal return (CAR) from one day before to one day after the announcement date of director appointments. The sample consists of 339 outside director appointments between 1990 and 2007. Of these 339 outside director appointments, 176 are government director appointments and 163 are nongovernment director appointments made by the same firms that appoint the government directors. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in the government prior to being appointed to the sample firm's board of directors. We refer to all other outside directors as nongovernment directors. Data on new director appointments come from BoardEx. Specifically, we assume that a new director appointment has taken place when the name of a new director first appears on the list of a firm's director names in BoardEx. For each of these new director appointments, we use the date that the appointment is first mentioned in *Factiva* as the initial announcement date. In addition, we search *Factiva* for major confounding corporate news (e.g., dividend payments, earnings announcements, and management turnover) one trading day before and after the initial announcement and exclude such observations. We estimate the market model by using 200 days of return data ending 21 trading days before the director appointment date. We use the CRSP value-weighted return as a proxy for the market return. All independent variables are measured at the fiscal year-end that immediately precedes the announcement date of director appointments. Appendix details the construction of the variables. *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Independent variables	Subsample of regulated firms			Total sample of regulated and nonregulated firms
	(1)	(2)	(3)	(4)
Firm appoints a government director (dummy)	-0.012** (0.03)			
Firm appoints a busy government director (dummy)		-0.018** (0.02)		
Firm appoints a nonbusy government director (dummy)		-0.010** (0.05)		
Firm with a major government customer appoints a government director (dummy)			-0.004 (0.57)	
Firm without a major government customer appoints a government director (dummy)			-0.015** (0.01)	
Regulated firm appoints a government director (dummy)				-0.015 (0.13)
Nonregulated firm appoints a government director (dummy)				-0.015** (0.02)
Log (director age)	0.025 (0.32)	0.021 (0.38)	0.025 (0.31)	0.028 (0.18)
Firm has at least one busy director (dummy)	-0.008** (0.05)		-0.008** (0.05)	-0.002 (0.71)
Firm has the government as a major customer (dummy)	0.007 (0.12)	0.007 (0.10)		0.007* (0.08)
Log (total assets)	0.001 (0.45)	0.001 (0.45)	0.001 (0.46)	0.001 (0.32)
Leverage	0.007 (0.70)	0.006 (0.71)	0.008 (0.67)	0.003 (0.85)
Capital expenditures / total assets	0.015 (0.74)	0.013 (0.78)	0.012 (0.78)	0.011 (0.82)
Industry-adjusted ROA	-0.002 (0.79)	-0.004 (0.63)	-0.002 (0.81)	-0.025 (0.34)
Constant	-0.101 (0.30)	-0.089 (0.34)	-0.102 (0.30)	-0.115 (0.15)
Number of observations	274	274	274	317
Adjusted R^2	0.01	0.01	0.02	0.02

Table 11
OLS regression of operating performance on explanatory variables

This table presents results of OLS regressions in which the dependent variable is a firm's annual industry-adjusted operating performance (ROA). Raw ROA is measured as the ratio of operating income before depreciation to the book value of assets. Industry-adjusted ROA is estimated by subtracting the median ROA of the other firms in a sample firm's Fama and French (1997) industry from each sample firm's raw ROA. The initial sample includes all firm-year observations covered in BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Subsample of nonregulated firms				Total sample of regulated and nonregulated firms
Independent variables	(1)	(2)	(3)	(4)	(5)
Firm has a government director (dummy)	-0.015** (0.02)				
Firm has at least one busy government director (dummy)		-0.021*** (0.01)			
Firm has government directors who are all not busy (dummy)		-0.013* (0.05)			
Firm has at least one socially connected government director (dummy)			-0.021** (0.02)		
Firm has government directors who are all socially not connected (dummy)			-0.014* (0.07)		
Firm with a government director have government as a major customer				-0.026 (0.17)	
Firm with a government director does not have government as a major customer (dummy)				-0.014** (0.02)	
Firm with a government director is in a regulated industry (dummy)					-0.009 (0.12)
Firm with a government director is in a nonregulated industry (dummy)					-0.013** (0.04)
Firm has the government as a major customer (dummy)	-0.009 (0.24)	-0.009 (0.24)	-0.011 (0.13)		-0.004 (0.55)
Board size	0.004*** (0.00)	0.004*** (0.00)	0.003*** (0.00)	0.004*** (0.00)	0.002*** (0.01)
Proportion of outside directors	-0.011 (0.26)	-0.012 (0.21)	-0.016 (0.13)	-0.011 (0.26)	-0.009 (0.29)
Log (total assets)	0.022*** (0.01)	0.022*** (0.01)	0.023** (0.01)	0.022*** (0.01)	0.020*** (0.01)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	59,939	59,939	59,939	59,939	78,803
Adjusted R^2	0.60	0.60	0.58	0.60	0.59

Table 12
Change of sales following director appointment

The table shows summary statistics on change of sales to government customer, sales to other customers, and total sales following director appointment. The initial sample includes all outside director appointments by firms covered in BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. We assume that a new director appointment takes place when the director's name appears for the first time on the list of a firm's directors. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside director appointments as nongovernment director appointments. Change of sales is calculated as average sales after appointment minus average sales before appointment, and the difference is scaled by average sales before appointment. If firms appoint different types of directors at the same time during the event year from year t to year $t+3$, they are deleted from the analysis. Government director appointing firms are matched with nongovernment director appointing firms by industry, size and year. N denotes the number of director appointment observations. Numbers in test-of-difference columns are p -values.

Variables	Time period	Government director appointment: A (N = 324)		Nongovernment director appointment: B (N = 324)		Test of difference (A-B)	
		Mean	Median	Mean	Median	Wilcoxon t -test	z -test
Change of sales to government customer	(-1, +3)	0.098	0	0.012	0	0.00***	0.09*
	(-2, +3)	0.108	0	0.015	0	0.00***	0.25
Change of sales to nongovernment customer	(-1, +3)	0.577	0	0.493	0	0.29	0.57
	(-2, +3)	0.592	0	0.538	0	0.49	0.93
Change of total sales	(-1, +3)	0.663	0	0.565	0	0.04**	0.04**
	(-2, +3)	0.696	0	0.511	0	0.07*	0.1

Table 13
OLS regression of acquirers' cumulative abnormal return (-1, 1) on explanatory variables:
Separating government directors into newly and non-newly appointed government directors

This table presents the results of OLS regressions in which the dependent variable is the acquirer's cumulative abnormal return (CAR) from one day before to one day after the merger announcement date. The sample consists of 5,188 mergers between 1990 and 2007. We obtain the initial sample of mergers from Thomson Financial's Security Data Corporation (SDC) Platinum database. We then exclude cases in which the acquirer is not covered in BoardEx. We also exclude those mergers in which the transaction value is less than one million dollars or less than 1% of the acquirer's market value of equity. We estimate the market model by using 200 days of return data ending 21 trading days before the merger announcement date. We use the CRSP value-weighted return as a proxy for the market return. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. Newly (non-newly) appointed government directors are directors whose tenure at the firm prior to the merger announcement is below (above) the sample median level. All independent variables are measured as of the fiscal year-end that immediately precedes the merger announcement date. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	Subsample of nonregulated firms			Total sample of regulated and nonregulated firms
	(1)	(2)	(3)	(4)
Firm has government directors who are all newly appointed (dummy): a	-0.007 (0.10)	0.001 (0.89)	-0.008* (0.07)	-0.008* (0.06)
Firm has at least one non-newly appointed government director (dummy): b	-0.015*** (0.00)	-0.003 (0.60)	-0.016*** (0.00)	-0.014*** (0.00)
Low institutional ownership (dummy): c		0.017*** (0.00)		
Inexperienced nongovernment outside director (dummy): d			0.020*** (0.00)	
Firm is in a regulated industry (dummy): e				-0.012* (0.06)
a*c		-0.002 (0.66)		
b*c		-0.020*** (0.00)		
a*d			-0.012* (0.08)	
b*d			-0.019*** (0.01)	
a*e				0.012* (0.10)
b*e				0.013* (0.07)
Other control variables used in Table 7	Yes	Yes	Yes	Yes
Number of observations	3,944	3,944	3,944	5,188
Adjusted R^2	0.06	0.06	0.07	0.07

Table 14
Two-stage least squares regression of operating performance on explanatory variables:
Instrumental variables approach

This table presents results of two-stage least square (2SLS) regressions. The initial sample includes all firm-year observations covered in BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. In the first stage, we estimate a probit regression of the likelihood of the presence of a government director, where we use as explanatory variables two instruments for having a government director on the board, namely, the fraction of nongovernment directors who sit on other boards in which there are government directors and the natural log of the distance (in miles) between a firm's headquarters and the closest state capital city (or Washington D.C. if the firm is located closer to Washington D.C. than to the state capital), plus the other variables used in Table 11. In the second stage, we estimate an OLS regression of a firm's operating performance (ROA) on the predicted value of the presence of a government director from the first stage and the other variables used in Table 11. Raw ROA is measured as the ratio of operating income before depreciation to the book value of assets. Industry-adjusted ROA is estimated by subtracting the median ROA of the other firms in a sample firm's Fama and French (1997) industry from each sample firm's raw ROA. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. Appendix provides a detailed description of the construction of the variables. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	First stage (Probit)	Second stage (OLS)	
	Presence of government director (1)	Raw ROA (2)	Industry- adjusted ROA (3)
Independent variables			
Firm has a government director (dummy)		-0.558*** (0.00)	-0.394*** (0.00)
Fraction of nongovernment directors who sit on other boards in which there are government directors	0.116*** (0.00)		
Log (distance between a firm's headquarters and the closest state capital (or Washington D.C.))	-0.015*** (0.01)		
Board size	0.040*** (0.00)	0.024*** (0.00)	0.016*** (0.00)
Proportion of outside directors	0.238*** (0.00)	0.110*** (0.01)	0.064*** (0.01)
Log (total assets)	0.033*** (0.00)	0.061*** (0.00)	0.050*** (0.00)
Other controls variables used in Table 11	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No
Year fixed effects	Yes	Yes	Yes
Number of observations	55,942	55,942	55,942
Pseudo / Adjusted R^2	-	0.26	0.10

Table 15
OLS regression of operating performance measured by three year rolling window

This table presents results of OLS regressions in which the dependent variable is a firm's average annual industry-adjusted operating performance (ROA) over $[t-1, t+1]$. Raw ROA is measured as the ratio of operating income before depreciation to the book value of assets. Industry-adjusted ROA is estimated by subtracting the median ROA of the other firms in a sample firm's Fama and French (1997) industry from each sample firm's raw ROA. The initial sample includes all firm-year observations covered in BoardEx between 1990 and 2007. To be included in the final sample, the firm must be covered in both Compustat and CRSP. Outside directors are directors who do not have any executive role in the firm. Government directors are outside directors who have worked in government agencies prior to being appointed to a sample firm's board. We refer to all other outside directors as nongovernment directors. Appendix provides a detailed description of the construction of the variables. The p -values in parentheses are based on standard errors that are heteroskedasticity-consistent and allow for clustering at the firm level. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Independent variables	Subsample of nonregulated firms				Total sample of regulated and nonregulated firms
	(1)	(2)	(3)	(4)	(5)
Firm has a government director (dummy)	-0.046*** (0.01)				
Firm has at least one busy government director (dummy)		-0.048*** (0.01)			
Firm has government directors who are all not busy (dummy)		-0.044** (0.02)			
Firm has at least one socially connected government director (dummy)			-0.053** (0.01)		
Firm has government directors who are all socially not connected (dummy)			-0.044** (0.02)		
Firm with a government director have government as a major customer				-0.065 (0.17)	
Firm with a government director does not have government as a major customer (dummy)				-0.045*** (0.00)	
Firm with a government director is in a regulated industry (dummy)					-0.009 (0.123)
Firm with a government director is in a nonregulated industry (dummy)					-0.013** (0.041)
Other control variables in Table 11	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	59,939	59,939	59,939	59,939	78,803
Adjusted R^2	0.75	0.75	0.76	0.75	0.59

Appendix

Variable definitions

This appendix provides a detailed description of the construction of all the variables used in the tables.

Variable name	Definition	Source
All cash payment (dummy)	Dummy variable that equals one if the payment method in acquisition consists of entire cash	SDC Platinum
All stock payment (dummy)	Dummy variable that equals one if payment method in acquisition consists of entire stock	SDC Platinum
Board size	Number of directors on the board	BoardEx
Government director is busy (dummy)	Dummy variable that equals one if the government director serve on three or more boards (Fich and Shivdasani, 2005)	BoardEx
Cash flow / total assets	Operating cash flow scaled by total book assets	Compustat
Competing offer (dummy)	Dummy variable that equals one if there are multiple bidders	SDC Platinum
Deal value / market value of equity	Value of the transaction dividend by target's market value of equity	SDC Platinum
Director age (year)	Director age calculated by taking the difference between firm year and director birth year reported in BoardEx.	BoardEx
Director is busy (dummy)	Dummy variable that equals one if the director serve on three or more boards (Fich and Shivdasani, 2005)	BoardEx
Director misses more than 25% of board meeting (dummy)	Dummy variable that equals one if a director misses 25% of the board meeting	RiskMetric
Directors with a law degree (dummy)	Dummy variable that equals one if the director degree is JD, LL.M, LL.B, LL.D, SJD or other law degrees	BoardEx
Director is socially connected to CEO (dummy)	Dummy variable that equals one if director and CEO share common educational/antecedents or common prior employment	BoardEx
Director is female (dummy)	Dummy variable that equals one if director is female	BoardEx
Firm age (years)	The difference between the current year and the year when the firm has first appeared on the CRSP tape	CRSP
Firm is in a regulated industry (dummy)	Dummy variable that equals one if the firm operates in one of the following 3-digit SIC industries: 421 (trucking and couriers services), 483 (radio and television broadcasting), 493 (utility services), 612 (savings institutions), 621 (security brokers and dealers), 633 (insurance), 805 (nursing and personal care facilities), and 809 (health and allied services) (O'Brien and Bhushan, 1990)	Compustat
Firm has at least one busy government director (dummy)	Dummy variable that equals one if at least one government director on the board is busy	BoardEx
Firm has government directors who are all not busy (dummy)	Dummy variable that equals one if none of the government directors on the board is busy	BoardEx
Firm has at least one socially connected government director (dummy)	Dummy variable that equal one if at least one government director on the board is socially connected to CEO.	BoardEx
Firm has government directors who are all socially not connected (dummy)	Dummy variable equals to one if none of the government directors on the board is socially connected to CEO.	BoardEx
Firm with government directors has the government as a major customer (dummy)	Dummy variable that equals one if a firm with government directors reports the government as the major customer (customer who accounts for 10% or more of sales)	Compustat
Firm with government directors does not have government as a major customer (dummy)	Dummy variable that equals one if a firm with government directors dose not report the government as the major customer (customer who accounts for 10% or more of sales)	BoardEx
Fraction of nongovernment directors who sit on other boards in which there are government directors	Number of nongovernment directors who sit on other boards in which there are government directors divided by total number of directors on the board	BoardEx
Government directors	Directors who have work experience in the government prior to the appointment to the sample firm board	BoardEx

Government sales / total sales	Government sales scaled by total sales. Missing values of government sales are coded with zero	Compustat
High cash flow / low Tobin's q (dummy)	Dummy variable that equals one if the ratio of cash flow to total assets is above the sample median and Tobin's q is below the sample median	Compustat
Industry-adjusted ROA	Firm's raw annual ROA minus median annual ROA of other firms in a firm's Fama and French (1997) industry	Compustat
Inexperienced nongovernment outside directors (dummy)	Dummy variable that equals one if nongovernment directors' average year of industry experience is below the sample median	BoardEx
Institutional ownership	Aggregated ownership for sample firm as reported by 13-F institutions	Thomson 13F
Leverage	Book debt scaled by total book asset	Compustat
Log (distance between a firm's headquarters and the closest state capital (or Washington D.C.))	Logarithm of the distance (in miles) between a firm's headquarters and the closest state capital city (or Washington D.C. if the firm is located closer to Washington D.C. than to the state capital)	Compustat
Low institutional ownership (dummy)	Dummy variable that equals one if a firm's institutional ownership is below the sample median	Thomson 13F
Newly appointed government directors	Government directors whose tenure at the firm prior to the merger announcement is below the sample median (4 years)	BoardEx
Non-newly appointed government directors	Government directors whose tenure at the firm prior to the merger announcement is above the sample median (4 years)	BoardEx
Number of departing director	Number of directors who leave the board within one year of the new director appointment	BoardEx
Number of other board seats director holds	Number of other boards the directors sit on	BoardEx
Outside directors	Directors who do not have any executive role in the firm	BoardEx
Previous one year industry-adjusted stock return	Firm's one year return minus median same Fama-French (1997) 48 industry	Compustat
Previous one year market return	CRSP value weighted index return	CRSP
Previous one year sales growth	Log (sales(t) / sales($t-1$))	Compustat
Private target (dummy)	Dummy variable that equals one if the target is a privately held firm	SDC Platinum
Proportion of busy directors	Number of directors who serve on three or more boards divided by total number of directors on the board (Fich and Shivdasani, 2005)	BoardEx
Proportion of government directors	Number of outside directors with government working experience divided by total number of directors on the board	BoardEx
Proportion of outside directors	Number of directors without executive role in the firm divided by total number of directors on the board	BoardEx
Public target (dummy)	Dummy variable that equals one if the target is a publicly held firm	SDC Platinum
Return volatility	Standard deviation of daily stock returns in a fiscal year	CRSP
R&D expenditures / total assets	Research and development expenditures scaled by total book assets. Missing values are coded with zero.	Compustat
Same industry merger (dummy)	Dummy variable that equals one if the acquirer and the target have the same first two digits of SIC code	SDC Platinum
Tender offer (dummy)	Dummy variable that equals one if the acquisition is made through a tender offer	SDC Platinum
Tobin's q	(Total assets - book equity + market value of equity - deferred tax) / total assets	Compustat
Top executive is a chairman (dummy)	Dummy variable that equals one if top executive is chairman	BoardEx
Top executive is a founder (dummy)	Dummy variable that equals one if top executive is a founder	BoardEx
Top executive is older than 60 (dummy)	Dummy variable that equals one if the director's age is greater than 60	BoardEx
Top executive age	CEO age calculated by taking the difference between firm year and CEO birth year reported in BoardEx.	BoardEx
Top executive tenure	Number of year worked as top executive	BoardEx
Total assets (\$ billions)	Book value of assets	Compustat

Chapter two: Customer firms as blockholders and corporate control

Abstract

Using a large sample of block acquisitions, this paper examines the governance role of customer blockholders -- blockholders who are also firms' corporate customers. We find significant differences between customer deals, where acquirers are targets' customers, and noncustomer deals, where acquirers hold only equity stakes in targets after the deals. In particular, customer deals elicit larger announcement effects, lead to more involuntary top executive turnovers among poorly performing targets, and result in greater improvements in target firms' operating performance, than do noncustomer deals. Moreover, we find that these differences are especially pronounced when targets' managerial agency problems are likely to be highly detrimental to their product market relationships. Our evidence supports the view that customer blockholders' nonfinancial claims arising from the product market relationships enhance their incentives to strengthen target firms' corporate governance and improve target firms' operating performance.

I. Introduction

A sizable literature in finance shows that blockholders — holders of large equity claims — play an important role in corporate governance.³¹ This literature generally focuses on the agency conflict between managers and shareholders, and views both managerial and non-managerial blockholdings as mechanisms that either attenuate or exacerbate such a conflict (Jensen and Meckling, 1976). However, emanating from firms' nexus of contracts, there are agency conflicts between not only managers and shareholders, but also managers and firms' other stakeholders, including firms' suppliers and customers. To date, little is known about the corporate governance role of blockholders who share product market relationships with firms. This paper focuses on firms' corporate customers, and empirically examines the corporate governance and value consequences of customer blockholdings. We focus on corporate customers both because suppliers are relatively smaller and rarely hold large equity stakes in firms, and because corporate customers are an important type of participants in the market for partial acquisitions.³²

Unlike blockholders who only hold equity claims, customer blockholders also retain significant *nonfinancial claims*, which arise from their trading relationships with firms, and whose values depend critically on firm performance and viability. For example, in managing their day-to-day operations, customers may be highly reliant on the continuous availability of products and services from firms (Titman, 1984; Chevalier and Goolsbee, 2005; Cremer, Nair

³¹For an excellent recent survey of the evidence on the corporate governance role of blockholders in the U.S., see Holderness (2003). Outside of the U.S., evidence also shows that blockholders play an important role in corporate governance (e.g., Kang and Shivdasani, 1995; Yafeh and Yosha, 1996; Shivdasani, 1993; Shleifer and Vishny, 1997).

³²Indeed, among our sample of 511 partial acquisition deals over the period 1984-2005, acquirers in more than 20% of the deals (130) are targets' customer firms, but in no instance acquirer is a supplier to target firm. This is consistent with the large-sample finding in Fee, Hadlock, and Thomas (2006) that suppliers almost never hold equity in their customers.

and Peyers, 2006).³³ Furthermore, customers' ability to reduce production cost and enhance product quality can depend critically on firms' continuing investments in assets that are fitted to customers' specific needs (Clarkson, 1995, Arora and Alam, 2005). Finally, when contracts governing product market relationships are incomplete, implicit agreements may serve as a necessary lubricant to the smooth functioning of the relationships. Consequently, firm's ability to live up to the implicit agreements critically affects the trading relationships (Williamson, 1979, 1983).

One possible view on customer blockholders' nonfinancial claims states that concerns over the values of these claims enhance customer blockholders' incentives to improve firms' corporate governance and operating performance. By impairing performance and increasing chances of failure, firms' managerial agency problems, including managers' shirking and rent seeking, not only negatively affect firm values, but can also be highly detrimental to the values of customers' nonfinancial claims. Thus, in comparison to other blockholders who only hold equity claims (henceforth referred to as noncustomer blockholders), customer blockholders may have stronger incentives to closely monitor firm managers and ensure sound performance³⁴. Furthermore, since customer blockholders are well informed about firm's downstream industries, they are more capable than noncustomer blockholders of separating firms' performance shocks that are due to managerial agency problems from those that are due to factors beyond managers' control. This information advantage enables customer

³³ Recent experiences of the U.S. automotive industry provide useful anecdotal evidence. In a survey performed by Ernst & Young, two thirds of companies responded that they would be adversely affected if one of their top three suppliers should fail and identified suppliers' failure as a key risk factor. ("Will your suppliers still be here tomorrow?" by Sarah Johnson, *CFO* magazine, 29/April/2009 and "Uncertainty around supply chain stability puts added strain on US companies, Ernst & Young LLP finds", *Reuters*, 17/Feb/2009).

³⁴ Anecdotal evidence supports this argument that customers have incentives to monitor their key suppliers to protect their implicit claims in the suppliers. For example, "Agosta (Ford's North American purchasing controller) and Pamela White, finance director at Rolls-Royce North America, recommended that procurement offices and finance departments get better at monitoring their suppliers so they can put contingency plans in place and avoid as much as possible any disruption to their day-to-day business if a supplier does fail." ("Will your suppliers still be here tomorrow?" by Sarah Johnson, *CFO* magazine, 29/April/2009)

blockholders to be particularly effective in spotting and disciplining errant firm managers. We refer to the view that nonfinancial claims motivate customer blockholders' to more closely monitor firm managers and provide more value-enhancing corporate governance than noncustomer blockholders as the "*customer intensified monitoring hypothesis*".

An alternative view on customer blockholders' nonfinancial claims holds that the desire to enhance the values of nonfinancial claims can create incentives for customer blockholders to engage in activities that may negatively affect firms' shareholders. For example, leveraging on their influence over firms cemented by the blockholdings, customer blockholders may try to induce firm managers to avail favorable terms of trade, or make relationship-specific investments, that benefit the customers at the expense of firms' shareholders. Alternatively, customer blockholders that worry about loss of valuable business ties with firms' incumbent managers may choose to abstain from intervening in managers' shirking or rent seeking, thereby weakening firms' corporate governance. While these activities bring about losses to customer blockholders' equity claims, they may nevertheless yield net gains to customer blockholders if the resulting increases in the values of nonfinancial claims outweigh the losses in the values of equity claims. We refer to the view that nonfinancial claims create incentives for customer blockholders to engage in activities that enhance the value of their nonfinancial claims but harm firms' shareholders as the "*customer entrenchment hypothesis*".

To investigate the relative merits of the contrasting views on customer blockholders' nonfinancial claims, we examine a sample of 511 partial acquisition deals over the period from 1984 to 2005. Our analysis of the sample yields three sets of results. As our first set of results, we find that in comparison to noncustomer deals, customer deals generally elicit more positive announcement effect, especially when the deals lead to post-acquisition involuntary target top executive turnovers. Furthermore, we find that in comparison to noncustomer deals, customer deals result in significantly more post-acquisition involuntary top executive turnovers in poorly performing targets. Similarly, we find that customer deals generally lead

to greater post-acquisition improvements in targets' operating performance than do noncustomer deals. Taken together, our first set of results provides evidence that is consistent with the implications of the customer intensified monitoring hypothesis.

Our second set of results concerns the link between the influence of target managers' agency problems on trading partners' nonfinancial claims and customer acquirers' incentives to strengthen targets' corporate governance and induce improvements in targets' operating performance. We measure such an influence by the level of target's industry-adjusted *R&D* level, whether there is strategic alliance agreement between the customer and the target, whether the target is in durable goods industry, and the target's industry profit margin (we discuss these measures in detail in Section 2). Based on these measures, we find that the differences in the likelihood of post-acquisition involuntary executive turnover and the extent of improvement in targets' operating performance between customer and noncustomer deals are most pronounced, when target managers' agency problems are likely to be especially damaging to customer acquirers' nonfinancial claims. These findings suggest that customer acquirers' nonfinancial claims serve as an important impetus to their incentive to strengthen target corporate governance and improve target operating performance.

Finally, our analysis provides complementing evidence to Allen and Philips (2000), and Fee, Hadlock, and Thomas (2004), that suggests a mitigating effect of customer blockholdings on potential under investments in relationship-specific assets by target firms. Following theories on incomplete contract (Williamson, 1979, 1983; Grossman and Hart, 1986), these authors argue that blockholding by parties to product market relationship can discourage *ex post* opportunism, and thereby promote *ex ante* incentives to make relationship-specific investments. Consistent with this idea, we find that in the post-acquisition period, targets of customer deals more significantly increase their *R&D* expenditures than those of noncustomer deals. Thus, customer block acquisitions appear to solidify the relationships between customer acquirers and target firms and encourage relationship-specific investments by the latter firms.

This paper also makes a contribution to the growing literature that explores the potential link between product market relationships and key firm decisions. Prior studies have examined the impact of product market relationships on firms' capital structure decision (Titman, 1984; Titman and Wessels, 1988; Banerjee, Dasgupta and Kim, 2008), incentives to engage in earnings management (Raman and Shahrur, 2008), and CEO compensation (Arora and Alam, 2005). The present analysis contributes to the literature by analyzing the corporate governance and value consequences of blockholdings by firms' corporate customers.

Our paper also contributes to the literature about stakeholders and corporate control. Previous studies have examined the corporate control issues from the perspective of equity holder (Shleifer and Vishny, 1997), bond holders (Zwiebel, 1996), and employee (Bae, Kang and Wang, 2011). By examining the role of customer firm in corporate governance, we provide a more complete picture about the role of each type of stakeholders in the market for corporate control. Our paper also makes a contribution to the growing literature that explores the potential link between product market relationships and corporate governance (Hart, 1983; Shleifer and Vishny, 1986; Guadalupe and Perez-Gonzalez, 2006; Karuna, 2008). Our paper is different from these previous studies in that we investigate an important corporate governance event – block acquisitions and in that we provide evidence on the mechanism through which industry characteristics and product market concerns affect internal monitoring efforts and non-voluntary CEO turnover.

The balance of the paper proceeds as follows. In Section 2, we develop the testable empirical implications of our hypotheses and outline our empirical strategy. In Section 3, we discuss our sample. Section 4 presents the empirical analysis and the main findings, and Section 5 contains additional discussions of our analysis. We conclude the paper in Section 6.

2. Hypothesis implications and empirical strategy

The customer intensified monitoring hypothesis suggests that nonfinancial claims provide customer blockholders with stronger incentives than noncustomer blockholders to closely monitor firm managers and ensure sound firm performance. Furthermore, customer blockholders' information advantage about firms' downstream industries enables customer blockholders to be more capable than noncustomer blockholders of separating firm performance shocks that are due to managers' shirking or rent seeking from those that are due to factors beyond managers' control. As a result, customer blockholders' stronger monitoring incentives and unique information advantage enable them to be more effective in disciplining underperforming firm managers, and improving firm values and corporate governance, than do noncustomer blockholders. Thus, according to the customer intensified monitoring hypothesis, block acquisitions by target firms' customers produce greater increases in the values of target stocks, lead to more forced turnovers of poorly performing top executives, and result in larger improvements in targets' operating performance, than do those by noncustomers.

In contrast, the entrenched customer hypothesis suggests that customer blockholders' concern over enhancing the values of their nonfinancial claims may give rise to incentives to undertake decisions that can be detrimental to firms' shareholders. For example, customer blockholders may use the influence they gain from the blockholdings to induce firm managers to make concessions on the terms of trade or undertake relationship-specific investments that benefit the customer blockholders at the expense of firms' shareholders. Customer blockholders may also choose to turn a blind eye to firm managers' shirking or rent seeking, so as to maintain cordial relationships with the managers. According to the entrenched customer hypothesis, therefore, block acquisitions by corporate customers reduce the values of target firms, lower the likelihood of involuntary turnovers of underperforming target managers, and impair targets' operating performance, relative to those by noncustomers. The contrasts between the two hypotheses provide the following implication.

Implication 1: According to the customer intensified monitoring hypothesis (entrenched customer hypothesis), block acquisitions by target firms' corporate customer elicit higher (lower) announcement returns to the targets' common stocks, lead to more (less) frequent occurrences of involuntary turnovers among underperforming target managers, and bring about larger (smaller) improvements in the targets' operating performance, than do noncustomer block acquisitions.

Since our evidence is generally consistent with Implication 1 above, the following discussion examines additional implications of customer intensified monitoring hypothesis. Another key aspect of the intensified monitoring hypothesis concerns the link between customer acquirers' monitoring incentives and the extent to which target managers' agency problems, including shirking and rent seeking, negatively impact customer acquirers' nonfinancial claims. In particular, customer acquirers will be especially motivated to closely monitor target managers and ensure sound performance when target managers' agency problems are most detrimental to the value of customers' nonfinancial claims. In such instances, therefore, the differences in the frequency of involuntary turnovers among poorly performing targets and improvements in target operating performance between customer and noncustomer deals are most pronounced.

In our empirical analysis, we use several variables to measure the potential negative effect of a target firm's managerial agency problem on the customer acquirer's nonfinancial claim. These measures include the target's industry-adjusted *R&D* level, the existence or absence of strategic alliance agreements between the target and the customer acquirer, whether the target operates in the durable goods industries, and the profit margin of the target's industry. We explain these measures in the followings.

The target's industry-adjusted *R&D* intensity, the presence of strategic alliance agreements between the target and the customer acquirer, and whether the target operates in the durable goods industries, provide three alternative measures of the level of specificity of

the product market relationship between the target and customer acquirer. When the target has high R&D intensity, it is likely to be making significant investments that create relationships-specific assets. The presence of alliance agreements require investment in joint projects that provide benefits, which are shared by parties to the agreements. Finally, alliance agreement implies that there are a lot of joint investment opportunities and room for synergistic gains between customers-acquirers and suppliers-targets (Chan, Kensinger, Keown and Martin, 1997). When the target specializes in producing durable goods, customers and suppliers need to maintain long-term business relationships after the purchase for updates or repairs.

When target firm has already in place a large amount of relationship-specific assets, then customers likely have stronger incentives to discipline underperforming target firm managers. The reason is as follows. The (*ex ante*) hold-up problem arises when new relationship-specific investments replace relationship-specific investments already in place upon the breakup of the current business relationships. The hold-up problem is costly since it forces customers to provide costly incentive contracts or other commitment devices to induce new suppliers to make relationship-specific investments. Thus, when a large amount of relationship-specific investments are already in place, disruption of the current business relationships will incur significant relationship breakup costs to customers. Therefore, in such industries, financial health and viability of suppliers become more important concern to customers, implying that customers-acquirers are more likely to be actively involved in turnover of badly performing target CEOs when targets are in the relationship and the durable industries.

As the profit margin of the target's industry declines, the target faces more intense competition. Such intense competition is likely to leave little room for inefficient behavior and managerial agency problems by the target before getting expelled from the industry. Failure of the target firm causes discontinuation of the supply of intermediate goods that are necessary for the customer's production process (Stigler, 1958). Thus, when the target firm operates in a

low profit margin industry, managerial agency problems is especially detrimental to the customer acquirer's nonfinancial claim, and, in response, the customer acquirer will have strong incentive to closely monitor target manager and ensure sound performance by the target.

The above discussions suggest the following implication of customer intensified monitoring hypothesis.

Implication 2: Among customer deals, target firm's asset relationship-specificity, intense product market competition target firm faces, the existence of strategic alliances between customer acquirers and targets result in more frequent involuntary top executive turnover in target firms.

Besides the effect on target corporate governance and operating performance, block acquisition by a target's corporate customer may also serve to solidify the trading relationship and alleviate the potential disincentive by the target to invest in relationship-specific assets. Theories on incomplete contracts suggest that when future transactions are governed by an incomplete contract, a party to the contract may under-invest in relationship-specific assets for fear of being held up later by the other party (Williamson, 1979, 1983; Grossman and Hart, 1986). Equity ownership by the customer acquirer can alleviate the holdup problem and solidify the trading relationship, thereby encouraging the target's incentive to make relationship-specific investments (Aghion and Tirole, 1994).

As part of our analysis, we also briefly investigate this alternative role of customer block ownerships. In this respect, our analysis complements those of Allen and Philips (2000), and Fee, Hadlock, and Thomas (2006). However, in contrast to Allen and Philips, where product market relationships are identified by the existence of strategic alliance agreements, the product market relationships in this analysis involve actual purchases and sales of intermediate goods. On the other hand, unlike in Fee, Hadlock, and Thomas (2006), which

analyzes the frequency and sizes of customer equity ownerships, and the duration of such trading relationships, we examine directly the changes in targets' post-acquisition investment behavior. The potential enhancement effect of customer blockholdings on targets' incentive to make relationship-specific investments provides the following implication.

Implication 3: If block acquisitions by targets' corporate customers mitigates holdup problem, targets of customer acquisitions will more actively make investments in relationship-specific assets in the post-acquisition period.

It is worth noting that improved investment incentive by targets is not inconsistent with enhanced corporate governance of target firms. In particular, if target managers' shirking and/or rent seeking direct them away from actively making value-enhancing relationship-specific investments, customer acquisitions, by strengthening target corporate governance and subjecting target managers to more scrutiny, can encourage target managers' incentive to undertake such investments.

3. Data construction and summary statistics

3.1. The Sample

We obtain an initial sample of partial acquisition deals from the Security Data Corporation (SDC) Platinum database. We require that the acquirer held less than 5% of the target's outstanding shares before the deal and purchases more than 5% but less than 100% of the target's outstanding shares. We further require that the acquirer is not an Employee Stock Ownership Plan, an Employee Benefits Trust, a group of investors or companies, or investment firms. We exclude a deal from our sample if the acquirer or the target is in the financial (with SIC code 6000-6999) or utility (with SIC code 4900-4999) industries. To get financial data and stock return data, we require that the target firm's financial and stock price information is available in the Compustat and CRSP databases. To conduct event study, we

require that the announcement date of the deal can be determined from news reports achieved in *Factiva*.

Our final sample consists of 511 block acquisitions over the period from 1984 to 2005. We stop the sample in year 2005 because we examine target top executive turnovers, and changes in targets' operating performance and investment behavior, over a period of three years after the deals. On the other hand, the financial crisis triggered by the crash of real estate bubble in 2008 has had profound effects on firms, making the years after 2008 a rather usual period.

We find possible customer-supplier relationships between the acquirers and targets using a two-step procedure. The customer acquirers identified through this two-step procedure are acquirers that *actually* purchase intermediate goods and services from the targets, rather than just being in industries that are vertically related to the targets' industries.

In the first step of the procedure, we manually match the name of the acquirer in each deal with those of firms listed as the target's major customers in the Compustat segment customer database in any one of the three fiscal years ending before the deal announcement date.³⁵ This step of the procedure identifies 40 deals in which the acquirers are also targets' customer firms.

In the second step of the procedure, among deals that do not yield a match in the first step we select those in which the acquirers are in the targets' downstream industries. We then conduct extensive searches for potential customer-supplier relationships for this group of deals. We search in several information sources, including the target's annual reports, news reports or journal articles achieved in *Factiva*, for explicit mentioning of the acquirer as the

³⁵ The Compustat segment customer database has been used in several recent studies as a source of information on firms' product market relationships (see, for example, Fee and Thomas (2004) and Banerjee, Dasgupta, and Kim (2008)). According to U.S. disclosure rule (FASB No.131), each firm must report in its SEC filings the names of customers to which the firm's sales comprise 10% or more of the firm's total revenue. Compustat segment customer database provides data on firms' customers based on firms' SEC filings.

target's customer firm in any of the three fiscal years ending before the deal announcement date.³⁶ This news search process finds a further 90 deals in which the acquirers are targets' customer firms.

We also use the SDC database to obtain the following information. First, we follow Robinson (2008) and collect information on whether or not there is a strategic alliance agreement between each pair of acquirer and target. Second, we obtain deal related variables, including percent of shares acquired and method of share acquisition -- privately negotiated or open market purchase. We record a deal as having a control purpose if it is indicated as such in the acquirer's 13-D filing extracted from the SEC website.

For information on target ownerships, we hand collect data on the ownerships by target executives, directors, and blockholders, from proxy statements and annual reports. We gather data on target institutional ownerships from the Thomson TFN database. We also use director biography information provided in proxy statement to check the employment history of each director, and define a director as having industry expertise if the individual severed a company as an executive with the same 3 digit SIC code as the target.

We obtain the sample of targets' top executive turnover events from reading targets' proxy statements and annual reports, and from searching news articles achieved in *Factiva*. If a target firm has a CEO, we define the top executive as the CEO, but if a target firm does not have a CEO, we take the chairman of the board to be the top executive. When a target firm has neither a CEO nor a chairman of the board, we take the president to be the top executive. Following Denis, Denis, and Sarin (1997), we classify a turnover in which the top executive is removed due to death, illness, retirement where the retiring executive is between the ages of 64 and 66, or other normal reasons, as a routine turnover. We consider all other turnovers as non-routine.

³⁶ Our main results do not appreciably change by choosing different years prior to the announcement date as a cutoff point to determine the customer-supplier relationship.

3.2. Sample Summary Statistics

Table 1 presents the distribution of the sample deals by year, target industry, and whether the deal is a customer deal. It shows that the annual number of partial acquisitions by noncustomers was fairly stable from 1984 till 2000, after which year it dropped significantly. In contrast, customer acquisitions were most active during 1995-2000. After year 2000, the annual number of customer acquisitions declined substantially as well. The sudden declines in both types of deals are in line with the drop in the overall *M&A* market following the crash of the internet bubble. Table 1 also shows that customer and noncustomer deals exhibit a similar pattern in the distribution of target industries, with manufacturing occurring with the highest frequency (48%), followed by services (21%) and transportation (12%).

Table 2 presents the descriptive statistics on target firm characteristics, target industry characteristics, transaction characteristics, and the comparisons of these characteristics between customer and noncustomer deals. As Table 2 shows, compare to targets in noncustomer deals, targets in customer deals on average have significantly lower book value of assets, higher market value of equity, lower leverage but higher Tobin's *Q*. Comparisons of industry-adjusted capital expenditure and *R&D* expenditure show that targets in customer deals invest more aggressively than do those in noncustomer deals. However, targets in customer deals on average have worse operating performance, as measured by operating income and operating cash flow, and are managed by younger CEOs, than those in noncustomer deals. Finally, Table 2 indicates that institutional ownerships are generally higher for targets in noncustomer deals than in customer deals. This is consistent with the institutional investors' preference for larger firms and firms with lower market-to-book ratios (Gompers and Metrick, 2001). Taken together, these comparisons suggest that targets in customer deals are smaller in size, with poorer operating performance and lower institutional

ownerships, but have higher growth prospects, lower leverage, and greater amounts of investment, than targets in noncustomer deals.

For transaction characteristics, the percentage of shares acquired in customer deals is significantly lower than that in noncustomer deals. This is perhaps because customer acquirers have other means of influence derived from the product market relationships that reduce the needs for large equity stakes in order to gain sufficient influence over targets. Alternatively, a customer taking too large an equity stake may create undesirable incentive for the supplier firm, as the latter becomes fearful that customer may later seize control of the firm (Burkart, Gromb, and Panunzi, 1997).

As for the product market/target industry characteristics, targets in the customer deals have significantly higher likelihood of having strategic alliances, and face more intense product market competition, than targets in the noncustomer deals. These comparisons are suggestive that customer block acquisitions are more likely to occur when target managerial agency problems tend be particularly harmful to customer acquirers' nonfinancial claims. Furthermore, the comparison of the relative size of acquirers and targets, as measured by the sales ratio, shows that relative to targets, acquirers in customer deals are generally much larger than those in noncustomer deals. Consequently, customer acquirers are likely to have quite a bit of bargaining power over the targets.

In Table 3, we compare customer and noncustomer deals in respect to governance and control event. Panel A of Table 3 shows that relative to acquirers in noncustomer deals, customer acquirers are much more likely to be long-term oriented in their holdings of target shares. For example, in about 7.69% of the customer deals, customer acquirers retain the equity block for less than a year; in contrast, in a significantly larger 22.83% of noncustomer deals, noncustomer acquirers hold on to the block for less than a year. At the other end of the spectrum, in 72.30% of the customer deals acquirers continue to hold the blocks after 3 years,

but in only 54.86% of the noncustomer deals acquirers hold on to the stakes for more than 3 years.

Panel B of Table 3 shows that acquirers in noncustomer deals are more likely to explicitly indicate that the block acquisitions are with control purposes. In addition, targets in noncustomer deals are much more likely to be taken over by the acquirers in the three years after the block acquisitions than those in noncustomer deals. Thus, in comparison to customer deals, noncustomer deals are much more likely to be a prelude to eventual takeovers of the targets by the acquirers. However, target firms of customer deals are somewhat more likely to be taken over by parties other than the block acquirers than those of noncustomer deals. On the other hand, the comparison between customer and noncustomer acquisitions shows that there are significantly more frequent occurrences of non-routine top executive turnovers in the three years after the former type of acquisitions. These results suggest that customer block acquisitions are more intended towards strengthening the corporate governance of target firms, and, to a less extent, facilitating transfer of control to other acquirers, than towards paving the way for eventual takeovers.

Finally, Panel C shows that the frequency of board representations by acquirers is similar between customer and noncustomer deals. Nevertheless, it seems that customer acquirers are more likely to appoint directors with prior work experience in targets' industries than noncustomer acquirers, though the difference is not significant.

4. Empirical results

4.1. Univariate analysis of target announcement return

As Panel A of Table 4 shows, for the full sample of acquisitions, the subsample of acquisitions by customer firms, and the subsample of acquisitions by noncustomer firms, the means and medians of cumulative abnormal returns (CARs) to target stock calculated over

various event windows are all positive and highly significant at 1% level. These findings suggested that investors take both types of deals as value-enhancing events and react positively. Furthermore, the comparisons of the CARs between the subsamples of customer deals and noncustomer deals show that both the mean and median of CARs for customer deals are systematically higher than those for noncustomer deals. In particular, the differences in CARs between the two subsamples are statistically significant at 5% level for event windows $(-1, 0)$, $(-1, +1)$, and $(-2, +2)$. Thus, consistent with the implication of the customer intensified monitoring hypothesis (Implication 1), target shareholders derive significant benefits from block acquisitions by customer firms, and these benefits tend to be higher than those from block acquisitions by noncustomer firms.

The SEC disclosure rule requires firms to disclose equity ownership in excess of 5% of the outstanding shares no later than 14 days (10 trading days) after the threshold is reached. Thus, a block acquisition may take place up to 10 trading days before the filing date. To account for the possible gap between the actual time of the acquisition and the filing date, we use the CAR over the $(-10, 10)$ window in the ensuing analysis.

To explore the possible sources of the benefit of block acquisitions to target shareholders, in Panel B we divide the sample in a two-way sort based on whether a deal is a customer or noncustomer deal and whether in the post-acquisition period (up to three years after the acquisitions) there is forced top executive turnover in the target firm. The sort on post-acquisition turnover is based on the notion that the stock market holds rational expectations about potential post-acquisition governance activities in the target and correctly prices the value impact of such activities into the target's stock at the announcement of the acquisitions.

Panel B shows that among deals which lead to forced turnovers, customer deals elicit significant positive CARs with a mean of 17.5% and median of 14.1%, but noncustomer deals generate only insignificant CARs with a mean of 11.1% and median of 7%. Furthermore, a comparison between customer and noncustomer deals shows that the median CAR from the

former type of deals is significantly more positive. These results are consistent with the idea that customer acquirers' information advantage over noncustomer acquirers about the downstream industries are likely to enable the former to be more effective in disciplining errant target managers.

Panel B also shows that among customer deals, those that lead to post-acquisition executive turnovers elicit more positive CARs, though the difference is not statistically significant. In contrast and perhaps surprisingly, among noncustomer deals those that lead to post-acquisition executive turnovers produce lower CARs than those that do not lead to turnovers, though only the difference in median is statistically significant. Thus, the stock market responds strongly to customer deals that are expected to lead to turnovers of target executives, but it appears to view the main benefits of noncustomer deals as coming from sources other than potential involvement by acquirers in targets' corporate governance.

4.2. Post-Acquisition Top Executive Turnovers and Changes in Operation Performance

To investigate the sources to target shareholders gain from and the corporate governance consequences of block acquisitions, this subsection examines target top executive turnovers, changes in target firm operating performance, and changes in target firm investment behavior, in the post-acquisition period.

4.2.1. Logistic Analysis of Top Executive Turnovers

Table 5 presents the results of logistic analysis of the likelihood of post-acquisition involuntary top executive turnover. The independent variables in the regressions include the dummy variable "customer acquirer", which takes a value of one if the acquirer is a customer of the target and zero otherwise, the target's performance prior to the acquisition as measured by the target's industry-adjusted stock return in the 12 months before the acquisition, and the interaction term between the customer acquirer dummy and the target's prior stock

performance. The interaction term is the variable of key importance, and it captures the difference between customer and noncustomer deals in the likelihood of executive turnover among targets with varying prior stock performance. All the regression models also include an extensive set of variables that control for target firm characteristics and block transaction characteristics.

Column (1) of Table 4 shows that for the full sample, the interaction term between the customer acquirer dummy and the target's prior stock performance is negative and significant at the 10% level. Thus, consistent with the implication of customer intensified monitoring hypothesis (Implication 1), among deals with poorly performing targets customer deals are more likely to lead to displacements of target executives than do noncustomer deals.

To test Implication 2, we separately run logistic regressions in various subsamples of deals. Columns (2) and (3) contain the results of regressions in the subsamples where target firms' industry-adjusted R&D intensities are respectively above and below the sample median intensity. Since firms with high R&D intensities are likely to invest heavily in relationship-specific assets, managerial agency problems are likely to be especially damaging to the firms' trading partners. Consequently, when these firms become the targets of acquisitions, customer acquirers will have stronger incentives to closely monitor target managers and ensure sound performance than do noncustomer acquirers.

Consistent with Implication 2, columns (2) and (3) show that the interaction term between customer acquirer dummy and target prior stock performance is negative, at -1.120, and significant at the 10% level for the subsample of targets with above median R&D intensities. In the subsample of targets with below median R&D intensities, the interaction is insignificant, though the customer acquirer dummy is significantly positive.

Results in the columns (4)-(11) reinforce those in columns (2) and (3) and further substantiate Implication 2. In particular, columns (4)-(5) show that the interaction term is significantly negative in the subsample where there are strategic alliance agreements between

acquirers and targets, but is insignificant in the subsample where such agreements are absent. Furthermore, columns (6)-(7) show that the interaction term is significantly negative in the subsample where target firms are in industries with below sample median profit margin, but is insignificant in the subsample where target firms are in industries with above sample median profit margin. Finally, columns (8)-(9) indicate that the interaction term is significantly negative only in the subsample where targets show above sample median sales growth, but is insignificant in the subsample where targets have below sample median sales growth.

Besides the interaction term between target prior stock performance and customer acquirer dummy, none of the other independent variables in the regressions show systematic pattern of significance, except for acquirer board representation dummy, which takes a value of one if the acquirer has representative(s) on the target board and zero otherwise. As columns (1)-(11) indicate, the coefficient of acquirer board representation dummy is generally positive and highly significant, suggesting that target managers are more likely to be forced out when acquirers obtain board representations. In unreported tests, we also consider as an independent variable the interaction term between customer acquirer dummy and acquirer board representation dummy, and find that this interaction term is insignificant. Thus, conditional on an acquirer obtaining board representation, whether the acquirer is a customer or noncustomer acquirer does not seem to significantly impact the likelihood of target executive turnover.

To further gauge the economic significance of our finding, in Panel B of Table 5 we report the marginal effect for key variables in the regressions. We find that the impact of customer equity block on the turnover performance sensitivity to be quite significant. For example, the marginal effect of interaction variable between customer acquisition dummy variable and stock return is -0.13, significant at 10% level, suggesting that for the same level of (poor) performance, the likelihood of CEO turnover is 13% higher in target of customer acquisition. Considering in our sample the unconditional likelihood of CEO turnover is 25%, the magnitude of impact is economically significant.

4.2.2. Multivariate Analysis of Post-Acquisition Changes in Target Operating Performance

Table 6 presents the results of multivariate analysis of changes in target operating performance around the block acquisitions. We measure firms' operating performance by their industry-adjusted operating income scaled by total assets at the fiscal year immediately before the acquisition. The key independent variable in the regressions is the customer acquirer dummy that captures the difference in the extent of improvement in target operating income between customer and noncustomer deals. In all of the regressions, we also include the set of control variables used in Table 5 to capture varying target firm characteristics and block transaction characteristics across the deals.

Column (1) of Table 6 shows that the customer acquirer dummy is positive but insignificant. Thus, in the full sample, the effect of customer acquirers on target operating performance seems indistinguishable from that of noncustomer acquirers.

Similar to the analysis on executive turnover, we separately run regressions in various subsamples of deals. Columns (2) and (3) show the regression results in the subsamples where target firms' industry-adjusted R&D intensity are respectively above and below the sample median intensity. Column (2) shows that customer acquirer dummy is positive, at 0.220, and significant at 1% level in the subsample of deals where targets have high R&D intensities. In contrast, column (3) reveals that in the subsample of deals where targets have low R&D intensities, the acquirer dummy is negative and insignificant. Thus, consistent with Implication 2, customer deals lead to more significant improvements in target operating performance than do noncustomer deals.

The results in models (4)-(9) reinforce the finding in models (2) and (3) and further substantiate Implication 2. In particular, the results show that when there is strategic alliance agreement between the acquirer and the target, when the target is in durable goods industry, and when the target faces intense product market competition, post acquisition the target

experiences more significant improvement in operating performance when the acquirer is a corporate customer than when it is not. In contrast, when there is no strategic alliance agreement between the acquirer and the target, when the target is not in durable goods industry, and when the target faces limited competition in industries with below sample median profit margin, the difference in the improvement of target operating income between customer and noncustomer deals is insignificant. Taken together, these results show that customer acquirers bring about greater improvements in target operating income than do noncustomer acquirers, when target managerial agency problem is likely to be most harmful to customer acquirers' nonfinancial claims.

Besides the acquirer customer dummy, none of the other independent variables, including acquirer board representation, show systematic significance in the regression results. It appears, therefore, that unlike the likelihood of executive turnover, changes in target operating performance in the post-acquisition period do not depend on whether acquirers obtain board representations.

4.3. Multivariate Analysis of Target Announcement Returns

The results in the previous two subsections are suggestive that improvements in target corporate governance and operating performance are two of the key sources of the benefit of block acquisitions to target shareholders. To substantiate such a possible link, in this subsection we perform multivariate analysis of target announcement returns.

The regression models parallel those used in the analyses of post-acquisition executive turnover and changes in operating performance. Table 7 contains the results from this set of models. Column (1) of Table 7 shows that the customer acquirer dummy is positive and significant. Thus, in the full sample customer block acquisitions create more gains to target shareholders than do noncustomer block acquisitions, confirming the result from the univariate analysis.

Columns (2)-(11) contain the regression results in various pairs of subsamples where targets differ in R&D intensities, whether they have strategic alliance agreements with acquirers, whether they operate in durable goods industries, the profit margin of the industries they operate in, and the level of sales growth. Except for the subsamples based on R&D intensity, the results across the other subsamples show a similar pattern as those in the subsample analyses of executive turnovers and changes in operating performance. In particular, the customer acquirer dummy is significantly positive in the subsamples where targets have strategic alliance agreements with acquirers, are in durable goods industries, operate in industries with below sample median profit margin, exhibit above sample median sales growth. In all the other subsamples, the customer acquirer dummy becomes insignificant. These results substantiate the conjecture that differences in post-acquisition target executive turnover and improvement in operating performance between customer and noncustomer acquisitions are the key sources of the differences in target shareholders' gains between the two types of acquisitions.

To further establish the link between target shareholders benefit from block acquisitions and post-acquisition target executive turnover, in model (12) and (13), we divide the sample based on whether the non-voluntary turnover occurs within three years after the acquisition. We find that the customer acquirer dummy is only significantly positive in the subsamples where targets have non-voluntary top executive turnover, suggesting that disciplinary top executive turnover is an important source of the benefit from the acquisition by customer firms.

4.4. Post-Acquisition Changes in Targets' Investment Behavior

Table 8 reports the changes in targets' property, plant and equipment (PPE), R&D expenditure, and capital expenditure, where all variables are scaled by total assets immediately before the acquisition and adjusted by the respective industry median levels. Except for the median of changes in target capital expenditure over the period from one year before the

acquisitions to three years after the acquisitions, i.e., the (-1, +3) window, the means and medians of changes in all types of investments following customer block acquisitions are higher than those following noncustomer block acquisitions, suggesting that customer acquisitions more strongly enhance targets' investment incentives.

Out of the three types of investments, the difference in the changes in target R&D expenditure between customer and noncustomer deals is most pronounced. In particular, the means and medians of the changes in targets' R&D expenditure from one year before the acquisitions to one year, two years, and three years, after the acquisitions, for customer deals are consistently higher than those for noncustomer deals at 1% significance level. Since targets with higher R&D intensity tend to create more relationship-specific assets, these comparisons show that customer acquisitions are particularly helpful in strengthening targets' incentives to invest in relationship-specific assets.

The greater increases in relationship-specific investments by targets of customer acquisitions are not inconsistent with improved corporate governance. For example, if target managers' shirking or rent seeking causes targets to under-invest in valuable relationship-specific assets, customer acquisitions, by strengthening target corporate governance and place target managers under close scrutiny, may improve managers' incentive to increase such investments. However, recall that our prior analyses on target executive turnover and changes in operating performance show that the positive effects of customer acquisitions are primarily among targets that have been experiencing high sales growth. Since higher sales growth is likely to be associated with more intensive firm investment, it seems, therefore, that the changes in target R&D expenditure might not be due entirely to the improved corporate governance of target firms.

The increases in relation-specific investments are, however, consistent with customer blockholdings mitigating contractual frictions in product market relationships. Specifically, since property rights over the products of R&D investments are likely to difficult to define,

R&D investments are prone to the *ex post* holdup problem (Aghion and Tirole, 1994). By better aligning trading partners' incentives and solidifying trading relationships, customer blockholdings can help alleviate the holdup problem, thereby promoting targets' incentive to undertake relationship-specific investments (Williamson, 1979; Pisano, 1989; Aghion and Tirole, 1994). Our findings are, therefore, consistent with prior evidence on this important benefit of customer blockholdings (Allen and Philips, 2000; Fee, Hadlock, and Thomas, 2006).

5. Discussion

5.1. Selection bias

In our regressions models, we take as our key independent variable the customer acquirer dummy that takes the value of one for customer deals and zero for noncustomer deals. However, our regression models may be susceptible to a selection bias, if the targets of the customer and noncustomer deals represent the outcomes of strategic choices by the acquirers. In particular, if the selections of targets by customer and noncustomer acquirers systematically differ, and factors that influence such selection decisions also potentially impact post-acquisition target governance activities and operating performance, the estimates from ordinary least square regressions may be biased and inconsistent.

To correct this selection problem, we follow the procedure in Green (2011) to use a two-stage regression analysis *a la* Heckman. In first stage, we estimate a probit regression using customer acquisition dummy as the dependent variable and include a set of firm and deal characteristics as explanatory variables³⁷. In the second stage, we estimate the OLS regression with the change of ROA as dependent variable, correcting for the selection bias using the result

³⁷ We recognize that a drawback of this approach is that only one possible outcome of selection process is considered. There may be other possible outcomes for the target firm such as complete integration, joint venture, or strategic alliance.

from first stage regression. The results are presented in Table 9. In model (2) to (10), we show that our results are robust to the correction of selection bias.

5.2. The advisory role of customer blockholders

Our main analysis focuses on the effect of customer blockholders' nonfinancial claims on their roles in firms' corporate governance. However, beyond corporate governance, the nonfinancial claims may also motivate customer acquirers to actively advise target managers on their corporate strategies, especially when the acquirers obtain representations on targets' boards (Adams and Ferreira, 2007).

To test this possibility, in Table 10 we run regression analysis of target CAR(-10, +10). We include two dummies variables as the key independent variable. The first dummy variable, "customer experienced board representative", takes the value of one if a customer acquirer has a representative on the target's board and the representative has experience in target industry, and a value of zero otherwise. We consider a representative as having industry experience if the director appointed has working experience in the same 3-digit SIC industry. The second dummy variable, "no experienced representative" dummy takes a value of one if acquirers' board representatives do not have experience in target industry, *or* if acquirers do not have their associates on the target's board. The base case for comparisons is, therefore, the one in which a noncustomer acquirer has an experienced board representative. As column (3) of Table 10 shows, the coefficient on the customer experienced board representative dummy is positive and highly significant. Thus, experience board representatives from customer acquirers can more positively impact targets' value than do experienced board representatives from noncustomer acquirers. This finding is consistent with nonfinancial claims enhance customer acquirers' incentive to provide value-improving advisory service to target management.

5.3. Customer block purchase as a source of capital to target firm

The large increases in investment in target firms of customer deals might be the results of ex ante underinvestment because of liquidity constraints. To address this issue, in untabulated test, we estimate OLS regression using the change in capital expenditure from year -1 to year +3 as dependent variable and include the interaction term between customer acquisition dummy and the ratio of capital expenditure to total asset in target firm before the acquisition. If the increase in investment is driven by the mitigation of financial constraint, we should be able to see firms with lower capital expenditure to assets ratio have more increase in investment after the acquisition. However, we find that interaction term is not significant, suggesting that increases in investment in target firms of customer deals is not due to the ex ante underinvestment because of liquidity constraints.

6. Conclusion

This paper examines the governance role of firms' corporate customers when they take equity stakes in the firms. We argue that because of customer blockholders' nonfinancial claims, which arise from their product market relationships with firms, they are more strongly motivated to closely monitor firm managers and ensure sound firm performance than do noncustomer blockholders. Furthermore, customer blockholders information about firms' downstream industries enables them to be more effective in indentifying and disciplining underperforming firm managers. This intensified monitoring by customer blockholders is likely to be particularly relevant when firms' potential managerial agency problems, including managers' shirking and rent seeking, are likely to be highly detrimental to customer blockholders' nonfinancial claims.

Our empirical evidence from the sample of block acquisitions substantiates the above argument. Specifically, we find that customer acquisitions create greater value gains to target

shareholders, lead to more forced turnovers of underperforming target managers, and result in greater improvements in target operating performance, than do no-customer acquisitions. Furthermore, we find that these differences between customer and noncustomer acquisitions are especially pronounced when target managerial agency problems are likely to create significant negative effects on customer acquirers' nonfinancial claims.

Our results show that beyond corporate governance, customer blockholdings can also play important roles in resolving contractual frictions in product market relationships, and in facilitating advisory services to firm managers. In particular, confirming prior evidence in Allen and Philips (2000) and Fee, Hadlock, and Thomas (2006), we find that customer blockholding improves firms' incentive to invest in relationship-specific assets. Furthermore, we find that through their board representatives, customer blockholders also appear to serve as advisors to firm managers (Adams and Ferreira, 2007).

One important caveat to the above is that although our paper uses customer equity acquisitions to address the importance of product market relationship in the market of corporate control, our sample represents only one type of deals that can change the boundary of firm. This limits our ability to generalize the paper's conclusion to other settings in which other form of deals such as complete integration, joint venture, and strategic alliance are involved. Thus, the important question of the link between product market relationship and the market for corporate control is subject to further research.

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Table 1
Distribution of acquisition activity by year and target industry

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as of one the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date.

Year	Agriculture SIC: 01--09		Mining SIC:10--17		Manufacture SIC: 20--39		Transportation SIC: 40--49		Wholesale and Retail SIC: 50--59		Service SIC: 70--89		Total	
	Customer Deals	Other Deals	Customer Deals	Other Deals	Customer Deals	Other Deals	Customer Deals	Other Deals	Customer Deals	Other Deals	Customer Deals	Other Deals	Customer Deals	Other Deals
1984	0	0	0	3	2	11	0	4	0	3	1	3	3	24
1985	0	0	0	2	2	14	0	2	0	1	0	1	2	20
1986	0	0	0	2	1	10	1	2	0	0	1	2	3	16
1987	0	0	0	1	3	15	0	3	1	7	0	6	4	32
1988	0	0	0	0	4	16	0	7	0	3	0	5	4	31
1989	0	0	0	3	1	6	0	4	0	2	3	5	4	20
1990	1	0	0	1	1	6	0	2	0	1	2	2	4	12
1991	0	0	0	3	2	8	0	2	0	0	1	4	3	17
1992	0	2	0	1	5	8	0	1	0	1	0	3	5	16
1993	0	0	0	3	3	6	1	0	0	3	0	1	4	13
1994	0	0	0	2	2	12	0	1	0	4	3	2	5	21
1995	0	2	0	3	8	3	0	3	0	1	3	2	11	14
1996	0	2	0	6	3	11	4	1	0	6	3	1	10	27
1997	0	0	0	4	7	8	0	2	1	3	4	8	12	25
1998	0	1	1	1	8	10	1	2	0	4	5	3	15	21
1999	0	0	1	1	4	16	0	6	1	4	8	5	14	32
2000	0	0	0	0	4	11	4	2	0	1	5	7	13	21
2001	0	0	0	0	1	2	0	5	1	0	3	2	5	9
2002	0	0	0	0	1	0	1	0	1	0	1	1	4	1
2003	0	0	1	0	1	2	0	0	0	0	0	0	2	2
2004	0	0	0	0	1	2	0	0	0	0	1	0	2	2
2005	0	0	0	0	1	3	0	0	0	0	0	2	1	5
Total	1	7	3	36	65	180	12	49	5	44	44	65	130	381

Table 2
Descriptive Statistics by types of acquisition

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. All variables are measured as of the fiscal year-end that immediately precedes the director appointments. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variables	Total Sample N=511		Acquisition by Customers (A)		Acquisition by Noncustomer (B)		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	t-test	Wilcoxon Z-test
Target Characteristics								
Book value of total assets (million of dollars)	443.555	51.154	317.349	40.601	486.617	62.996	0.38	0.00***
Market value of equity	459.347	62.767	652.912	92.249	398.249	57.310	0.15	0.05**
Capital expenditure / total assets (industry adjusted)	0.031	0.004	0.028	0.009	0.032	0.003	0.65	0.86
R&D expenditure / total assets (industry adjusted)	0.062	0.000	0.127	0.036	0.040	0.000	0.00***	0.00***
Tobin's Q	2.726	1.512	5.026	2.595	1.993	1.395	0.00***	0.00***
Debt / assets	0.500	0.478	0.450	0.397	0.517	0.503	0.02**	0.00***
Operating income / total assets (industry adjusted)	-0.160	-0.052	-0.251	-0.099	-0.129	-0.038	0.005***	0.00***
Cash flow/ total assets (industry adjusted)	-0.142	-0.041	-0.236	-0.096	-0.109	-0.029	0.00***	0.00***
Previous one year stock return (industry adjusted)	0.012	-0.090	0.060	-0.085	-0.004	-0.090	0.33	0.53
Institutional ownership	0.285	0.230	0.250	0.149	0.296	0.245	0.10*	0.03**
Management ownership	0.228	0.167	0.232	0.192	0.227	0.152	0.81	0.19
CEO age	49.843	49.000	47.106	47.000	50.870	51.000	0.00***	0.00***
Transaction Characteristics								
Percent of shares acquired	19.576	14.150	15.852	11.625	20.847	14.850	0.00***	0.14***
Offer price / acquirer's total asset	0.072	0.008	0.012	0.001	0.096	0.017	0.00***	0.00***
Product Market/Target Industry Characteristics								
Fraction of deals with strategic alliance agreement	23.29	-	44.61	-	16.01	-	0.00***	-
Median profit margin in target industry	-0.055	0.014	-0.125	0.001	-0.030	0.017	0.00***	0.00***
Fraction of target firms in relationship industry	0.36	-	0.36	-	0.36	-	0.98	-
Fraction of target firms in durable industry	0.14	-	0.15	-	0.14	-	0.95	-
Acquirer's net sales / target net sales	875.272	20.425	2373.450	190.851	242.423	7.147	0.00***	0.00***
Previous sales growth rate (three year average)	1.551	1.166	1.774	1.203	1.492	1.163	0.15	0.35

Table 3
Summary statistics for governance, control event and other deal characteristics

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. We classify the acquisition as control-motivated if the acquiring firm discloses as such in the 13D filing. We obtain the sample of top executive turnover events from proxy statements, annual reports, and Factiva. For the holding period up to three years after the formation of block, we search these sources for changes of CEOs, chairmen, and presidents. We define the top executive as the CEO. If a firm does not have a CEO, we take the chairman of the board to be the top executive; if the firm has neither a CEO nor chairman of the board, then we take the president to be the top executive. Following Denis, Denis, and Sarin (1997), we refer to turnover events in which the top executive is removed due to death, illness, or other normal reasons as routine turnover. We also classify a management change as normal if the stated reason for the change is retirement and the retiring manager is between the ages of 64 and 66. We refer to all other turnover events as non-routine turnover. Information about director's industry experience is from Factiva, SEC 10-k form and the company website. We check the employment history of each director appointed by the acquirer, and define a director to have target industry experience if he or she once served a company that is in the same industry with the target (at least to three digit) within five years before the acquisition. The numbers in the test-of-difference columns denote *p*-values. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Distribution by Holding Period of Block Ownership			
	Acquisition by Customers (A) N=130	Acquisition by Noncustomer (B) N=381	Test of Difference (A-B)
Less than one year	10 (7.69%)	87 (22.83%)	0.00***
More than one but less than two years	15 (11.54%)	52 (13.65%)	0.53
More than two but less than three years	11 (8.46%)	33 (8.66%)	0.94
More than three years	94 (72.30%)	209 (54.86%)	0.00***
Panel B: Distribution by Purpose of Acquisition and Governance Activity in Post Acquisition Period (three years after block formation)			
	Acquisition by Customers (A) N=130	Acquisition by Noncustomer (B) N=381	Test of Difference (A-B)
Acquisition indicated as with control purposes	1 (0.77%)	53 (13.91%)	0.01***
Target is taken over by the block acquirer	6 (4.61%)	47 (12.33%)	0.001***
Target is taken over by other acquirer	21 (16.15%)	39 (10.23%)	0.07*
Board representation in the target by the acquirer firm	48 (36.92%)	118 (30.97%)	0.2
Ratio of representation on the target's board by acquirers	0.07	0.08	0.91
Percentage of targets that experience top executive turnover	46 (35.38%)	81 (21.26%)	0.00***
Panel C: Distribution by Industry Experience of Acquirer Appointed Directors (for deals after 1993 only)			
	Acquisition by Customers (A) N=94	Acquisition by Noncustomer (B) N=180	Test of Difference (A-B)
At least one acquirer appointed director has experience in target industry	22 (23.40%)	35 (19.44%)	0.44

Table 4
Target Cumulative Abnormal Return around Announcement Date

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. Abnormal return is calculated using the market model. The market model is estimated over 200 trading days ending 21 days before the acquisition announcement date. We use the return on CRSP equally weighted index as the market return. Information about director's industry experience is from *Factiva*, SEC 10-k form, and the company website. We check employment history of each director appointed by acquirer, and consider a director as having target industry experience if he or she once served in a company that is in the same industry with the target (at least to three digit) within five years before the acquisition. Numbers in brackets denote the number of observations. The numbers in the test-of-difference columns denote *p*-values. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Cumulative Abnormal Return (-10, 10) by Acquirers' Customer Status								
Event Windows	Total Sample N=511		Acquisition by Customers (A) N=130		Acquisition by Noncustomer (B) N=381		Test of Difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon Z-test
(-1,0)	0.094***	0.056***	0.128***	0.083***	0.083***	0.052***	0.004***	0.015**
(-1,+1)	0.114***	0.082***	0.147***	0.103***	0.103***	0.075***	0.019**	0.018**
(-2,+2)	0.123***	0.082***	0.155***	0.107***	0.112***	0.077***	0.029**	0.032**
(-5,+5)	0.135***	0.094***	0.161***	0.110***	0.127***	0.090***	0.126	0.210
(-10,+10)	0.146***	0.112***	0.163***	0.130***	0.140***	0.106***	0.383	0.276

Table 4
Cumulative Abnormal Returns for Targets around the Announcement Date (continued)

Panel B: Cumulative Abnormal Return (-10, 10) by Acquirers' Customer Status and Subsequent Forced Turnover Event in Target Firm							
	Deals with Subsequent Forced Turnover in Target Firms (C)			Deals without Subsequent Forced Turnover in Target Firms (D)			Test of Difference (C-D)
	Mean		Median	Mean		Median	t-test Wilcoxon Z-test
Acquirer is the Target's Customer (A)	0.175***		0.141***	0.157***		0.120***	0.73 0.36
	(0.00)	[46]	(0.00)	0.00	[84]	0.00	
Acquirer is not the Target's Customer (B)	0.111		0.040	0.145***		0.107***	0.27 0.09*
	0.00	[81]	0.07	0.00	[300]	0.00	
Test of Difference (A-B): t-test	0.16			0.71			
Wilcoxon Z-test			0.09*			0.32	
Panel C: Cumulative Abnormal Return (-10, 10) by Acquirers' Customer Status and its Representation on Target's Board							
	Deals with Acquirer Representative on Target's Board (C)			Deals without Acquirer Representative on Target's Board (D)			Test of Difference (C-D)
	Mean		Median	Mean		Median	t-test Wilcoxon Z-test
Acquirer is the Target's Customer (A)	0.194***		0.181***	0.146***		0.114***	0.32 0.07*
	(0.00)	[48]	(0.00)	(0.00)	[82]	0.00	
Acquirer is not the Target's Customer (B)	0.109***		0.043***	0.151***		0.124***	0.13 0.00***
	(0.00)	[118]	(0.02)	(0.00)	[263]	(0.00)	
Test of Difference (A-B): t-test	0.07*			0.87			
Wilcoxon Z-test			0.01***			0.30	
Panel D: Cumulative Abnormal Return (-10, 10) by Acquirers' Customer Status and its Representation on Target's Board							
	Deals with Acquirer Representative on Target's Board and Subsequent Forced Turnover (C)			Other Deals (D)			Test of Difference (C-D)
	Mean		Median	Mean		Median	t-test Wilcoxon Z-test
Acquirer is the Target's Customer (A)	0.197***		0.132**	0.157***		0.128***	0.55 0.07*
	(0.00)	[21]	(0.03)	(0.00)	[109]	(0.00)	
Acquirer is not the target's customer (B)	0.100		0.004 **	0.143***		0.112***	0.27 0.02**
	(0.02)	[44]	(0.02)	(0.00)	[337]	(0.00)	
Test of Difference (A-B): t-test	0.15			0.64			
Wilcoxon Z-test			0.03**			0.29	

Table 4
Cumulative Abnormal Returns for Targets around the Announcement Date (continued)

Panel E: Cumulative Abnormal Return (-10, 10) by Acquirers' Customer Status and its Representative's Experience in Target Industry (for deals after 1993)

	At least One Acquirer Representative has Experience in Target Industry (C)			None of Acquirer Representatives has Experience in Target Industry (D)			Test of Difference (C-D)	
	Mean		Median	Mean		Median	t-test	Wilcoxon Z-test
Acquirer is the Target's Customer (A)	0.230***		0.219**	0.222***		0.182***	0.90	0.25
	(0.00)	[22]	(0.02)	(0.00)	[17]	(0.01)		
Acquirer is not the Target's Customer (B)	0.128**		0.018	0.082		0.024	0.50	0.47
	(0.04)	[35]	(0.74)	(0.04)	[45]	1.00		
Test of Difference (A-B): t-test	0.21			0.04**				
Wilcoxon Z-test			0.03**			0.00***		

Table 5

Logit Regression Estimates of the Likelihood of Non-routine Top Executive Turnover

The table presents the results of logit regressions in which the dependent variable is equal to one if a non-routine top executive turnover event occurs in a certain year, and zero otherwise. The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. We define the top executive as the CEO. If a firm does not have a CEO, we use the chairman of the board as the top executive. Otherwise, the top executive is defined as the president. Following Denis, Denis, and Sarin (1997), we refer to turnover events in which the top executive is removed due to death, illness, or other non-governance-related reasons over the three years from the acquisition date as routine turnover. We classify a management change as normal if the stated reason for the change is retirement and the retiring manager is between the ages of 64 and 66. We refer to all other turnover events as non-routine turnover. The dependent variable takes the value of one if non-routine top management turnover occurs and zero otherwise. Prior stock return is measured by return adjusted by Fama French 48 industry for the past one year before the block acquisition. The interaction effect is defined as the change in the predicted probability of executive turnover for a change in both the firm performance and the dummy variable (CST) using the methodology of Norton, Wang, and Ai (2004). *p*-values are in parentheses. *p*-values are estimated using robust standard errors to adjust for heteroskedasticity (White (1980)) and industry clustering. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Total Sample	Industry adjusted R&D ratio		Strategic Alliance Agreement		Profit Margin of Target Industry		Average Target Prior Sales Growth	
		Above Median	Below Median	Yes	No	Above Median	Below Median	Above Median	Below Median
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Industry adjusted one year stock return: a</i>	0.155 (0.61)	0.460 (0.38)	0.047 (0.91)	-0.571 (0.28)	0.350 (0.42)	0.521 (0.57)	0.252 (0.46)	-0.580 (0.63)	0.220 (0.80)
<i>Customer acquirer: b</i>	0.476* (0.08)	0.031 (0.94)	1.028*** (0.01)	0.206 (0.67)	0.737** (0.04)	-0.334 (0.49)	0.775** (0.04)	-0.024 (0.96)	1.086** (0.03)
<i>a*b</i>	-0.749* (0.08)	-1.120* (0.10)	-0.233 (0.70)	-1.705** (0.04)	-0.780 (0.21)	0.812 (0.30)	-1.452** (0.01)	-1.882* (0.08)	-0.370 (0.62)
<i>Acquirer's representatives on target's board (dummy)</i>	1.089*** (0.00)	1.382*** (0.00)	0.906*** (0.00)	0.371 (0.45)	1.356*** (0.00)	1.344*** (0.00)	1.276*** (0.00)	1.757*** (0.00)	1.048** (0.01)
Target Characteristics									
<i>Log (total assets)</i>	0.009 (0.91)	-0.034 (0.79)	0.032 (0.78)	0.227 (0.14)	-0.097 (0.33)	-0.068 (0.58)	0.095 (0.41)	0.183 (0.19)	0.035 (0.80)

<i>Leverage</i>	-0.279 (0.59)	0.015 (0.99)	-0.128 (0.85)	-1.941 (0.11)	0.119 (0.84)	-0.018 (0.98)	-0.536 (0.48)	-1.515* (0.08)	0.951 (0.33)
<i>Tobin's Q</i>	-0.020 (0.63)	0.020 (0.71)	-0.037 (0.61)	-0.080 (0.31)	-0.023 (0.66)	-0.018 (0.83)	-0.048 (0.37)	-0.082 (0.48)	-0.003 (0.99)
<i>Institutional ownership</i>	-0.334 (0.54)	-0.468 (0.55)	-0.665 (0.43)	-1.034 (0.31)	0.186 (0.78)	-0.995 (0.28)	0.042 (0.96)	-1.642* (0.06)	0.418 (0.70)
Transaction Characteristics									
<i>Holding Period (in years)</i>	0.152 (0.14)	-0.105 (0.54)	0.280** (0.05)	0.330 (0.14)	0.116 (0.34)	-0.026 (0.87)	0.308** (0.04)	0.077 (0.65)	0.112 (0.56)
<i>Private negotiated deal (dummy)</i>	-0.153 (0.61)	-0.590 (0.25)	-0.009 (0.98)	-0.999 (0.22)	-0.146 (0.66)	-0.250 (0.59)	-0.191 (0.66)	-0.298 (0.59)	0.006 (0.99)
<i>Percent of shares acquired</i>	0.001 (0.92)	0.012 (0.35)	-0.005 (0.58)	-0.031 (0.25)	0.004 (0.65)	0.011 (0.25)	-0.016 (0.18)	-0.011 (0.40)	0.004 (0.73)
<i>Target is taken over by acquirer within 3 years (dummy)</i>	-0.626 (0.14)	-0.407 (0.57)	-0.699 (0.20)		-0.522 (0.23)	0.125 (0.83)	-1.128* (0.10)	-0.767 (0.37)	0.304 (0.60)
<i>Strategic alliance agreement (dummy)</i>	0.082 (0.77)	0.653* (0.10)	-0.536 (0.25)			0.664 (0.14)	-0.603 (0.13)	0.553 (0.24)	-0.401 (0.47)
<i>Target and acquirer are in same industry (dummy)</i>	0.145 (0.53)	0.298 (0.39)	0.033 (0.92)	0.254 (0.60)	0.129 (0.64)	0.070 (0.84)	0.441 (0.19)	0.250 (0.52)	-0.097 (0.82)
<i>Intercept</i>	-1.774*** (0.00)	-1.215 (0.11)	-1.991*** (0.00)	-0.774 (0.50)	-1.720*** (0.00)	-1.503** (0.04)	-2.004*** (0.00)	-1.499* (0.07)	-2.805*** (0.00)
Pseudo R square	0.0814	0.122	0.0888	0.101	0.107	0.0960	0.152	0.178	0.0984
No of observations	495	207	288	112	383	250	245	180	188
Mean interaction effect for a*b (a*c)	-0.144** (0.04)	-0.191* (0.08)	-0.048 (0.35)	-0.302** (0.05)	-0.149* (0.10)	0.109 (0.16)	-0.276*** (0.01)	-0.287* (0.09)	-0.074 (0.30)

Table 5 (continued)
Logit Regression Estimates of the Likelihood of Non-routine Top Executive Turnover

Panel B: Marginal effect of the key variables											
Independent variables	Total Sample	Industry adjusted R&D ratio		Profit Margin of Target Industry		Strategic Alliance Agreement		Sales Ratio of Acquirer and Target		Average Target Prior Sales Growth	
		Above Median	Below Median	Above Median	Below Median	Yes	No	Above Median	Below Median	Above Median	Below Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<i>Industry adjusted one year stock return: a</i>	0.005 (0.890)	-0.006 (0.930)	0.006 (0.898)	0.143 (0.227)	0.009 (0.827)	-0.042 (0.436)	0.026 (0.651)	-0.038 (0.582)	0.004 (0.950)	-0.197 (0.69)	0.964* (0.09)
<i>Dummy for customer acquirer (b)</i>	0.088 (0.103)	0.006 (0.940)	0.199** (0.022)	0.033 (0.736)	0.136* (0.062)	-0.047 (0.457)	0.150* (0.055)	-0.004 (0.964)	0.192* (0.064)	-0.730 (0.42)	1.484** (0.01)
<i>a*b</i>	-0.130* (0.080)	-0.204* (0.092)	-0.037 (0.702)	-0.333** (0.045)	-0.126 (0.206)	0.122 (0.296)	-0.264** (0.012)	-0.341* (0.074)	-0.054 (0.621)	-3.404* (0.05)	-1.350 (0.15)
<i>Acquirer's representatives on target's board (dummy)</i>	0.207*** (0.000)	0.277*** (0.000)	0.159*** (0.007)	0.074 (0.463)	0.251*** (0.000)	0.228*** (0.000)	0.257*** (0.001)	0.345*** (0.000)	0.173** (0.026)	2.330*** (0.00)	1.041* (0.07)

Table 6
OLS Regression of Change in Industry-adjusted Ratio of Operating Income to Total Assets for Targets Following Block Share Purchase on Explanatory Variables

The table presents the results of OLS regressions in which the dependent variable is the difference between the average of operating performance in years +1, +2, and +3 and operating performance in year -1. Operating performance is measured by a ratio of operating income to total assets (ROA) adjusted by Fama French 48 industry. The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. R&D ratio of target industry is measured by the median value of R&D ratio for firms in the same industry. Profit margin of target industry is measured by the median value of profit margin for firms in the same industry. Sales ratio is the ratio sales between acquirer and target. *p*-values are in parentheses. *p*-values are estimated using robust standard errors to adjust for heteroskedasticity (White (1980)) and industry clustering. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Total Sample	Industry Adjusted R&D ratio		Strategic Alliance Agreement		Durable Industry		Industry Median Profit Margin	
		Above Median	Below Median	Yes	No	Yes	No	Above Median	Below Median
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Acquirer is customer (dummy)</i>	0.068 (0.19)	0.220*** (0.00)	-0.069 (0.12)	0.123* (0.06)	0.009 (0.90)	0.125** (0.04)	0.130 (0.25)	-0.023 (0.61)	0.152*** (0.01)
<i>Acquirer's representatives on target's board (dummy)</i>	0.002 (0.95)	-0.002 (0.98)	-0.004 (0.84)	0.068 (0.24)	-0.020 (0.66)	-0.165* (0.06)	0.010 (0.73)	0.003 (0.94)	-0.015 (0.76)
Target Characteristics									
<i>Log (total assets)</i>	-0.013 (0.32)	-0.039 (0.25)	0.000 (0.97)	-0.048*** (0.00)	0.006 (0.65)	-0.007 (0.83)	-0.014 (0.44)	0.009 (0.66)	-0.027* (0.07)
<i>Leverage</i>	0.114** (0.05)	0.128 (0.29)	0.070 (0.38)	0.049 (0.70)	0.151** (0.03)	0.600 (0.38)	0.175 (0.14)	0.083 (0.31)	0.138 (0.16)
<i>Tobin's Q</i>	-0.002 (0.87)	-0.004 (0.75)	0.003 (0.82)	-0.026* (0.09)	0.015*** (0.00)	0.062 (0.19)	0.009 (0.50)	0.019** (0.02)	-0.012 (0.30)

<i>Institutional ownership</i>	0.061 (0.25)	0.122 (0.26)	-0.011 (0.78)	0.042 (0.77)	0.044 (0.30)	0.301 (0.24)	-0.098 (0.30)	0.048 (0.45)	0.090 (0.41)
Transaction Characteristics									
<i>Holding period (in years)</i>	-0.008 (0.64)	-0.067* (0.08)	0.011 (0.66)	-0.080*** (0.00)	0.012 (0.59)	-0.037 (0.75)	0.074 (0.38)	-0.012 (0.41)	-0.008 (0.78)
<i>Private negotiated deal (dummy)</i>	0.000 (0.90)	-0.161* (0.10)	0.054* (0.07)	0.059 (0.39)	0.001 (0.97)	-0.183*** (0.01)	-0.080 (0.59)	-0.022 (0.60)	0.045 (0.45)
<i>Percent of shares acquired</i>	0.002 (0.17)	0.005** (0.02)	0.000 (0.84)	0.006 (0.23)	0.001 (0.41)	0.007* (0.05)	-0.001 (0.41)	0.002 (0.30)	0.002 (0.25)
<i>Strategic alliance agreement between acquirer and target (dummy)</i>	0.026 (0.59)	0.030 (0.78)	0.036 (0.39)			0.137 (0.12)	0.093 (0.20)	0.102* (0.05)	-0.040 (0.58)
<i>Target and acquirer are in same industry (dummy)</i>	0.033 (0.35)	0.120* (0.10)	-0.017 (0.59)	-0.017 (0.77)	0.024 (0.61)	0.136 (0.35)	-0.030 (0.61)	0.042 (0.22)	0.067 (0.37)
<i>Intercept</i>	-0.044 (0.51)	0.162 (0.48)	-0.087 (0.33)	0.266* (0.06)	-0.182** (0.04)	-0.306 (0.28)	-0.109 (0.37)	-0.146 (0.29)	-0.036 (0.75)
Adjusted R-square	0.03	0.13	0.04	0.24	0.05	0.35	0.20	0.08	0.08
No of observations	300	125	175	81	219	37	71	152	148

Table 7
OLS Regression of Cumulative Abnormal Returns (-10, 10) for Targets on Explanatory Variables

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. Abnormal return is calculated using the market model. The market model is estimated over 200 trading days ending 21 days before the acquisition announcement date. We use the return on CRSP equally weighted index as the market return. All dependent variables are measured at the fiscal year immediately before the acquisition. *p*-values in parentheses are estimated using robust standard errors to adjust for heteroskedasticity (White (1980)) and industry clustering. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Total Sample	Industry Adjusted R&D Ratio		Strategic Alliance		Durable Industry		Profit Margin of Target Industry		Average Target Prior Sales Growth		Subsequent Top Executive Turnover	
		Above Median	Below Median	Yes	No	Yes	No	Above Median	Below Median	Above Median	Below Median	Yes	No
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>Acquirer is customer</i>	0.064* (0.09)	0.040 (0.35)	0.068 (0.12)	0.075** (0.04)	0.079 (0.13)	0.226*** (0.00)	0.002 (0.98)	0.007 (0.92)	0.112** (0.02)	0.123* (0.08)	0.044 (0.60)	0.095** (0.04)	0.045 (0.48)
<i>Acquirer's representatives on target's board (dummy)</i>	-0.018 (0.60)	0.063 (0.11)	-0.067* (0.09)	0.028 (0.70)	-0.036 (0.28)	-0.073 (0.39)	-0.131*** (0.00)	-0.031 (0.33)	0.010 (0.89)	-0.017 (0.77)	-0.027 (0.51)	-0.017 (0.76)	-0.007 (0.81)
Target Characteristics													
<i>Log value of total assets</i>	-0.027*** (0.00)	-0.032** (0.05)	-0.021** (0.01)	-0.004 (0.73)	-0.036*** (0.01)	-0.032 (0.21)	-0.012 (0.43)	-0.027** (0.01)	-0.025* (0.05)	-0.025 (0.10)	-0.026** (0.03)	-0.037** (0.02)	-0.026** (0.01)
<i>Leverage</i>	0.074 (0.30)	0.228* (0.10)	0.008 (0.92)	0.123 (0.25)	0.058 (0.52)	0.181 (0.46)	0.171 (0.10)	0.007 (0.89)	0.139 (0.15)	0.124 (0.24)	0.094 (0.31)	0.036 (0.68)	0.082 (0.38)
<i>Tobin's Q</i>	-0.010*** (0.00)	-0.004 (0.20)	-0.019*** (0.00)	-0.009 (0.12)	-0.013** (0.05)	-0.037* (0.08)	-0.006 (0.15)	-0.011* (0.09)	-0.010*** (0.00)	-0.019* (0.08)	-0.005 (0.73)	-0.021* (0.06)	-0.007* (0.08)

<i>Institutional ownership</i>	0.081** (0.04)	0.068 (0.25)	0.066 (0.17)	-0.027 (0.57)	0.131** (0.02)	0.217 (0.10)	0.075 (0.41)	0.071 (0.17)	0.063 (0.32)	0.097* (0.08)	0.134 (0.19)	0.062 (0.55)	0.120*** (0.01)
Transaction Characteristics													
<i>Holding period (in years)</i>	-0.004 (0.63)	-0.006 (0.66)	-0.005 (0.72)	0.022 (0.28)	-0.009 (0.40)			0.007 (0.58)	-0.017 (0.25)	-0.016 (0.24)	0.001 (0.94)	0.028 (0.22)	-0.016 (0.19)
<i>Private negotiated deal (dummy)</i>	-0.038 (0.15)	-0.042 (0.51)	-0.029 (0.35)	-0.091 (0.22)	-0.028 (0.27)			-0.012 (0.69)	-0.054 (0.27)	-0.102*** (0.00)	0.022 (0.52)	-0.081 (0.17)	-0.021 (0.54)
<i>Percent of shares Acquired</i>	0.000 (0.95)	0.001 (0.52)	-0.000 (0.69)	-0.001 (0.66)	0.000 (0.81)			0.000 (0.92)	-0.000 (0.76)	0.001 (0.31)	-0.001* (0.07)	0.001 (0.50)	-0.000 (0.91)
<i>Target is taken over by within 3 years (dummy)</i>	0.032 (0.45)	0.024 (0.76)	0.044 (0.43)	0.164** (0.02)	0.022 (0.66)			-0.022 (0.68)	0.109* (0.05)	0.035 (0.73)	-0.017 (0.67)	-0.069 (0.25)	0.063 (0.25)
<i>Strategic alliance (dummy)</i>	-0.008 (0.77)	-0.037 (0.38)	0.034 (0.41)			-0.011 (0.92)	-0.008 (0.85)	-0.028 (0.56)	-0.009 (0.75)	0.021 (0.58)	-0.051 (0.40)	0.036 (0.44)	-0.020 (0.62)
<i>Target and acquirer in same industry (dummy)</i>	0.038 (0.19)	0.056 (0.18)	0.020 (0.52)	0.028 (0.62)	0.044 (0.19)	-0.116* (0.08)	0.100*** (0.01)	-0.009 (0.82)	0.093** (0.02)	-0.011 (0.76)	0.093* (0.05)	0.028 (0.39)	0.043 (0.20)
<i>Intercept</i>	0.254*** (0.00)	0.215** (0.03)	0.286*** (0.00)	0.152 (0.25)	0.292*** (0.00)	0.275** (0.02)	0.148 (0.14)	0.264*** (0.00)	0.234*** (0.01)	0.299*** (0.00)	0.208** (0.01)	0.269** (0.01)	0.244*** (0.00)
Adjusted R square	0.05	0.09	0.07	0.07	0.06	0.19	0.11	0.04	0.10	0.09	0.08	0.14	0.04
F-value	3.597***	3.225***	5.550***	5.791***	3.059***	34.86***	12.33***	1.820*	3.251***	8.284***	2.202**	3.860***	2.795***
No of observations	495	207	288	112	383	72	108	250	245	180	188	121	374

Table 8

Change in Industry-adjusted Investment for Targets Following Block Share Purchase

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as of one the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. The numbers in the test-of-difference columns denote *p*-values. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Time Period	Total Sample N=511		Acquisition by Customers (A) N=130		Acquisition by Noncustomer (B) N=381		Test of Difference (A-B)	
		Mean	Median	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon Z-test
Change in industry adjusted ratio of PPE to total asset	(-1, +1)	0.153	0.000	0.221	0.029	0.127	-0.005	0.10*	0.01***
	(-1, +2)	0.204	-0.006	0.254	0.008	0.185	-0.016	0.45	0.13
	(-1, +3)	0.323	-0.003	0.331	0.020	0.319	-0.014	0.93	0.19
Change in industry adjusted ratio of R&D expenditure to total asset	(-1, +1)	0.032	0.000	0.082	0.006	0.014	0.000	0.00***	0.00***
	(-1, +2)	0.064	0.000	0.169	0.018	0.025	0.000	0.00***	0.00***
	(-1, +3)	0.091	0.000	0.237	0.003	0.035	0.000	0.00***	0.02**
Change in industry adjusted ratio of capital expenditure to total asset	(-1, +1)	0.065	-0.001	0.163	0.017	0.028	-0.004	0.00***	0.00***
	(-1, +2)	0.088	0.000	0.139	0.010	0.069	-0.004	0.12	0.01***
	(-1, +3)	0.103	0.004	0.110	0.001	0.100	0.006	0.84	0.53

Table 9
OLS Regression of Change in Industry-adjusted Ratio of Operating Income to Total Assets for Targets Following Block Share Purchase on Explanatory Variables:
Heckman's two-step approach

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as of one the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. Operating performance is measured by a ratio of operating income to total assets (ROA) adjusted by Fama French 48 industry. The dependent variable is the difference between the average of ROAs in years +1, +2, and +3 and ROA in year -1. R&D ratio of target industry is measured by the median value of R&D ratio for firms in the same industry. Profit margin of target industry is measured by the median value of profit margin for firms in the same industry. Sales ratio is the ratio sales between acquirer and target. *p*-values are in parentheses. *p*-values are estimated using robust standard errors to adjust for heteroskedasticity (White (1980)) and industry clustering. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Selection model	Total Sample	Industry Adjusted R&D ratio		Industry Median Profit Margin		Strategic Alliance Agreement		Sales Ratio of Acquirer and Target	
			Above Median	Below Median	Above Median	Below Median	Yes	No	Above Median	Below Median
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Acquirer is customer (dummy)</i>		0.085** (0.03)	0.212*** (0.01)	-0.058 (0.22)	-0.000 (1.00)	0.142** (0.03)	0.123* (0.08)	0.009 (0.87)	0.121* (0.06)	0.152 (0.17)
<i>Acquirer's representatives on target's board (dummy)</i>		0.022 (0.48)	-0.024 (0.73)	0.004 (0.92)	0.013 (0.76)	-0.014 (0.82)	0.068 (0.30)	-0.020 (0.64)	0.024 (0.70)	0.001 (0.99)
Target Characteristics										
<i>Log (total assets)</i>	0.011 (0.78)	-0.033** (0.02)	-0.027 (0.23)	0.003 (0.84)	0.011 (0.39)	-0.022 (0.17)	-0.047** (0.03)	0.007 (0.63)	-0.064*** (0.01)	0.016 (0.43)
<i>Leverage</i>	-0.339 (0.18)	0.119 (0.20)	0.159 (0.35)	0.077 (0.33)	0.084 (0.36)	0.139 (0.29)	0.056 (0.72)	0.150 (0.10)	0.142 (0.48)	0.124 (0.33)
<i>Tobin's Q</i>	0.071***	-0.008	-0.004	0.005	0.019**	-0.009	-0.026***	0.015*	-0.008	-0.014

	(0.00)	(0.21)	(0.69)	(0.57)	(0.02)	(0.23)	(0.00)	(0.05)	(0.21)	(0.33)
<i>Institutional ownership</i>	-0.430 (0.11)	0.140 (0.14)	0.104 (0.51)	-0.038 (0.65)			0.035 (0.80)	0.041 (0.68)	0.036 (0.78)	-0.124 (0.49)
Transaction Characteristics										
<i>Holding period (in years)</i>		-0.013 (0.33)	-0.060* (0.10)	0.013 (0.34)	-0.011 (0.54)	-0.010 (0.70)	-0.080** (0.01)	0.012 (0.50)	-0.058* (0.07)	0.030 (0.27)
<i>Private negotiated deal (dummy)</i>					-0.004 (0.93)	0.039 (0.59)	0.059 (0.61)	0.001 (0.97)	0.214** (0.04)	-0.020 (0.78)
<i>Percent of shares acquired</i>		0.001 (0.17)	0.004* (0.07)	0.000 (0.68)	0.001 (0.29)	0.002 (0.23)	0.006 (0.14)	0.001 (0.37)	0.003 (0.16)	-0.000 (0.98)
<i>Target and acquirer are in same industry (dummy)</i>	0.054 (0.63)	0.022 (0.58)	0.115 (0.12)	-0.008 (0.81)	0.036 (0.39)	0.065 (0.24)	-0.014 (0.84)	0.023 (0.56)	0.008 (0.90)	0.022 (0.72)
<i>Intercept</i>	0.151 (0.41)	0.279*** (0.00)	-0.017 (0.94)	-0.072 (0.58)	-0.134 (0.26)	-0.090 (0.54)	0.248 (0.21)	-0.191 (0.15)	0.075 (0.65)	-0.220 (0.13)
No of observations	495	495	207	288	250	245	112	383	155	165

Table 10
OLS Regression of Cumulative Abnormal Returns (-10, 10) Classified by Acquirers' Customer Status and Governance Activities

The sample consists of 511 acquisitions between 1984 and 2005. Initial sample of acquisition is obtained from Security Data Corporation (SDC) database. We first identify acquisition deals in which the acquirers initially held less than 5% of a target firm's outstanding shares and then purchased more than 5% but less than 100% of its outstanding shares. We exclude cases in which the acquirer is either an Employee Stock Ownership Plan or an Employee Benefits Trust and cases in which the acquirer is a group of investors, companies, individuals, or investment firms (i.e., more than one acquirer). We further exclude cases in which either the acquirer or the target is in financial (SIC 6000-6999) or utility (SIC 4900-4999) industry. We require that target firm is in Compustat and CRSP database and a public announcement date of the deal is available in Factiva, where the announcement date is the date that a news report first appears. We rely on annual report and news report from Factiva to identify customers of the target. First, we hand match all targets with Compustat Segment dataset and identify an acquirer as the target's customer when the acquirer is listed as one of the targets' customers within three fiscal years prior to the announcement date. We then search for the acquirer information in the target annual report and news report from Factiva and identify an acquirer as the target's customer if the 10k form or news report confirm that the target provide goods or service to the acquirer within three years prior to the announcement date. The dependent variable is cumulative abnormal return (-10, 10) for targets. We compute abnormal returns with market model, using 200 trading days of return data ending 21 days before the acquisition announcement date, with announcement date as the first date we identify a news report from Factiva. We use the CRSP equally weighted return as a proxy for market return. Information about director's industry experience is from Factiva, SEC 10-k form and the company website. We check the employment history of each director appointed by the acquirer and define a director to have target industry experience if he or she once served a company that is in the same industry with the target (at least to three digit). According to Klein (1998), complex firm may need more advisory. Following Guay (1999), we use three variables as the proxy for firm complexity: number of segments, log value of net sales and leverage. Following Guay (1999), for each observation, we calculate a factor score based on these three variables. We call this factor score "advisory needs" because it increase with firm complexity and hence and advisory needs. *p*-values are in parentheses. *p*-values are estimated using robust standard errors to adjust for heteroskedasticity (White (1980)) and industry clustering. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Independent variables	Total Sample				Deals with Director Appointed (after 1993)	
	(1)	(2)	(3)	(4)	(5)	(6)
Governance Activity						
<i>Acquirer is customer (dummy)</i>	0.066*				0.197***	
	(0.10)				(0.00)	
<i>Acquirer has representation in target board (dummy)</i>	-0.016					
	(0.64)					
<i>At least one acquirer representative in target board has experience in target industry (dummy)</i>					-0.002	
					(0.98)	
<i>Target experience forced turnover (dummy)</i>	-0.007					
	(0.79)					
<i>Acquirer is customer and target experience forced turnover (dummy)</i>		0.106**				
		(0.02)				
<i>No forced turnover in target firm (dummy)</i>		0.036				
		(0.18)				
<i>Acquirer is customer and has representation in target board (dummy)</i>			0.097**			
			(0.03)			
<i>No acquirer representation in target board (dummy)</i>			0.044			
			(0.24)			

<i>Acquirer is customer and has representation in target board and target experience forced turnover (dummy)</i>					0.118*** (0.00)	
<i>No acquirer representation in target board or no forced turnover in target firm (dummy)</i>					0.055 (0.21)	
<i>Acquirer is customer and at least one acquirer representative in target board has experience in target industry (dummy)</i>						0.171** (0.01)
<i>None of acquirer representatives has experience in target industry (dummy)</i>						0.046 (0.44)
<i>Acquirer has representation in target board (dummy)</i>					-0.015 (0.66)	
Target Characteristics						
<i>Log (total assets)</i>	-0.027*** (0.00)	-0.027*** (0.00)	-0.028*** (0.00)	-0.028*** (0.00)	-0.063*** (0.01)	-0.060** (0.01)
<i>Leverage</i>	0.072 (0.32)	0.072 (0.31)	0.079 (0.28)	0.073 (0.31)	0.185 (0.13)	0.143 (0.28)
<i>Tobin's Q</i>	-0.010*** (0.00)	-0.008*** (0.01)	-0.008*** (0.01)	-0.008** (0.01)	-0.021** (0.04)	-0.018* (0.10)
<i>Institutional ownership</i>	0.081** (0.04)	0.081** (0.03)	0.088** (0.03)	0.081** (0.03)	0.206*** (0.00)	0.184*** (0.00)
Transaction Characteristics						
<i>Holding period (in years)</i>	-0.004 (0.66)	-0.004 (0.70)	-0.001 (0.86)	-0.003 (0.76)	-0.056*** (0.01)	-0.043** (0.04)
<i>Private negotiated deal (dummy)</i>	-0.037 (0.20)	-0.030 (0.33)	-0.027 (0.37)	-0.029 (0.31)	-0.013 (0.90)	-0.029 (0.79)
<i>Percent of shares acquired</i>	0.000 (0.98)	-0.000 (0.93)	-0.000 (0.89)	-0.000 (0.83)	0.004*** (0.00)	0.004*** (0.00)
<i>Target is taken over by acquirer within 3 years (dummy)</i>	0.030 (0.49)	0.029 (0.50)	0.025 (0.55)	0.026 (0.53)	0.255* (0.09)	0.235 (0.10)
<i>Strategic alliance agreement between acquirer and target (dummy)</i>	-0.008 (0.77)	0.001 (0.97)	-0.003 (0.92)	0.002 (0.95)	0.115** (0.01)	0.120** (0.01)
<i>Target and acquirer are in same industry (dummy)</i>	0.038 (0.18)	0.040 (0.16)	0.035 (0.23)	0.039 (0.16)	0.037 (0.45)	0.038 (0.51)
<i>Intercept</i>	0.256*** (0.00)	0.225*** (0.00)	0.215*** (0.00)	0.204*** (0.01)	0.290 (0.18)	0.279 (0.29)
Adjusted R square	0.05	0.05	0.05	0.04	0.24	0.19
F-value	5.267***	6.65***	6.87***	8.792***	19.34***	6.35***
No of observations	495	495	495	495	114	114

Chapter three: Friendly board and innovation

Abstract

We examine how friendly directors affect firm innovation. We find that firms with friendly directors have more research and development expenditures and these investments translate into greater innovation. Specifically, firms with CEO-board social connections create more patents and have more citations than firms without CEO-board social connections. We also find that institutional origin of the social connection matters. While nonprofessional connections due to shared educational and non-business antecedents increase innovation, professional connections formed due to common prior employment have no impact on innovation. The positive effects of nonprofessional connections are more pronounced when firms have more R&D expenditure, when they have more advisory needs, when they operate in innovative industries, and when their outside directors have relevant industry expertise. Our results support a “friendly board” perspective in which directors are not merely monitors but also provide advice and counsel to CEOs.

1. Introduction

In corporate world, senior executives and boards of directors form an extensive network of social ties. These social ties may be developed from alumni networks, professional employment, or other activities such as country clubs and not-for-profit organizations. For example, Hwang and Kim (2009) find that among Fortune 100 firms, 87% of boards are conventionally independent³⁸, but that only 62% are conventionally and socially independent, highlighting the prevalence of social connection within the boardroom.

In this paper, we investigate the impact of CEO-director social ties on corporate innovation, focusing on connections developed from educational background, professional employment, and non-professional activities. We examine social connection in the context of innovation activity because as a crucial corporate outcome, innovation activity requires considerable communication and coordination during the decision-making process for directors and executives involved. The interactive nature of this decision-making processes makes social ties especially relevant for us to understand the advisory role of board of directors. Moreover, our research question is motivated by the observation that CEO-director social connection is prevalent in some very innovative companies. For example, Google Inc, one of the most innovative firms in the world, has its CEO and three other directors from Stanford University³⁹.

There are two competing views about the impact of social connections on innovation, namely, the view that CEO-director social ties facilitate information sharing between CEO and outside directors and improve innovation activity, and the view that these social ties will have negative impact on innovation activity due to less monitoring from friendly directors.

³⁸ Conventionally, a director is classified as independent if he/she has neither financial nor familial ties to the CEO or to the firm.

³⁹ “Why Stanford is celebrating the Google IPO”, *Wall Street Journal*, 23, August, 2004.

One hypothesis is that CEO-director social ties will enhance the flow of information, foster better environment for outside directors to perform their advisory role and thus have a positive impact on corporate innovation. Under this view, social ties reduce the barrier of information sharing, providing a means of efficient information exchange. For example, Cohen, Frazzini, and Malloy (2008) find that information is dispersed via educational networks between mutual fund managers and corporate boards. Schmidt (2010) finds that social ties are associated with higher bidder announcement returns when advisory needs are high. From a theoretical perspective, Adams and Ferreira (2007) provide a framework showing that top executive is more willing to share information with a “friendly” board. To the extent that boards with connected directors are more friendly to CEO, these results suggest that socially connected outside directors have better access to the company information, and are able to provide better advisory.

An alternative hypothesis is that social ties between top executives and outside directors will lead to less innovation activity due to poor board monitoring. For example, Ishii and Xuan (2011) show that between-firm social ties have a negative effect on the abnormal returns to the acquirer and to the combined entity upon merger announcement. Hwang and Kim (2009) find that firms with more connected outside directors award higher level of compensation, exhibit weaker pay performance sensitivity and weaker turnover-performance sensitivity. Fracassi and Tate (2008) document that CEO-director social ties limit the effectiveness of internal corporate governance. Firms with this connection are less likely to do company-prompted earnings restatements and perform more value destroying acquisitions.

We test these hypotheses by empirically estimating relationship between level of innovative activity and CEO-director social ties. We measure innovation by R&D expenditure, number of patent filed by each firm, and number of citations for each patent. More specifically, we use R&D expenditure to measure the input of innovation activity while the number of patent and number of citation to measure the output of innovation activity. We focus on

educational institutions, not-for-profit activities as well as employment history as the basis of the social networks. We further categorize social ties developed from these experiences into two types: *Facebook* type social ties are connections developed from nonprofessional activities such as education, country club, or not-for-profit organizations, while *LinkedIn* type social ties are connections developed from professional employment⁴⁰.

Using a sample of 32,937 firm year observations from 1990 to 2004, we find that social connections between CEO and outside directors are prevalent in US firms. For example, about 42.82% of our sample firms have social connection between the CEO and at least one outside director. Among them, about 27.82% of our sample firms have *Facebook* type social connection and 24.39% have *LinkedIn* type social connection. We also find that connected directors are more likely to be appointed to those board committees that perform advisory role. For example, in our sample 13.14% of *Facebook* type connected directors are appointed to advisory committee and only 8.62% of non *Facebook* type connected directors are appointed to advisory committees.

As the first experiment, we first examine whether social connections between CEO and outside director have impact on the R&D expenditure. We find that firms with CEO-director social connection invest more in R&D activity and the results hold for both *Facebook* type and *LinkedIn* type social connection.

We then examine the impact of CEO-director social connection on the outcome of innovation activity, as measured by the number of patent and the citation for each patent. We find that firms with social connection between CEO and outside director produce more patents

⁴⁰ *Facebook* is a social networking service and website launched in February 2004, operated and privately owned by Facebook, Inc. As of January 2011, *Facebook* has more than 600 million active users. *LinkedIn* is a business-oriented social networking site. Founded in December 2002 and launched in May 2003, it is mainly used for professional networking. As of 22 March 2011, *LinkedIn* reports more than 100 million registered users, spanning more than 200 countries and territories worldwide. We only use the word “*Facebook*” and “*LinkedIn*” as metaphors to describe their respective nonprofessional and professional nature. The director profile we use in this study is not extracted from these two website. Chidambaran, Kedia, and Prabhala (2010) use similar phrase to categorize two types of social connection.

and have more citations, suggesting that those firms have better innovation measured by the quantity and quality of their patent. More interestingly, we find that while *Facebook* type social connection have positive impact on innovation activity, *LinkedIn* type social connection does not have any impact on innovation activity-. These results suggest that the impact of social connection depend crucially on its institutional origin: while nonprofessional connections due to shared educational and non-business antecedents increase innovation, professional connections formed due to common prior employment have no impact on innovation.

Given our strong evidence from *Facebook* type social connection, we further test whether the impact of connection is more pronounced in industries where more opportunities for innovation are available. We define innovative industry as one where the average citation per patent for the industry is greater than the median average citation across all industries and divide the sample accordingly⁴¹. We find that the positive impact of *Facebook* type is significantly more pronounced in innovative industry.

We then examine the role of directors' industry experience. To the extent that directors are advising the firm with their industry expertise, we would expect that connected director would have more impact on innovation if they have industry experience. Our finding confirms this expectation.

We then turn to the cross sectional variation for the impact of social connection and examine whether the impact is more significant when firm have more advisory needs. We measure the advisory needs by R&D expenditure and the number of business segments and find that the positive impact of *Facebook* type social connection on innovation is more pronounced in firms with high advisory needs.

One potential issue to interpret our results is that social connection may capture the CEO ability. For example, to the extent that capable people attend better schools and have more

⁴¹ Our definition of innovative industry follows that of Hirshleifer, Low and Teoh (2010).

social interaction with others, CEOs with better innovation ability maybe more likely to have connection with their directors. To address this issue, we first include the Scholastic Assessment Test (SAT) score for the undergraduate school of CEOs as a proxy for their aptitude. We also use the founder status as another variable to control for the fact that founding CEO may have more impact on the innovation outcome of a company. We find that our results hold after including these two variables.

Finally, to mitigate potential endogeneity concerns and control for unobservable firm characteristics driving the results, we perform several robustness checks -- including an instrumental variables approach -- and find that our results are qualitatively unchanged.

Overall, our findings suggest that social connections between CEO and director have positive impact on firm innovation, especially when the connection is developed from shared educational and non-business antecedents. These findings support a “friendly board” perspective in which directors are not merely monitors but also provide advice and counsel to CEOs.

Our study contributes to the literature in at least three ways. First, it expands the literature on the role of social connection on corporate policy. There is an emerging literature examines the impact of CEO-director social ties on a variety of corporate outcome variables such as CEO turnover and compensation (Hwang and Kim, 2009), merger and acquisition performance (Ishii and Xuan, 2011), and investment behavior (Fracassi and Tate, 2008). This literature, however, has largely focused on the cost of connected directors due to their lack of monitoring to the top executive⁴². Little is known about the benefit that socially connected director can bring. By examining the impact of social connection on innovation, we document

⁴² The cost of social connection has also received considerable media coverage. For example, during Enron scandal, the company donated 1.6 million dollars to University of Texas M.D. Anderson cancer center, whose president John Mendelsohn was on Enron’s board as an “independent” director. (“Inside, outside Enron, audit panel is scrutinized: links to company of certain members are called too cozy”, *Wall Street Journal*, 1 February 2002).

the benefit that the connected director can bring to the company and indentify the circumstances when CEO-director social connection can add value.

Second, our paper extends the literature on the advisory role of boards. Although literatures on board of directors focus mainly on their monitoring role, there are a growing number of papers looking at their advisory. For example, Adams and Ferreira (2007) provide a theoretical analysis of the advisory role of “friendly” boards. In their model, how well the board performs advisory function depends on how much information executives and board members exchange. When directors are “friendly”, CEO is more willing to reveal private information. In the model of Harris and Raviv (2008), it is costly for outside board members to obtain inside information about the company. Uninformed outside directors cannot properly advise the CEO. Consequently, when the value of inside knowledge is high, shareholders will prefer to delegate control to insiders. These theoretical models suggest that board with friendly directors have better access to the inside information and could be beneficial to the firm, especially when the advisory role is crucial. By looking at the impact of CEO-director social ties on innovation activity, we provide direct evidence on the advising role of friendly directors.

Third, we contribute to the literature on corporate innovation. There is considerable evidence that corporate innovation is an important contributor of firm value⁴³ and a small but emerging literature considers the corporate finance implications of innovation in particular. For example, Atanasov (2008) examine how strong corporate governance proxied by the threat of hostile takeover affects innovation and find that firms incorporated in states that enact antitakeover laws create less patents and have less citations per patents than firms in states that do not enact these laws. Hirshleifer, Low and Teoh (2010) use options and press-based proxies for CEO overconfidence and find that firms with overconfident CEOs invest more in innovation, obtain more patents and patent citations, and achieve greater innovative

⁴³ Hall, Jaffe, and Trajtenberg (2001) provide a survey of recent study on corporate innovation.

success for given research and development (R&D) expenditure. By examining the CEO-director social connection as a determinant of innovation activity, we explore a new dimension that could have impact on the product of innovation.

The remainder of the paper proceeds as follows. Section 2 describes the data and sample characteristics, and measures for both innovation activity and CEO-director social connection. Section 3 provides results from various tests on the role of social connection on innovation activity. Section 4 presents results from additional tests that address endogeneity bias. Finally, we present summary and concluding remarks in Section 5.

2. Sample selection and measures of innovation and CEO-director social connection

We use several sources to construct our sample. Board information is extracted from Management Diagnostics Ltd's BoardEx database. BoardEx contains information on board structures as well as detailed profiles of more than 30,000 executives and board members. It has been used in several recent studies, such as Ferreira and Mato (2007), Cohen, Frazzini, and Mally (2008), and Schmidt (2009).

We match firm names in BoardEx to the universe of firms in Compustat/CRSP following approaches used in previous studies (Chidambaran, Kedia, and Prabhala, 2010; Ishii and Xuan, 2010; Kang and Kim, 2011). Specifically, we first match firm names in BoardEx to firms in Compustat and CRSP⁴⁴. Then, for each name matched, we verify the identity of the company by hand checking company websites, *Business Week* magazine, and Hoovers' databases⁴⁵.

We construct data for patent counts and patent citations using the 2006 edition of the NBER patent database (Hall, Jaffe, and Trajtenberg 2001). The database covers more than 3.2 million patent grants and 23.6 million patent citations from 1976 to 2006 and contains

⁴⁴ We use the SAS function *compged* to perform fuzzy string match.

⁴⁵ We thank Y. Han Kim for sharing the link table between BoardEx and Compustat.

information about names of patent assignee, the number of citations for each patent, the technology class of the patent, and other details. After matching with this patent data, our sample consist of 32,937 firms year observations from 1990 to 2004⁴⁶.

2.1. Measures of corporate innovation

We follow Hirshleifer, Low and Teoh (2010) and use three variables to measure corporate innovation activity. Our first measure is the R&D intensity calculated as the R&D expenditure divided by book assets. We code missing R&D expenditure values from Compustat as zero. We use this variable to measure firm's *input* for innovation activity.

We then use patent count for each firm in each year, to measure the *output* of innovation activity. Because patents are included in the database only if they are eventually granted and there is on average a two-year lag between patent application and patent grant, we restrict our sample period to end in 2004 to avoid any truncation bias of this variable.

However, simple count of patent may not distinguish groundbreaking innovations from incremental technological discoveries. For example, Griliches, Pakes, and Hall (1987) show that the value of patents is concentrated in a small number of patents with significant impact, and Hall, Jaffe, and Trajtenberg (2005) show that citations are related to firm value. To measure the significance and impact of innovative output, our third measure for innovation activity is the number of citations summed across all patents during a certain year for a firm. One issue of using the citation as a measure of innovation output is the truncation bias due to the finite length of sample: because citations accumulate many years after a patent is created, patents created in 2002 will have less time to accumulate citations than patents created in 1996.

⁴⁶ We stop our sample at 2004 to address the truncation bias in the patent data. Patents are included in the database only if they are eventually granted and there is on average a two-year lag between patent application and patent grant (Hall, Jaffe, and Trajtenberg 2001). Since the latest year in the database is 2006, patents applied after 2004 may not appear in the database.

To address this issue, we adjust the patent citation count of each patent using the weighting index (Hall, Jaffe, and Trajtenberg, 2005) provided in NBER patent database.

2.2. Measures of CEO-director social connection

We construct our connection measures based on both the nonprofessional and professional activity history of CEO and directors provided in the BoardEx database. Nonprofessional connections between CEOs and directors can arise from common educational background or common activity at not-for-profit institutions. To identify these connections, first for each director we extract names of her educational institutions from BoardEx and manually match the names of educational institutional, taking care of version of the names for the same school (for example, UCLA and University of California, Los Angeles). Following Ishii and Xuan (2010), we identify CEOs and directors as sharing an educational tie if they both obtained degrees from the educational institution. These degrees could be either undergraduate or graduate degrees. For example, two executives or directors who both attended Ohio State University would be classified as sharing a connection.

We also construct data for common activity by the CEO and director at not-for-profit organizations (trust, universities, clubs and other non-business associations). To identify social ties arising from these institutions, we extract names of institutions about “other activity” from BoardEx and excluding those professional or industry institutions (for example, American Bar Association). We then combine the connections arising from educational background and not-for-profit activity into *Facebook* type social connection.

We classify a CEO as having a professional connection with a director if both of them have been employed by a firm at the same time (excluding the service at the current firm). We refer to this type of connection as *LinkedIn* type social connection.

We categorize social connection into nonprofessional connection and professional connection to better understand the nature of social connection in boardroom. Compare to

professional connections, nonprofessional connections are less competitive in nature and more likely to facilitate interactions and thereby foster personal connections. Adams and Ferreira (2005) argue that management-friendly boards can be optimal to provide better advice. To the extent that CEOs are more willing to share information with their “friends”, we would expect that directors with nonprofessional connections will perform better in advising. Cohen, Frazzini, and Malloy (2007) use a similar approach, linking mutual-fund managers and corporate officers/directors “via shared education networks”. Using the same “Facebook” and “LinkedIn” type social connection based on their institutional origin, Chidambaran, Kedia and Prabhala (2010) study the propensity of firms to commit financial fraud and find that nonprofessional connection between CEO and director increase fraud probability, while professional connections decrease fraud.

2.3. Summary statistics

We report summary statistics in Table 1. In Panel A, we find that in 27.82% (24.39%) of our sample firms, CEO shares *Facebook (LinkedIn)* type social connection with at least one of the outside directors. Conditional on the existence of CEO-director social connection, on average 38% of outside directors is connected to the CEO. These results suggest that CEO-director social connections are prevalent across US firms.

Panel B of Table 1 provides summary statistics for firms with and without any type of CEO-director social connection. We find that the former firms have significantly more patent and more citations. For example, the mean value of number of patent for connected (unconnected) firm is 21.54 (7.12). For board and firm characteristics, we find that connected firms are larger, have larger board and more tangible assets, and more business segment.

In Table 2, we examine the committee member and industry experience of directors with and without the social connection to CEO. To examine whether a connected director’s committee membership is different from that of a nonconnected director, we classify directors’

committee assignments into two groups: committees that perform a monitoring role and committees that perform an advisory role. Following Klein (1998), we consider audit, compensation, and nominating/corporate governance committees as those that perform a monitoring role (monitoring committee), and executive, investment, and finance committees as those that perform an advisory role (advisory committee). Our result is reported in Panel A of Table 2. We find that connected directors are more likely to be appointed to perform advisory role while and non-connected director are more likely to be appointed to perform monitoring role.

Given that more connected director is performing an advisory role, it is important that the director have relevant industry expertise so that she could provide valuable insight during the decision making process. To examine this issue, we use director profile information from BoardEx and define a director as having industry experience if the director has working experience in the same Fama-French 48 industry. We report our findings Panel B of Table 2. We find that directors with *Facebook (LinkedIn)* type connection are more (less) likely to have industry experience than nonconnected directors. For example, 77.09% of directors with *Facebook* type connection to CEO have industry experience, while only 60.77% of directors without *Facebook* type connection to CEO have industry experience.

3. Role of social connection on innovation activity

In this section, we examine the role of CEO-director social connection on a firm's innovation activity, including the R&D expenditure, number of patent, and number of citations. To control for the truncation bias in patent data and the possible industry effect of patenting activity, we include in all regressions year and industry fixed effect.

3.1. Social connection and R&D expenditure

We first examine the impact of CEO-director social connection on the R&D expenditure as the input of innovation activity. The dependent variable is R&D expenditure scaled by book assets and we code missing values of R&D with zero. Our control variables follow that of Atanassov (2008) and Hirshleifer, Low and Teoh (2010). Specifically, we include Tobin's Q and ROA as the proxy for growth opportunity, and finance leverage as the proxy for financial constraint. We also include dummy variable for founder CEO, dummy variable for CEO-chairman duality and CEO tenure as proxies for CEO entrenchment. All independent variables are lagged by one year and we express the value of financial variables in 2004 dollars to adjust for the effect of inflation.

Our results are reported in Table 3. In model (1), we use "any type of social connection" as the social connection measure. We find that the coefficient on dummy variable "*any connection*" is 0.007 and highly significant, suggesting that firms with CEO-director connection have higher R&D expenditure.

In model (2) to (4), we use different types of CEO-director social connection as dependent variable and find similar results. To the extent that R&D expenditure measures input of innovation activity, our findings suggest that firms with CEO-director social connection invest more into innovation activity.

3.2. Social connection and firm innovation

To examine the role of social connections on the output of innovation activity, we examine whether firms with CEO-director connection generate more patent and citations in regression framework. The two dependent variables we use are the number of patents and number of citations. We measure citation by the total number of citation counts of all patents applied for during the year, where each patent's number of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account the truncation bias. Our control variables follow that of Hall and Ziedonis (2001) and Hirshleifer,

Low and Teoh (2010). All independent variables are lagged by one year and we express the value of financial variables in 2004 dollars to adjust for the effect of inflation.

Our results are reported in Table 4. In model (1) to model (4), we use the number of patent as dependent variable and include different types of social connection as the key dependent variable. In model (1), we find that firms with CEO-director social connection have significantly more patents, suggesting the positive impact of social connection on corporate innovation. In model (2) and (3), we use *Facebook* type connection and *LinkedIn* type connection respectively and find that only the former type has a positive impact on the number of patent. For example, the coefficient on connection dummy in model (2) is 0.206 and highly significant, while the coefficient on the connection dummy variable in model (3) is only 0.006 and is not statistically significant⁴⁷. In model (4) we include both types of social connection to estimate a horse-race type regression and find that only *Facebook* type connection has positive impact on innovation.

In the second set of results reported in the same table, we use the number of citation as the dependent variable and find similar results. Taken together, our findings suggest that firms with CEO-director social connection have better innovation measured by the quantity and quality of their patent. More interestingly, the impact of social connection on corporate innovation depends crucially on the institutional origin of the connection. While nonprofessional connections due to shared educational and non-business antecedents increase innovation, professional connections formed due to common prior employment have no impact on innovation.

3.3. *Effect of industry innovativeness*

⁴⁷ In untabulated test, we use alternative definition for LinkedIn type connection where the connected CEO and director are not required to work for the same employer at the same time. We find that LinkedIn type connection does not have significant impact on the innovation activity. For example, the coefficient on the connection dummy variable is 0.26, the p value is 0.39.

Given our strong evidence from the *Facebook* type social connection, we further test whether the impact of connection is more pronounced in industries where more opportunities for innovation are available. We define innovative industry as the industry where the average citation (adjusted for truncation bias) per patent is greater than the median average citation across all industries and divide the sample accordingly.

Our results are reported in Table 5. We find that the positive impact of *Facebook* type connection is significantly more pronounced in innovative industry. For example, coefficient on the connection dummy is 0.271 for firms in innovative industry and 0.066 for firms in non-innovative industry. In untabulated test, we find that the difference of these two coefficients is significant at 1% level.

3.4. Effect of director industry experience

Our next test examines the role of directors' industry experience. To the extent that the director is advising the firm with their industry expertise, we would expect that industry expertise has a positive impact on the relationship between social connection and corporate innovation.

Table 6 presents our results. In model (1), we use the log value of years of industry experience for all director as the key independent variable and find the coefficient on this variable significantly positive, suggesting that firms with more directors with industry expertise generate more patents. In model (2), we include the interaction term between the log value of year of experience with the dummy variable for *Facebook* type CEO-director social connection. We find that the interaction term is significantly positive, suggesting that the positive impact of *Facebook* connection is more pronounced when more directors have industry expertise. In model (3), we use only the year of industry experience from connected directors and interact this variable with the social connection dummy, we find that the

interaction term is positive and not statistically significant. Overall, our results suggest that the outside directors' industry expertise is an important contributor for their advising performance.

3.5. Effect of R&D expenditure level and firm complexity

We then examine whether the impact of connected director is more significant when firms have more advisory needs. We measure the advisory needs by R&D expenditure and the number of business segments.

The results are presented in Table 7. We find that the positive impact of *Facebook* type social connection on innovation is more pronounced in firms with high R&D expenditure and multiple business segments. For example, in model (1) (model (3)), the interaction term between *Facebook* type CEO-director social connection and R&D intensity (dummy variable for multi-segment firm) is significantly positive. To the extent that firms with high R&D expenditure and multiple business segments are more complex and need more advisory from their outside directors, our results suggests that the benefit of CEO-director social connection is more pronounced when advisory needs are high.

4. Additional test

4.1. CEO characteristics

One potential issue to interpret our results is that the *Facebook* type social connection may capture the CEO ability. For example, to the extent that capable people attend better schools and have more social interaction with others, CEOs with better innovation ability maybe more likely to have *Facebook* type connection with their directors. To address this issue, we first include the Scholastic Assessment Test (SAT) score for the undergraduate school of CEO as a proxy for their aptitude to examine the impact of social connections on

innovation⁴⁸. We also use the founder status as another variable to control for the fact that founding CEO may have more impact on the innovation outcome of a company.

Our results are reported in Panel A of Table 8. We find that our results do not change after including these two variables. For example, after control for SAT score of CEO's undergraduate school, the coefficient on the connection dummy is still significantly positive.

To further examine if our results are driven by other CEO characteristics such as level of entrenchment, in Panel B of Table 8, we include CEO founder status, CEO tenure, and CEO-chairman duality. We find similar results.

4.2. The endogeneity of board structure

If board structure and innovation activity are jointly determined by other firm characteristics, our regression estimated is subject to endogeneity problem. To mitigate this concern, we use an instrumental variables approach. The instrument variable we use is the number of members in the not-for-profit organization that the CEO attends. At one hand, CEOs attend larger not-for-profit organizations will have more interaction with others and are more likely to have social connection with outside directors of his company. At the other hand, CEO's organization membership does not have conclusive impact on the innovative activity.

Our results are reported in Table 9. In the first stage, we find that the coefficient on the number of CEO's organization is positive and significant, suggesting the validity of our instrument. In the second stage, we use the predicted value from first stage and find that the *Facebook* type social connection has positive impact on both the number of patent and number of citation.

4.3. Are directors matched to innovative firm?

⁴⁸ We thank Stephen Dimmock for sharing the SAT data.

If innovative opportunities are predictable, it is possible that firms will choose to optimally adjust their board structure before these opportunities arise. For example, firms anticipating a future increase in innovative activity are more likely to appoint socially connected directors and if this is indeed the case, we might detect a spurious relation between the presence of a CEO-director social connection and innovation. We apply two approaches to address this issue.

First, we replace the dummy variable for connected director with dummy variables for newly and non-newly appointed connected directors. We define newly (non-newly) appointed government directors as those whose tenure at the firm is below (above) 3 years⁴⁹. For non-newly appointed government directors, it is unlikely that their appointment is due to the anticipation of increase in innovation activity. Thus, the effect based on the above endogeneity concern should be more pronounced for newly appointed connected directors than for non-newly appointed connected directors.

Our results are reported in Panel A of Table 10. We find that the impact of social connection still holds for non-newly appointed director. For example, in model (2), the coefficient on the newly (non-newly) appointed director is a significant 0.136 (0.243). These results are do not support the board adjustment explanation.

As an alternative approach to address the endogeneity concern, we replace the dummy variable for connected director with dummy variables for connected director appointed before incumbent CEO assumes position and dummy variables for connected director appointed after incumbent CEO assumes position. To the extent that during his tenure the incumbent CEO has significant influence over the director appointment, we would expect that director appointment after incumbent CEO assumes position is more likely to be driven by the anticipated change of innovative opportunity. Our results are reported in Panel B of Table 10. We find that

⁴⁹ Median of director tenure is 3 years in our sample.

coefficient on both dummy variable are positive and significant, suggesting that both type of connected directors have positive impact on firms' innovation activity.

4.4 Proportion of connected directors

In the empirical analysis, we use dummy variable as proxy for the presence of CEO-director social connections. One potential concern is that a dummy variable may not be able to capture the strength of connection: firms with one connected director and firms with five connected directors are treated equally. As an alternative measure, in Table 11 we report results using the proportion of connected directors as our measure and repeat all analysis. We find that firms with higher proportion of *Facebook* type connected directors generate more patent and more citations for their patent.

4.5 Overlap time period of education experience

When defining social connection from education, we only require CEO and director attended the same school, without emphasizing common years of attendance. As a result, this definition of educational ties captures shared beliefs, common culture and a sense of belonging. However, one potential concern is that direct friendship effects may be reflected better in overlaps in both institutions and time period during education. To better understand the effect of connections and the channels through which they act, we use the refined definition of education tie that requires common year of attendance. Our results are report in Table 12.

We find that this refined social tie between CEO and director has significant impact on firms' R&D expenditure, number and patents, and number of citations. For example, in model (2) the coefficient on connection dummy variable is 0.089, significant at 5% level, suggesting that firms with CEO-director educational ties generate more patents.

5. Summary and Conclusion

In this paper, we document a positive impact of friendly board on innovation. Using the CEO-director social connection as the measure of board friendliness, we find that firms with friendly directors have higher research and development expenditures, create more patents and have more citations for their patents. The positive effects of friendly board on innovation activity is more pronounced in firms with more R&D expenditure, more advisory needs, from industries where innovation is more important, and when their outside directors have relevant industry expertise.

More interestingly, we find that institutional origin of the social connection matters. While nonprofessional connections due to shared educational and non-business antecedents increase innovation, professional connections formed due to common prior employment have no impact on innovation.

Overall, our results provide empirical evidence to support a “friendly board” perspective in which directors are not merely monitors but also provide advice and counsel to CEOs. We also identify an exact channel through which CEO-director social connection can add value.

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Table 1: Summary statistics

The sample consists of all non-financial and non-utility firms in Boardex from 1990 to 2004. To be included in the sample, firms are required to have accounting data from Compustat, patent data from the NBER patent dataset, and board data from Boardex. The sample consists of 32,937 firm-year observations. Detailed profile information from BoardEx is used to define social ties between the CEO and director. 1) Facebook connections are social ties developed from attending the same schools, clubs and not-for-profit (NFP) organizations; 2) LinkedIn connections are social ties developed from working previously in the same company as either an executive or director. Panel A shows summary statistics for different types of connection measure. Column one gives the percentage of firms with the various types of connections. Columns two to five give the distribution of the ratio of connected directors to outside directors for firms with the specific type of connection. Panel B shows means and medians of key variables used in the study for firms where the CEO has connection to at least one of the outside directors, and for firms without any connected directors. Variable definitions can be found in Appendix A. Two-sample t-tests (Wilcoxon-Mann-Whitney tests) are used to test whether the means (medians) of connected firm-years are significantly different from non-connected firm-years. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

Panel A: CEO ties to outside directors

Type of connection	Connected firms (%)	#Connected directors/#outside directors (type of connection = 1)			
		p25	Median	Mean	p75
Same school: a	15.64	0.17	0.25	0.29	0.33
Same NFP and clubs: b	17.51	0.15	0.25	0.28	0.33
Same previous employer as executive: c	12.90	0.17	0.20	0.27	0.33
Same previous employer as director: d	15.93	0.17	0.25	0.36	0.50
Same previous employer as executive/director: e	11.26	0.20	0.33	0.39	0.50
Facebook connection: a or b	27.82	0.17	0.25	0.32	0.40
LinkedIn connection: c, d, or e	24.39	0.17	0.25	0.35	0.50
Any type of a, b, c, d, or e	42.84	0.20	0.33	0.38	0.50

Panel B: Summary statistics by existence of any type of social connection

	Connected firm-years N=14,111		Non-connected firm-years N=18,826	
	Mean	Median	Mean	Median
<i>Dependent variables</i>				
R&D/Assets	0.06	0.01	0.07	0.00
Number of Patent	20.54	0.00	6.25***	0.00***
Number of Citation	134.90	0.00	39.13***	0.00***
Number of Citation without truncation adjustment	309.05	0.00	89.24***	0.00***
Tobin's Q	2.33	1.52	2.53***	1.56*
<i>Firm characteristics</i>				
Board size	7.82	7.00	5.97***	6.00***
Ratio of outside directors	0.74	0.77	0.66***	0.67***
Total asset	4711.13	478.17	1376.47***	135.37***
Asset tangibility	3.94	3.77	3.62***	3.48***
R&D/Assets _{t-1}	0.05	0.01	0.06	0.00
Innovative industry	0.67	--	0.66	--
Segments	2.11	1.00	1.75***	1.00

Table 2: Directors' committee membership and industry experience

This table presents frequency count for director committee membership and industry experience for the 174,011 outside directors in our sample. Panel A reports the percentage of directors sitting on advisory committees and monitoring committees. We classify audit, compensation, nominating, and corporate governance committees as monitoring committees and executive, finance, and investments committees are classified as advisory committees. Chi-sq tests are used to test whether there is any association between being connected to the CEO through Facebook ties (LinkedIn ties) and committee membership. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively. Panel B reports percentage of directors with industry experience for directors who are connected to the CEO via Facebook ties and those connected through LinkedIn ties. We use director profile information from BoardEx and define a director as having industry experience if the director has work experience in the same Fama-French 48 industry as the firm. In Panel C, we calculate the number of years the director has worked in the same industry and sum up the number of years of experience across the directors on the board. We report the distribution of total years of industry experience for directors with the different types of connection.

Panel A: Directors' committee membership

	Non-connected director	Connected director
<u>Facebook connection</u>		
Advisory committees	8.62%	13.14% ***
Monitoring committees	13.14%	80.65% ***
<u>LinkedIn connection</u>		
Advisory committees	8.51%	12.82% ***
Monitoring committees	87.43%	81.65% ***

Panel B: Directors' industry experience

	Non-connected director	Connected director
<u>Facebook connection</u>		
Experienced director	60.77%	77.09% ***
No experience director	39.23%	22.91% ***
<u>LinkedIn connection</u>		
Experienced director	61.58%	61.00% ***
No experience director	31.42%	31.00% ***

Panel C: Distribution of outside directors' industry experience at firm level

	N	p1	p25	p50	p75	p90	p99
Total years of experience of:							
All outside directors	32824	2	18	38	76	136	380
Outside directors with any connection	32824	0	0	0	0	9	80
Outside directors with Facebook connection	32824	0	0	0	0	0	64
Outside directors with LinkedIn connection	32824	0	0	0	0	0	43

Table 3: Social connection and R&D expenditure

The table presents results of regressions of research and development (R&D) expenditure on different types of connections. The dependent variable is R&D/Assets, missing values of R&D are coded with zero. Any connection is an indicator variable equals to one if the CEO is connected to at least one of the outside director through either a Facebook or LinkedIn tie, and zero otherwise. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. LinkedIn connection is an indicator variable equals to one if the CEO and at least one of the outside directors previously worked in the same company as either an executive or director, and zero otherwise. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	R&D/Assets,			
	(1)	(2)	(3)	(4)
Any connection	0.007*** (0.001)			
Facebook connection		0.006*** (0.008)		0.006** (0.010)
LinkedIn connection			0.005** (0.038)	0.005* (0.056)
Board size	0.001** (0.011)	0.001*** (0.009)	0.001*** (0.004)	0.001** (0.012)
Ratio of outside directors	0.045*** (0.000)	0.047*** (0.000)	0.048*** (0.000)	0.046*** (0.000)
CEO is the founder: dummy	0.004 (0.275)	0.004 (0.296)	0.004 (0.253)	0.004 (0.280)
CEO is the chairman: dummy	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)
CEO tenure	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Log(sales)	-0.013*** (0.000)	-0.013*** (0.000)	-0.013*** (0.000)	-0.013*** (0.000)
Asset tangibility	0.000 (0.946)	0.000 (0.875)	0.000 (0.890)	0.000 (0.930)
ROA	-0.017 (0.366)	-0.017 (0.364)	-0.017 (0.365)	-0.017 (0.365)
Tobin's Q	0.008*** (0.000)	0.007*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
Leverage	-0.019** (0.034)	-0.019** (0.035)	-0.019** (0.034)	-0.019** (0.035)
Observations	31611	31611	31611	31611
Adjusted R-squared	0.48	0.48	0.48	0.48
Year fixed effects	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y

Table 4: Social connection and firm innovation

The table presents results of regressions of firm innovation on different types of connections. Patent is the number of patents applied for during the year. Citation is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Any connection is an indicator variable equals to one if the CEO is connected to at least one of the outside director through either a Facebook or LinkedIn tie, and zero otherwise. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. LinkedIn connection is an indicator variable equals to one if the CEO and at least one of the outside directors previously worked in the same company as either an executive or director, and zero otherwise. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	Log(1+patent)				Log(1+citation)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Any connection	0.110*** (0.00)				0.165*** (0.00)			
Facebook connection		0.206*** (0.00)		0.206*** (0.00)		0.289*** (0.00)		0.289*** (0.00)
LinkedIn connection			0.006 (0.86)	-0.007 (0.82)			0.017 (0.75)	-0.002 (0.97)
Board size	0.033*** (0.00)	0.031*** (0.00)	0.035*** (0.00)	0.031*** (0.00)	0.036*** (0.00)	0.033*** (0.00)	0.040*** (0.00)	0.033*** (0.00)
Ratio of outside directors	0.071 (0.47)	0.052 (0.59)	0.128 (0.19)	0.054 (0.58)	0.328** (0.04)	0.308** (0.05)	0.411*** (0.01)	0.309** (0.05)
Log(sales)	0.252*** (0.00)	0.248*** (0.00)	0.256*** (0.00)	0.248*** (0.00)	0.373*** (0.00)	0.367*** (0.00)	0.377*** (0.00)	0.367*** (0.00)
R&D/Assets _{<i>t-1</i>}	2.016*** (0.00)	2.009*** (0.00)	2.032*** (0.00)	2.010*** (0.00)	3.430*** (0.00)	3.423*** (0.00)	3.454*** (0.00)	3.423*** (0.00)
Asset tangibility	0.117*** (0.00)	0.118*** (0.00)	0.119*** (0.00)	0.118*** (0.00)	0.181*** (0.00)	0.182*** (0.00)	0.184*** (0.00)	0.182*** (0.00)
Observations	31959	31959	31959	31959	31959	31959	31959	31959
Adjusted R-squared	0.39	0.40	0.39	0.40	0.37	0.37	0.36	0.37
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y

Table 5: Effect of industry innovativeness

The table presents results of regressions of firm innovation on different types of connections where firms are classified based on whether they belong to an innovative industry or not. An innovative industry is one where the average citation (adjusted for truncation bias) per patent for the industry is greater than the median average citation across all industries. Innovative industry is lagged by one year. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. All independent variables are lagged by one year. Definitions of other variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	Innovative industry		Non-innovative industry	
	(1)	(2)	(1)	(2)
	Log(1+patent)	Log(1+citation)	Log(1+patent)	Log(1+citation)
Facebook connection	0.271*** (0.00)	0.377*** (0.00)	0.066** (0.01)	0.102** (0.04)
Board size	0.044*** (0.00)	0.050*** (0.00)	0.016** (0.02)	0.016 (0.11)
Ratio of outside directors	0.195 (0.13)	0.588 (0.12)	-0.054 (0.52)	0.033 (0.81)
Log(sales)	0.326*** (0.00)	0.467*** (0.00)	0.085*** (0.00)	0.149*** (0.00)
R&D/Assets _{<i>t-1</i>}	2.430*** (0.00)	3.988*** (0.00)	3.992*** (0.00)	7.378*** (0.00)
Asset tangibility	0.176*** (0.00)	0.281*** (0.00)	-0.015 (0.16)	-0.028 (0.17)
Observations	21413	21413	10546	10546
Adjusted R-squared	0.43	0.39	0.18	0.16
Year fixed effects	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y

Table 6: Effect of director industry experience

The table examines the effect of director industry experience on the relation between social connections and firm innovation. A director is considered to have industry experience if she has worked in the same Fama-French 48 industry before. The numbers of years that each director has worked in the same industry is aggregated across all outside directors (all directors who are connected to the CEO through a Facebook tie). In the regressions, to make the coefficients on Facebook connection easier to interpret, we use the number of years of experience net of the median number of years across the sample. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. All independent variables are lagged by one year. Definition of other variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	Log(1+patent)			Log(1+citation)		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(1+yrs of exp - all outside directors): a	0.061*** (0.00)	0.008 (0.62)		0.103*** (0.00)	0.028 (0.30)	
Facebook connection: b		0.177*** (0.00)	0.177*** (0.00)		0.243*** (0.00)	0.259*** (0.00)
a*b		0.185*** (0.00)			0.267*** (0.00)	
Log(1+yrs of exp - Facebook connected directors)			0.031 (0.17)			0.029 (0.37)
Board size	0.026*** (0.00)	0.020** (0.02)	0.031*** (0.00)	0.024** (0.05)	0.016 (0.18)	0.034*** (0.00)
Ratio of outside directors	0.220** (0.03)	0.147 (0.14)	0.041 (0.67)	0.565*** (0.00)	0.465*** (0.00)	0.281* (0.06)
Log(sales)	0.252*** (0.00)	0.243*** (0.00)	0.249*** (0.00)	0.372*** (0.00)	0.359*** (0.00)	0.369*** (0.00)
R&D/Assets _{<i>t-1</i>}	2.030*** (0.00)	1.981*** (0.00)	2.012*** (0.00)	3.452*** (0.00)	3.384*** (0.00)	3.434*** (0.00)
Asset tangibility	0.122*** (0.00)	0.119*** (0.00)	0.119*** (0.00)	0.188*** (0.00)	0.184*** (0.00)	0.185*** (0.00)
Observations	31851	31851	31851	31851	31851	31851
Adjusted R-squared	0.40	0.41	0.40	0.37	0.37	0.37
Year fixed effects	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y

Table 7: Effect of R&D expenditure level and firm complexity

The table examines the effect of research and development (R&D) level and firm complexity on the relation between social connections and firm innovation. Firm complexity is measured using an indicator variable which equals to one if the firm has more than one business segment as reported in the Compustat segment files, and zero otherwise. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	Log(1+patent) (1)	Log(1+citation) (2)	Log(1+patent) (3)	Log(1+citation) (4)
Facebook connection : a	0.150*** (0.00)	0.226*** (0.00)	0.111*** (0.00)	0.183*** (0.01)
R&D/Assets _{<i>t-1</i>} : b	1.815*** (0.00)	3.176*** (0.00)	2.000*** (0.00)	3.399*** (0.00)
Multi-segment dummy: c			-0.015 (0.57)	-0.047 (0.29)
a*b	1.189*** (0.00)	1.494*** (0.00)		
a*c			0.232*** (0.00)	0.278*** (0.00)
Board size	0.031*** (0.00)	0.034*** (0.00)	0.029*** (0.00)	0.032*** (0.00)
Ratio of outside directors	0.052 (0.60)	0.305** (0.05)	0.049 (0.61)	0.303* (0.05)
Log(sales)	0.249*** (0.00)	0.368*** (0.00)	0.245*** (0.00)	0.365*** (0.00)
Asset tangibility	0.119*** (0.00)	0.184*** (0.00)	0.119*** (0.00)	0.183*** (0.00)
Observations	31959	31959	31959	31959
Adjusted R-squared	0.40	0.37	0.40	0.37
Year fixed effects	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y

Table 8: Controlling for CEO characteristics

The table presents results of regressions of firm innovation on different types of connections, controlling for CEO characteristics. CEO intelligence is proxied using the SAT score of the college he attended as an undergraduate. CEO founder status is obtained from Boardex and is an indicator variable equals to one if the CEO is also the founder, and zero otherwise. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

Panel A						
	R&D/Assets _{<i>t</i>}	Log(1+patent)	Log(1+citation)	R&D/Assets _{<i>t</i>}	Log(1+patent)	Log(1+citation)
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Facebook type connection	0.004 (0.31)	0.210*** (0.00)	0.296*** (0.00)	0.009*** (0.00)	0.212*** (0.00)	0.301*** (0.00)
Log (SAT score of CEO college)	0.028** (0.05)	-0.091 (0.60)	-0.177 (0.53)			
CEO is founder				-0.001 (0.81)	0.089** (0.01)	0.186*** (0.00)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
In previous tables						
Observations	14540	14702	14702	31611	31959	31959
Adj R-squared	0.45	0.43	0.40	0.41	0.40	0.37
Year fixed effects	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y

Panel B			
VARIABLES	R&D/Assets _{<i>t</i>}	Log(1+patent)	Log(1+citation)
	(1)	(2)	(3)
Facebook type connection	0.011*** (0.000)	0.212*** (0.000)	0.302*** (0.000)
CEO is founder: dummy	0.006 (0.121)	0.113*** (0.002)	0.229*** (0.000)
CEO is chairman: dummy	-0.008*** (0.001)	0.047* (0.058)	0.060 (0.137)
CEO tenure	-0.001*** (0.000)	-0.006*** (0.001)	-0.011*** (0.001)
Other control variables In previous tables	Yes	Yes	Yes
Observations	31,611	31,959	31,959
Adj R-squared	0.42	0.40	0.37
Year fixed effects	Y	Y	Y
Industry fixed effects	Y	Y	Y

Table 9: Two stage least squares (2SLS) regressions: social connection and firm innovation

The table presents results from 2SLS regressions of firm innovation on Facebook connections. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. The instrumental variable for Facebook connection is the total number of members from the clubs and not-for-profit (NFP) organizations which the CEO is a member of. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Panel A shows the results of 2SLS, where the first stage is estimated using a linear probability model. Panel B shows the results of 2SLS, where the first stage is estimated using a probit model. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. P-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	1st stage	2 nd stage	
		Log(1+patent)	Log(1+citation)
Facebook connection (instrumented)		0.608*** (0.00)	0.932*** (0.00)
Board size	0.021*** (0.00)	0.021** (0.01)	0.019 (0.11)
Ratio of outside directors	0.285*** (0.00)	-0.096 (0.35)	0.070 (0.68)
Log(sales)	0.014*** (0.00)	0.234*** (0.00)	0.345*** (0.00)
R&D/Assets _{<i>t-1</i>}	0.082* (0.05)	1.943*** (0.00)	3.318*** (0.00)
Asset tangibility	-0.002 (0.72)	0.116*** (0.00)	0.179*** (0.00)
Instrument: Log(# of member from CEO's clubs)	0.059*** (0.00)		
Observations	31959	31959	31959
Adjusted R-squared	0.23	0.38	0.35
Year fixed effects	Y	Y	Y
Industry fixed effects	Y	Y	Y

Table 10: Are directors matched to innovative firms?

The table shows results where directors are differentiated based on their tenure. Newly hired directors are those with tenure less than or equal to 3 years. Facebook connection with newly-hired (non-newly-hired) director is an indicator variable which is equals to one if the CEO is connected to at least one newly-hired (non-newly-hired) director through a Facebook tie, and zero otherwise. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. All other independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

Panel A			
VARIABLES	R&D/Assets, (1)	Log(1+patent) (2)	Log(1+citation) (3)
Facebook connection with newly-hired director	0.009*** (0.00)	0.136*** (0.00)	0.157*** (0.00)
Facebook connection with non-newly-hired Director	0.005** (0.04)	0.243*** (0.00)	0.363*** (0.00)
Board size	0.002*** (0.00)	0.029*** (0.00)	0.031*** (0.00)
Ratio of outside directors	0.050*** (0.00)	0.033 (0.73)	0.283* (0.07)
Log(sales)	-0.016*** (0.00)	0.246*** (0.00)	0.365*** (0.00)
R&D/Assets _{<i>t-1</i>}		1.998*** (0.00)	3.408*** (0.00)
Asset tangibility	-0.002 (0.18)	0.118*** (0.00)	0.182*** (0.00)
Observations	31611	31959	31959
Adjusted R-squared	0.41	0.40	0.37
Year fixed effects	Y	Y	Y
Industry fixed effects	Y	Y	Y
Panel B:			
VARIABLES	R&D/Assets, (1)	Log(1+patent) (2)	Log(1+citation) (3)
<i>Facebook</i> connection with director appointed before incumbent CEO	0.010*** (0.002)	0.295*** (0.000)	0.424*** (0.000)
<i>Facebook</i> connection with director appointed after incumbent CEO	0.007*** (0.008)	0.143*** (0.001)	0.212*** (0.001)
Observations	31611	31959	31959
Adjusted R-squared	0.42	0.40	0.36
Year fixed effects	Y	Y	Y
Industry fixed effects	Y	Y	Y

Table 11: Social connection and firm innovation

The table presents results of regressions of firm innovation on different types of connections. Patent is the number of patents applied for during the year. Citation is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. Any connection is an indicator variable equals to one if the CEO is connected to at least one of the outside director through either a Facebook or LinkedIn tie, and zero otherwise. Facebook connection is an indicator variable equals to one if the CEO attended the same school, club, and/ or not-for-profit (NFP) organizations with at least one of the outside directors, and zero otherwise. LinkedIn connection is an indicator variable equals to one if the CEO and at least one of the outside directors previously worked in the same company as either an executive or director, and zero otherwise. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	Log(1+patent)				Log(1+citation)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Proportion of directors with any connection	0.246*** (0.000)				0.350*** (0.001)			
Proportion of directors with <i>Facebook</i> connection		0.490*** (0.000)		0.494*** (0.000)		0.674*** (0.000)		0.678*** (0.000)
Proportion of directors with <i>LinkedIn</i> connection			-0.042 (0.528)	-0.073 (0.274)			-0.031 (0.788)	-0.073 (0.523)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31959	31959	31959	31959	31959	31959	31959	31959
Adjusted R-squared	0.40	0.40	0.39	0.40	0.37	0.37	0.36	0.37
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y

Table 12: Using refined definition of educational tie

The table presents results of regressions of firm innovation on educational tie between CEO and outside directors. Patent is the number of patents applied for during the year. Citation count is the total number of citation counts of all patents applied for during the year, where each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005) to take into account truncation bias. CEO-director educational tie is an indicator variable equals to one if the CEO attended the same school with at least one of the outside directors at the same time period, and zero otherwise. All independent variables are lagged by one year. Definitions of the variables are described in Appendix A. Firm sales is expressed in 2004 million of dollars. All regressions include year and industry fixed effects, defined based on Fama-French 48 industry groupings. Standard errors are clustered at the firm level. *P*-values are reported in parentheses. *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

	R&D/Assets _{<i>t-1</i>}	Log(1+patent)	Log(1+citation)
VARIABLES	(1)	(2)	(3)
CEO-director	0.008**	0.089**	0.128*
educational tie	(0.02)	(0.04)	(0.06)
Board size	0.002***	0.035***	0.039***
	(0.00)	(0.00)	(0.00)
Ratio of outside directors	0.052***	0.114	0.395**
	(0.00)	(0.24)	(0.01)
Log(sales)	-0.016***	0.255***	0.377***
	(0.00)	(0.00)	(0.00)
R&D/Assets _{<i>t-1</i>}		2.025***	3.444***
		(0.00)	(0.00)
Asset tangibility	-0.002	0.120***	0.185***
	(0.19)	(0.00)	(0.00)
Observations	31611	31959	31959
Adjusted R-squared	0.41	0.39	0.36
Year fixed effects	Y	Y	Y
Industry fixed effects	Y	Y	Y

Appendix

This appendix defines the variables used in the study. Accounting data is from Compustat, patent data is from the NBER patent dataset, and board structure data from Boardex. We define two types of social connection between the CEO and each outside director which distinguishes connections of personal nature from that of a professional nature: Facebook connection and LinkedIn connection. Facebook connections are social ties developed from attending the same schools, clubs and not-for-profit (NFP) organizations. For school connections, we require that the CEO and directors graduated within 4 years of each other. When defining connections based on club and NFP membership, we delete those professional organizations such as American Bar Association, American Institute of Certified Public Accountants, where members of the organization are unlikely to have any personal interaction at all. LinkedIn connections are social ties developed from working previously in the same company as either an executive or director. We also require that the CEO and director overlap for at least one year in the company.

Variable	Description
<i>Dependent variables</i>	
Patent	# of patents applied for during the year
Citation	# of citations summed across all patents applied for during the year. Each patent's no. of citations is multiplied by the weighting index from Hall, Jaffe, and Trajtenberg (2001, 2005)
R&D/Assets _{<i>t</i>}	Research and development expenditures scaled by book assets. Missing values are coded with zero
Tobin's Q	(Assets – book equity + market value of equity-deferred taxes) / assets
<i>Connection variables</i>	
Facebook connection	Indicator variable equals to one if at least one of the outside director attends the same educational institutions, clubs, and/ or NFP organizations as the CEO, and zero otherwise
LinkedIn connection	Indicator variable equals to one if at least one of the outside director and the CEO previously works in the same company as either an executive or director, and zero otherwise
<i>Firm characteristics</i>	
Board size	Number of directors on the board
Ratio of outside director	# of outside director/board size
Sales	Firm sales in millions of 2004 dollars
Asset tangibility	Natural logarithm of the ratio of net property, plant, and equipment in millions of 2004 dollars to number of employees in thousands
R&D/Assets _{<i>t-1</i>}	Research and development expenditures scaled by book assets. Missing values are coded with zero
Innovative industry	Indicator variable equals to one if the firm is in an industry where the average citation (adjusted for truncation bias) per patent for the industry is greater than the median average citation across all industries, and zero otherwise
Segments	Number of business segments reported by the firm