



Board independence and corporate investments

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ABSTRACT

This research investigates whether and how board independence influences corporate investment decisions in a Seemingly Unrelated Regression (SUR) framework, where the capital investment and the research and development (R&D) investment are examined simultaneously. We argue that the free cash flow problem primarily inflicts capital investments, while the managerial conservatism mainly undercuts the more risky R&D investments. Consistent with independent board mitigating both agency problems, we find that firms with a higher degree of board independence is negatively associated with capital investments but positively associated with R&D investments, after controlling for common determinants of investments. We address the endogeneity of board independence by exploiting an exogenous change in board structure brought about by the Sarbanes–Oxley Act (SOX) and continue to find consistent results.

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1. Introduction

There has been heightened attention to the corporate governance issues among both policymakers and academics since the Enron scandal in 2001 and the subprime crisis in 2008. To address these issues, a frequent recipe is to enhance the independence of company boards. The Sarbanes–Oxley Act of 2002 (hereafter, SOX), for example, mandated that a majority of board members be independent and all audit committee members be independent; the Dodd–Frank Act of 2010 went further to require that compensation committees consist of only outside directors. In this background, [Bebchuk and Weisbach \(2012\)](#) point out, “given the growing importance of independent directors, ... it is important to study empirically the effects of director independence.” (Page 329).

Surprisingly, while how various corporate governance mechanisms influence firm value and corporate activities has been intensively examined, empirical evidence on the relation between board independence and corporate investments, often viewed as the most important value driver for a business, is scarce and inconclusive. In this paper, we take on the issue to investigate, in a unified framework, whether and how

board independence affects a firm's investments in both physical and knowledge assets, i.e., capital investments and R&D investments.

Economic theory suggests that capital investments and R&D investments are driven by similar considerations, and that one could use the present value of future cash flow streams to evaluate the desirability of either investment. The *q* theory holds that in a frictionless world, investment should be determined only by *q*, a measure of growth opportunities ([Tobin, 1969](#)). In an imperfect world, however, agency problems often cause a firm's investments to deviate from the optimal levels dictated by the *q* theory. In particular, the separation of ownership and management could give rise to the free cash flow problem and excessive conservatism in investments. On one hand, a self-serving manager tends to make investments beyond the optimal level to harvest the private benefits of empire building when free cash flows are available (e.g., [Jensen, 1986](#); [Stulz, 1990](#)). On the other hand, an incentive for the manager, who is less diversified and hence more risk-averse than shareholders, to protect his wealth and career creates excessive avoidance of risky investments, leading to underinvestment (e.g., [Amihud & Lev, 1981](#); [Hirshleifer & Thakor, 1992](#)).

Two major differences exist between capital and R&D investments. First, capital investments bring about tangible assets that end up in balance sheets and increase total book assets. R&D investments, in contrast, are treated as expenses under the current accounting standards and typically do not raise a firm's book assets. Second, the

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future cash flow stream resulting from an R&D project is subject to greater uncertainty compared to an investment in plant and equipment, making the former more risky (e.g., Ben-Zion, 1984; Bhagat & Welch, 1995; Kothari, Laguerre, & Leone, 2002). These differences could have profound implications on a firm's investment decisions when conflicts of interest exist between the manager and shareholders. We postulate that the free cash flow problem is relevant primarily for a firm's capital investments but not R&D investments because only the former result in a larger firm with more physical assets and all the private benefits that come with it. Managerial conservatism, in contrast, would be more likely to undercut R&D investments because they are more risky than capital investments. In other words, firms tend to overinvest in physical assets but underinvest in R&D.

An independent board of directors, acting in the interests of shareholders, is expected to mitigate both the free cash flow problem and managerial conservatism, and hence their distortions in corporate investments. Thus, we hypothesize that greater board independence is associated with lower capital investments and higher R&D investments.

We measure board independence by three board attributes: the separation of a firm's CEO and board Chairman (e.g., Fama & Jensen, 1983), the percentage of outside directors on a board (e.g., Weisbach, 1988), and the independence of nominating committee in terms of whether the CEO is involved in director nomination (e.g., Carcello, Neal, Palmrose, & Scholz, 2011). We also conduct principal component analysis of the above board attributes to create an aggregate measure of board independence. In a sample of U.S. firms during 1999–2009, we find that overall, a firm with a more independent board makes lower capital investment and higher R&D investment. The effect is economically significant: in terms of the aggregate board independence, a one-standard-deviation improvement in board independence is associated with a decrease of 0.179 percentage point in the capital-investment-to-asset ratio and an increase of 0.129 percentage point in the R&D-to-asset ratio.

The investigation of investment decisions is susceptible to the endogeneity problem because the observed level of board independence may be the result of managerial entrenchment (e.g., Hermalin and Weisbach, 1988). The passage of SOX in 2002 provides an opportunity to address this issue because it represents an exogenous shock to board independence for some but not all firms, thus allowing us to double check the relation between board independence and investments. A fraction of our sample firms already had a majority of independent directors even before the passage of the SOX, but the rest were forced to increase their board independence following the SOX. We show that, as initially SOX-compliant firms invest less post-SOX in both capital and R&D assets, initially non-compliant firms cut their capital investments more, but slightly increase their R&D investments. The differences-in-difference in capital and R&D investments are both statistically significant after control variables are brought in. This suggests that, after controlling for factors that underlie common changes in investments for both types of firms, the exogenous improvement in board independence of initially noncompliant firms brings about lower capital investments and greater R&D investments, consistent with our expectation.

Different from the earlier research on corporate investments, we analyze a firm's capital and R&D investments simultaneously in a Seemingly Unrelated Regression (SUR) system. In the real world, both investments contribute to firm growth and performance, and their decisions are made in the same budgeting process and under the same financial constraints, thus the SUR specification confers the advantage of increased estimation efficiency compared to examining the two types of investments separately.² In addition, the mere contrast

² Most of the literature investigates capital investment only or R&D investment only. A few, such as Coles et al. (2006), Harford et al. (2008), and Brown and Petersen (2009), consider both investments but examine them separately without treating them as interrelated decisions.

between the effect of board independence on capital investments and that on R&D investments provides evidence of the coexistence of the free cash flow problem and managerial conservatism, the two forms of manager–shareholders conflicts of interest that have opposite implications on corporate investments.

The rest of this paper proceeds as follows. Section 2 reviews the related literature. Section 3 describes our data and methodology. Results are reported in Section 4. Section 5 concludes.

2. Literature review and hypothesis

2.1. Agency problems in corporate investment decisions

Existing literature proposes that conflicts of interest between the manager and shareholders could distort a firm's investment decisions upwardly or downwardly.³ On one hand, the free cash flow theory (e.g., Jensen, 1986; Stulz, 1990) suggests that a self-interested manager tends to expand the size of the firm beyond the optimal level to acquire higher managerial power, social status, compensation, perquisites and other private benefits. As a result, the managerial objective may be growth rather than value. The examples of this empire-building tendency include suboptimally high level of acquisition as well as capital expenditures by poorly monitored managers (e.g., Harford, 1999; Lang, Stulz, & Walkling, 1991). On the other hand, underinvestment could result from managerial conservatism. To the extent that managers are undiversified with respect to firm-specific wealth, they are exposed to more risk than diversified shareholders, leading to underinvestment in risky projects (Amihud & Lev, 1981; Smith & Stulz, 1985). Hirshleifer and Thakor (1992) hold a similar view that the desire of managers to build their reputations gives rise to avoidance of risky investments, “thereby aligning managers' interests with those of bondholders” instead of shareholders.⁴

Given different characteristics of capital investment and R&D investment, the above agency problems would have different implications for the two types of investments. First, in contrast to capital investments, R&D investments are “intangible” that typically do not increase the firms' book assets under the current accounting rules. Second, R&D projects are more risky than capital investments because future cash flows resulted from R&D projects that are far more uncertain (e.g., Ben-Zion, 1984; Bhagat & Welch, 1995; Kothari et al., 2002). As a result, a R&D-intensive firm has greater risk of failure, posing a high risk for the manager's wealth and career. Besides, R&D projects are harder to evaluate and oversee and it only generates cash flows in the long run (Thakor, 1993). To managers, this means greater efforts but less immediate benefits. It follows that a self-interested manager would invest excessively in property, plant and equipment rather than R&D because only the former leads to a larger firm and more resources under control. Instead, he would refrain from investing in R&D projects because they are more likely to jeopardize his wealth and career. Therefore, we argue that the free cash flow problem is more relevant for capital investment, causing overinvestment, and managerial conservatism is more relevant for R&D investment, causing underinvestment.

³ Conflicts of interest between shareholders and debtholders could also distort investments. Our focus in this paper, though, is conflict between the manager the shareholders given that board of directors is a corporate governance mechanism designed to align the interests of the manager and shareholders.

⁴ Underinvestment can also arise simply because the manager faces a private cost of undertaking investment projects. For instance, Aggarwal and Samwick (2006) argue that CEOs underinvest to avoid privately costly effort into screening new investments and responsibility for oversight of undertaken projects. Likewise, Bertrand and Mullainathan (2003) suggest that entrenched CEOs prefer to enjoy the quiet life to avoid all the efforts associated with investment activities. A lazy manager would behave just like a conservative one to undercut R&D investments rather than capital investments because R&D projects are harder to evaluate and oversee.

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